



## EVIDENCE FOR THE WORK/OCCUPATION AND SYSTEMIC HYPERTENSION INTERRELATIONSHIP: AN INTEGRATIVE REVIEW

*Evidências da interrelação trabalho/ocupação e hipertensão arterial sistêmica: uma revisão integrativa*

*Evidencias de la interrelación del trabajo/ocupación y la hipertensión arterial sistémica: una revisión integrativa*

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### ABSTRACT

**Objective:** To identify in the literature evidence for the interrelationship between work/occupation and the onset of arterial hypertension.

**Methods:** This is an integrative review. The databases used were: Latin American and Caribbean Health Sciences (LILACS) and Scientific Electronic Library Online (SciELO). There were 11 studies that met the search criteria. The analysis and synthesis of data were conducted in a descriptive way, and then the value of evidence adopted for elaboration of the integrative review was described. **Results:** After an integrative review of articles, value III was observed in almost all studies, which demonstrates intermediate evidence for the relation between work and the development of hypertension. **Conclusion:** Despite being addressed by a few studies, the deleterious effects of the work/occupation on the onset of systemic arterial hypertension were identified.

**Descriptors:** Hypertension; Occupational Health; Working Conditions.

### RESUMO

**Objetivo:** Identificar evidências na literatura da interrelação entre trabalho/ocupação e o aparecimento da hipertensão arterial sistêmica.

**Métodos:** Trata-se de uma revisão integrativa. As bases de dados utilizadas foram: Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) e Scientific Electronic Library Online (SciELO). Foram encontrados 11 estudos que contemplavam os critérios da pesquisa. Realizou-se a análise e síntese dos dados de forma descritiva e, em seguida, descreveu-se o valor das evidências adotadas para a elaboração da revisão integrativa. **Resultados:** Após revisão integrativa dos artigos, o valor III foi observado em quase a totalidade dos estudos, o que demonstra evidências intermediárias da relação do trabalho com o desenvolvimento da hipertensão. **Conclusão:** Embora abordado por poucos estudos, identificou-se os efeitos deletérios do trabalho/ocupação no aparecimento da hipertensão arterial sistêmica.

**Descritores:** Hipertensão; Saúde do Trabalhador; Condições de Trabalho.

### RESUMEN

**Objetivo:** Identificar en la literatura las evidencias que existen sobre la relación entre el trabajo y/o ocupación y la Hipertensión Arterial Sistémica. **Métodos:** Se trata de una revisión integrativa. Las bases de datos utilizadas fueron: Literatura Latino Americana y del Caribe en Ciencias de la Salud – LILACS y Scientific Electronic Library Online – SciELO. Se encontraron 11 estudios que cumplían con los criterios de la investigación. Se realizó un análisis y síntesis de los datos de modo descriptivo y en seguida se describió el valor de las evidencias adoptadas para la elaboración de la revisión integrativa. **Resultados:** El valor III fue observado en casi la totalidad de los estudios después de la revisión integrativa lo que demuestra evidencias intermedias de la relación del trabajo y el desarrollo de la hipertensión. **Conclusión:** Aunque pocos estudios hayan sido incluidos se pudo identificar los efectos deletéreos del trabajo y/o ocupación para la aparición de la Hipertensión Arterial Sistémica.

**Descriptores:** Hipertensión; Salud Laboral; Condiciones de Trabajo.



## INTRODUCTION

Systemic arterial hypertension (SAH) is a multifactorial clinical condition characterized by increased and sustained blood pressure levels. It is frequently associated with functional and/or structural changes in target organs and with metabolic alterations, having as consequence increased risk of fatal or non-fatal complications<sup>(1,2)</sup>. Also known as high blood pressure, it is a chronic, controllable disease, and an important risk factor for the development of cardiovascular conditions<sup>(3)</sup>.

Around 11 million people in Latin America and the Caribbean will die from cardiovascular diseases by the year 2020, and mortality due to these is becoming more premature<sup>(4)</sup>. It is estimated that hypertension affects 5 to 10% of the population aged up to 18 years, that is, 7 million children and adolescents. In the adult population, the estimate is around 30%, reaching more than 50% among the elderly<sup>(5)</sup>.

SAH presents sedentary lifestyle, stress, poor eating habits, overweight, smoking and age as main risk factors<sup>(1,3)</sup>. Such factors, mostly behavioral, are directly associated with heart diseases and high blood pressure.

Even though hypertension is a pathological condition with higher prevalence among the elderly population, according to the Brazilian Society of Hypertension (*Sociedade Brasileira de Hipertensão - SBH*), 70% of the economically active population in Brazil is hypertensive<sup>(1)</sup>.

Hypertension is recognized as a pathological condition of higher risk for cardiovascular diseases, which are responsible for high medical and socioeconomic costs for health, significant losses in quality of life and productivity<sup>(1)</sup>, in addition to being responsible for premature death or overload in the healthcare services demand<sup>(6)</sup>, which can cause prolonged absence of the employee, hindrance to the concentration and performance at work due to their accompanying symptoms<sup>(7)</sup>.

It is fundamental to evaluate the cardiovascular risk factors among the Brazilian population to serve as a subsidy in the construction of policies and actions for elimination of factors, when feasible, and control of those that cannot be eliminated.

The aim of this study was to identify in the literature evidence for the interrelationship between work/occupation and the onset of systemic arterial hypertension.

## METHODS

This is an integrative review with the following guiding question: What is the evidence of the scientific facts about the effect of work on the onset of systemic arterial hypertension?

The integrative review is defined as a specific evaluation method that summarizes empirical or theoretical literature with studies of different approaches<sup>(8)</sup>, and has the purpose of providing greater understanding of a given phenomenon or health issue, in addition to presenting a more comprehensive understanding for the health practices and policies<sup>(9)</sup>.

The search was carried out through the literature available in databases on the internet, by means of the Virtual Health Library (Bireme). The databases used for the research were Latin American and Caribbean Literature in Health Sciences (LILACS) and Scientific Electronic Library Online (SciELO), in July 2015.

For data search, the study used as descriptors: hypertension, occupational health and working conditions, in Portuguese, English and Spanish languages; and the crossing between them was carried out. The inclusion criteria defined for the study were: articles addressing the guiding question; being published between the period 2009 and 2015; in one of the languages (Portuguese, English and Spanish) and being available in full text.

The titles and abstracts were then read to identify whether they addressed and portrayed the factors related to the theme. The availability of the study in full text was verified. The search and the selection were performed at two different moments, in order to ensure greater trustworthiness in the search and inclusion of the articles for the study.

The total sample consisted of 172 studies, of which only 38 were selected to compose the review sample. Of these, 24 were excluded because the text was not available, did not approach the theme, or were theses. Besides these, three studies were found repeated in the databases. Data analysis and synthesis were performed in a descriptive way, raising the relevant information about the knowledge produced and the theme explored in the review.

Following that, the value of the evidence adopted for development of the integrative review of the present study was described: in value I, the evidence comes from a systematic review of multiple, well-delineated, randomized controlled trials; in value II, the evidence comes from at least one delineated, randomized clinical trial; in value III, the evidence is from well-delineated experiments, such as non-randomized studies, cohort, time series, and combined case-control studies; evidence of value IV refers to well-delineated non-experimental studies; and, in value V, the evidence comes from authorities' opinions, based on clinical evidence, or reports from expert committees<sup>(10)</sup>.

## RESULTS

The study analysed 11 articles, of which, one was in English, three in Spanish and seven in Portuguese. It was identified that the predominant type of study was the cross-sectional. As for the year of publication, they were quite homogeneous, with the exception of publication for years 2014 and 2015.

In regard to the evidence obtained in the articles, value III was observed in almost all the studies, that is, they presented intermediate evidence of the work in arterial hypertension. The evidence contributes to a critical evaluation of the research results, as well as to evidence-based practice.

In a study about the prevalence of metabolic syndrome among employees of a large banking network in Vitória (ES), the authors correlated occupation and development of the metabolic syndrome<sup>(11)</sup>. In two studies carried out with teachers, the situation of work with the presence of arterial hypertension becomes evident<sup>(12,13)</sup>. Alternatively, in a study on the prevalence of ischemic heart disease (IHD) in adults and associated factors, it was found that IHD is not dependent on the working condition<sup>(14)</sup>.

The independent association between nocturnal labor and high cardiovascular risk was the object of a study that proved that the frequency of high cardiovascular risk and the prevalence of arterial hypertension in night workers are higher<sup>(15)</sup>. Nursing professionals are in inadequate work situations and are exposed to greater occupational risks, according to some of the results of a study with nursing staff presenting arterial hypertension<sup>(16)</sup>.

No significant relationship was found between occupational noise-induced hearing loss, its intensity, and prolonged working time, with the prevalence of arterial hypertension in workers of a Venezuelan oil company<sup>(17)</sup>. Collective nutrition workers are the focus of a study that described, among others, the health profile, reporting cases of hypertension<sup>(18)</sup>.

The health and working conditions of drivers of large vehicles are portrayed in two studies. In one of these, it is considered that, because of the type of exposure, many drivers are more likely to develop cardiovascular diseases, including arterial hypertension<sup>(19)</sup>. In the other study, the association between the stress level and the onset of arterial hypertension was confirmed<sup>(20)</sup>.

Having only women as study subjects, a study associated stress at work with hypertension. The results showed a higher risk of developing hypertension in women who perform passive work<sup>(21)</sup>.

The results of the synthesis of the selected articles are presented in Chart I.

Chart I - Summary of articles selected for literature review according to author/year, type of study/level of evidence, main results and conclusion.

Author/Year	Type of study/evidence	Main results	Conclusions
Salaroli et al., 2013 <sup>(11)</sup>	Cross-sectional/value III	Occupation can be correlated with the development of metabolic syndrome (presence of dyslipidemia, glucose intolerance, hypertension, overweight, abdominal obesity, type 2 diabetes mellitus and cardiovascular disease).	A large number of bank workers have metabolic syndrome, which may be associated with an increased risk for developing cardiovascular disease, although their schooling levels is not low. Obesity has emerged as a risk factor for metabolic syndrome, and should be the object of further investigation.
Santos; Marques, 2013 <sup>(12)</sup>	Cross-sectional/value III	There was an association between arterial hypertension and stress index with the overall health perception, as well as time working as a teacher, and absenteeism.	Longer time working as a teacher and absenteeism are related to health/illness issues and negatively affect health perception. Being physically inactive, being overweight, eating less frequently, and having high blood pressure and stress level contributed to an unfavorable health perception.
Cisneros-Blas; 2009 <sup>(13)</sup>	Sandoval, Cross-sectional, retrospective, descriptive / value IV	The working conditions influence on the development of illness, with evidence for psychosomatic diseases and increased blood pressure.	The results obtained point out that there are problems in teachers' working conditions and health.
Moraes; Freitas, 2012 <sup>(14)</sup>	Cross-sectional/value III	Ischemic heart disease is not dependent on the working condition.	The factors independently associated with ischemic heart disease, in this case, the working conditions, are potentially modifiable.
Pimenta et al., 2012 <sup>(15)</sup>	Cross-sectional/value III	The cardiovascular risk was higher among night workers, as was the prevalence of systemic arterial hypertension. Nocturnal labor, highly demanding shift scale and work control, and time at work were positively associated with high cardiovascular risk.	The professionals who practiced their work activities at night had a higher prevalence of arterial hypertension in comparison to day workers. Nocturnal labor is associated with high cardiovascular risk.
Custodio et al., 2011 <sup>(16)</sup>	Descriptive-exploratory/value III	Work overload and lack of time to take care of a nursing team. Thus, professionals are likely to develop, over time, wear and tear of vital capacities.	The risks inherent in the work environment, which is composed not only of the physical and technical infrastructure, but also of the people who use it, as they are the ones who contribute (or not) to a healthy and desired environment. Nursing professionals, concerning aspects of the prevention and control of arterial hypertension, are in inadequate conditions. The results obtained herein denote the exposure of these professionals to environmental and occupational risks that may contribute to the development of such pathological condition.

Fernández-D'Pool et al., 2010 <sup>(17)</sup>	There was no significant result between occupational noise-induced hearing loss, its intensity and working time with the prevalence of arterial hypertension in workers of an oil company.	It was not possible to conclude that occupational noise is a decisive factor for the development of arterial hypertension in workers exposed to noise.
Aguilar et al., 2010 <sup>(18)</sup>	The information on hypertension was collected indirectly, that is, not confirmed by clinical exams, which could underestimate the prevalence of this disease.	There was no exact conclusion regarding the prevalence of hypertension and work.
Mallma-Acuña et al., 2013 <sup>(19)</sup>	Public transport drivers are exposed and vulnerable to health risks, being more likely to develop cardiovascular diseases.	Long working hours, exposure to noise, high ambient temperature, fuel, tobacco. The major health changes related to work are hypertension, back pain, presence of varicose veins, and emotional stress.
Cavagioni et al., 2009 <sup>(20)</sup>	The working conditions to which long-distance truck drivers are subject, and the ways these professionals cope with stress can contribute to the activation of the stress mechanism, with consequent imbalance in body homeostasis, which may favor the onset of hypertension.	The occurrence of common mental disorders that may be associated with manifestations of stress at work was observed, as well as a significant prevalence of arterial hypertension, though not statistically associated with the presence of common mental disorders. It stands out the presence of inappropriate habits and lifestyles that deserve attention, such as the consumption of alcoholic beverages and the use of sleep-inhibiting medications. Such condition may affect the physiological functions with increase in cardiac and behavioral risk factors.
Alves et al., 2009 <sup>(21)</sup>	The highest prevalence of arterial hypertension was found in the group with passive work (28.3%), followed by highly demanding work (24.8%). The group with the lowest prevalence was the one with low demands (20.9%). The risk for developing hypertension was 35% higher in women in passive work, when compared to women in jobs with low-demand.	There is a need for studies on the characteristics of the work processes that influence the workers' life and health. Health promotion strategies in the workplace should consider, besides the prescription of healthy individual behaviors, the labor characteristics in the process of sickness of the workers, since many can be modified.

## DISCUSSION

Hypertension is a pathological condition of high prevalence in the adult population<sup>(22,23)</sup>, that is, in the working age, which results in lower labor productivity<sup>(24,25)</sup>.

The provision of social security benefits for cardiovascular diseases has been increasing. One of the causes is the high prevalence of SAH, a clinical condition which, despite being rather easy to diagnose, preventable and controllable, shows a significant occurrence of disability retirement, a worrying fact for the country<sup>(25)</sup>.

The interrelationship between the work or occupational exposure and hypertension/cardiovascular diseases has been observed even before the 1980s, but it is still difficult to understand its etiology when its onset involves labor<sup>(26)</sup>.

The Ministry of Health sees the working condition as a potential cause of some diseases of the circulatory system, namely, arterial hypertension, acute myocardial infarction, and arrhythmias, among others. Issues like the stress due to occupation and/or unemployment is considered a risk factor for the development of hypertension<sup>(27)</sup>.

In a study, a positive association was confirmed with the exposure to high noise levels, since this worker may develop cardiovascular responses such as increased blood pressure, probably mediated by increased peripheral vascular resistance<sup>(28)</sup>. In a more recent study, it was observed that the individual exposed to high levels of noise is more likely to be hypertensive than the non-exposed one<sup>(29)</sup>.

Continuous exposure to psychosocial stress, the length of working hours, and night shifts directly or indirectly contribute to the onset and aggravation of cardiovascular diseases, and lead to an early reduction in the individuals' productive lives as well<sup>(24)</sup>. The working conditions of long-distance truck drivers were also found in association with the chronic disease, object of the study<sup>(20)</sup>.

Another relevant fact is the nocturnal labor, which potentially increases the occurrence of cardiovascular diseases, a fact that is correlated to smoking and hypertension, the latter occurring more frequently in those workers when compared to day workers<sup>(15)</sup>. In a longitudinal study performed with Japanese who performed night work activities, a significant increase in systolic and diastolic blood pressure was evidenced<sup>(30)</sup>.

In Pernambuco, Brazil, a study with hypertensive individuals assisted by the Family Health Strategy observed a positive association between SAH control and the variables gender, age, education level, body mass index and occupation<sup>(31,32)</sup>. Occupation in the banking industry is also correlated with the risk of developing cardiovascular diseases, SAH included<sup>(33)</sup>.

A more comprehensive analysis shows that factors recognized as modifiable, such as overweight, obesity, physical inactivity (sedentary lifestyle), bad nutrition, smoking, work environment, stress, occupation, among others, appear in the studies as contributing factors in the development and aggravation of hypertension<sup>(17,32)</sup>.

Studies mention the need to strengthen the promotion and prevention of actions in order to intervene in the course of hypertension and control the socioeconomic impact caused by its aggravation<sup>(29)</sup>.

## CONCLUSION

Few are the studies that have addressed the relationship between work/occupation and the development of Systemic Arterial Hypertension. Nevertheless, it was possible to identify negative implications of work/occupation in the onset of this medical condition, even though the analysis of evidence may be rendered unfeasible because the data collection was carried out, for the most part, at a single moment. Having said that, more research on the subject is needed in order to obtain additional information about the workers' health/illness process. Thus, more effective programs and actions can be implemented in the work environment, focused on workers' quality of life and health.

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