

# Modifiable cardiovascular risk factors in nursing professionals at a cardiology sector: cross-sectional study

*Fatores de risco cardiovascular modificáveis em profissionais de enfermagem do setor de cardiologia: estudo transversal*

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## ABSTRACT

To evaluate the prevalence of cardiovascular risk factors and their associations with sociodemographic characteristics in nursing professionals. A cross-sectional, quantitative study with professionals of the Nursing team who worked in the cardiology units of a large-sized university hospital. The risk factors evaluated were: systemic arterial hypertension, diabetes mellitus, dyslipidemia, smoking, alcoholism, sedentary behavior, obesity, excessive daytime sleepiness, depression, stress and risk of obstructive sleep apnea. One hundred twenty-two professionals were evaluated, where sedentary behavior, followed by excessive daytime sleepiness, obesity and depression were the most prevalent risk factors. Age and length of employment were the variables most associated with the analyzed risk factors. In the face of the high prevalence of risk factors it is imperative health promotion interventions as an incentive to physical activity and adequacy to a healthy diet that in addition to reducing cardiovascular risk may attenuate the prevalence of other risk factors.

**Descriptors:** Cardiovascular Diseases; Risk Factors; Nursing Team.

## RESUMO

Avaliar a prevalência dos fatores de risco cardiovascular e suas associações com as características sociodemográficas em profissionais de enfermagem. Estudo transversal, quantitativo com profissionais da equipe de Enfermagem que trabalhavam nas unidades de cardiologia de um hospital universitário de grande porte. Os fatores de risco avaliados foram: hipertensão arterial sistêmica, diabetes mellitus, dislipidemia, tabagismo, etilismo, sedentarismo, obesidade, sonolência diurna excessiva, depressão, estresse e risco de apneia obstrutiva do sono. Avaliados 122 profissionais onde o sedentarismo, seguido da sonolência diurna excessiva, obesidade e depressão foram os fatores de risco mais prevalentes. A idade e o tempo de profissão foram as variáveis com mais associação com os fatores de risco analisados. Diante da alta prevalência dos fatores de risco torna-se imperativo intervenções de promoção à saúde como incentivo à prática de atividade física e adequação a dieta saudável que além de reduzir o risco cardiovascular pode atenuar a prevalência de outros fatores de risco.

**Descritores:** Doenças Cardiovasculares; Fatores de Risco; Equipe de Enfermagem.

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## INTRODUCTION

Cardiovascular diseases are the main causes of morbidity and mortality in the world. In 2015, these diseases were responsible for 17.7 million deaths worldwide, corresponding to 31% of global deaths, 7.4 million due to coronary heart disease and 6.7 million due to stroke (CVA)<sup>(1)</sup>.

These high morbidity and mortality rates may be related to the various risk factors associated with these diseases, and may be divided into modifiable (dyslipidemias, smoking, alcoholism, diabetes mellitus, systemic arterial hypertension, obesity, excessive daytime sleepiness, depression, stress, obstructive sleep apnea and sedentary behavior) and non modifiable (age, gender, heredity and race)<sup>(2)</sup>.

Nursing professionals, as well as the general population, are exposed to risk factors for cardiovascular diseases. Nursing professionals are susceptible to daily stress, with problems of professional dissatisfaction, occupational diseases, work overload and lack of financial recognition, variables that may further interfere in the development of risk factors for cardiovascular diseases<sup>(3,4)</sup>.

Nursing, due to it is considered an intense work activity in caring, deals with situations of suffering, pain, anguish and death and often forgets self-care in relation to health promotion practices such as physical activity, balanced diet, abandonment of smoking and harmful use of alcohol and stress control<sup>(5)</sup>.

Mapping, diagnosing and implementing preventive measures in relation to cardiovascular risk factors in workers, especially in nursing are consistent with the regulatory norms six and seven that seek to promote the worker's health thus avoiding early illness and removal from the work environment<sup>(6,7)</sup>, because identifying the clinical profile of nursing professionals allows the institution to implement health education measures based on more specific and effective theoretical models of health promotion.

Several national studies that evaluated cardiovascular risk factors in the nursing team are identified in the national literature, mainly regarding the prevalence of hypertension, diabetes mellitus, dyslipidemia, sedentary behavior, obesity, diet profile and smoking, demonstrating that these risk factors are high in this population<sup>(4,8-12)</sup>, however, no study has been identified evaluating, in addition to those investigated risk factors, excessive daytime sleepiness, the risk of obstructive sleep apnea and depression in this class of workers, currently considered as emerging risk factors.

Therefore, due to the high prevalence of cardiovascular risk factors in the nursing team identified by these studies and the lack of evaluation of other emerging risk factors, this study aimed to evaluate the prevalence of cardiovascular risk factors and their associations with sociodemographic characteristics.

## METHOD

It is a cross-sectional and correlational study. Professionals from the nursing team (nurses, nursing assistants and technicians) who worked in the cardiology units of a public, university, large-sized hospital in the city of São Paulo from October 2016 to February 2017 were included in this study, and professionals who were on medical leaves or any type of removal during the period of data collection were excluded. The study was submitted to the Ethics and Research Committee of the institution and approved under opinion number 1,626,612.

Professionals from the nursing team were invited to participate in the research by the main researcher, and the informed consent form was given for signature to those who agreed to participate in the research. Data collection was performed by means of a structured interview conducted by one of the members of the research team through a form containing the sociodemographic variables, the clinics and the instruments validated for evaluation of risk factors.

The sociodemographic variables analyzed were age (full years), race, religion, education (years of study), marital status, family income (minimum wage), position (nurse, nursing assistant/nursing technician), working hours (morning, afternoon and night), time of profession (months) and number of jobs. The risk factors investigated were systemic arterial hypertension (SAH), diabetes mellitus (DM), dyslipidemia (DLP), smoking, alcoholism, sedentary behavior, obesity, stress, depression, obstructive sleep apnea (OSA) and excessive daytime sleepiness (EDS).

The presence of SAH, DM and DLP was obtained through the self-reporting of professionals in a dichotomous manner (yes/no).

Nicotine addiction was obtained through the Fagerström Questionnaire. This questionnaire was developed by Fagerström and translated and validated in 2002. It is composed by six questions with scores ranging from zero to 10 points. The individuals were classified into: very low risk (0 to 2 points), low (3 to 4 points), medium (5 points), high (6 to 7 points) and very high (8 to 10 points).

The consumption of alcohol was evaluated in relation to the usual consumption of ethanol, being considered alcoholic the professionals who reported consumption above 60g for men and 50 g for women. Alcohol-related disorders were also analyzed by AUDIT, which was prepared by the WHO and translated and validated in Brazil in 1999<sup>(8)</sup>. This scale is composed of 10 topics and with alternatives ranging from zero to four points, allowing a total alternation from zero to 40 points. The categorization used to evaluate professionals was: Zone I low risk (0 to 7 points); Zone II use of risk (8 to 15); Zone III harmful use (16 to 19); Zone IV possible dependence (>20).

Sedentary behavior was analyzed through the criterion of the World Health Organization (WHO), established as less than 30 minutes of light physical activity at least five times a week or 20 minutes of vigorous physical activity at least three times a week and collected through the declaration of the professional, being classified sedentary or active.

Obesity was assessed by Body Mass Index (BMI). The BMI was calculated using the formula Weight/Height, being considered as obese those individuals who had a BMI higher or equal to 30 kg/m<sup>2</sup>.

The stress was assessed through the Perceived Stress Scale (PSS 10), translated and adapted into Portuguese in 2007. Each item on the scale has alternatives ranging from zero to four points, and the total score can range from 0 to 40 points, where the higher the score, the greater the perceived stress of the individual.

The symptoms of depression were evaluated through the Beck Depression Inventory, which was validated in Brazil in 1998, and is composed of 21 items, containing four alternatives in which the score ranges from zero to three, with zero being the absence of depressive symptoms and three being the presence of these symptoms in more intense way. Through this scale the individual was classified in the absence of depressive symptoms with a score from zero to nine points, presence of symptoms of mild depression with a score between 10 and 18 points, presence of moderate depression symptoms between 19 and 29 points and presence of severe depression symptoms between 30 and 63 points.

The Berlin Questionnaire was used to assess the risk of developing obstructive sleep apnea, translated into Portuguese in 2011. This questionnaire determines a high (when two or more categories score positive) or low (when none or only one category is positive) risk for obstructive sleep apnea. For this assessment, each category is initially assessed separately.

The Epworth sleepiness scale used to assess EDS was developed in 1991 and translated into Portuguese in 2009. It is a questionnaire that analyzes the probability of the individual falling asleep in eight circumstances of daily activities, some of which are recognized as being subject to inducing sleep. The score can range from zero to 24 points, in which up to nine points signaling a physiological condition, *i.e.*, normal and above 10, the diagnosis of EDS is suggested.

The data were organized in Excel spreadsheets and submitted to statistical analysis by the Statistical Package for the Social Science (SPSS) version 22.0. For the analysis of the associations between the sociodemographic variables and the risk factors the Pearson or Spearman correlation test for quantitative measurements, the Student t test or the U Mann-Whitney test for analysis between the quantitative and qualitative variables and the Fisher exact test or Pearson Chi-square test for analysis between the qualitative variables were used. A significance level of 0.05 was adopted.

## RESULTS

Data were collected from 122 nursing professionals, most of whom were female, white, and with a mean age of 40.42 (Table 1). The average number of cohabitants was 2.5 (standard deviation 1.48), the average number of children was one (standard deviation 1.24), and 43.4% of the professionals reported that the couple was responsible for the income.

**Table 1.** Sociodemographic characterization of the nursing team of the cardiology units participating in the study (n=122). São Paulo, Brazil, 2016–2017.

Variables	Total
Age	
Mean (sd)	40.42 (10.65)
Minimum–Maximum	23–76
Sex	
Female	103 (84.4%)
Male	19 (15.6%)
Education (years)	
Mean (SD)	16.45 (2.72)
Minimum–Maximum	10–28
Race	
Yellow	5 (4.1%)
White	59 (48.4%)
Black	27 (22.1%)
Brown	31 (25.4%)
Religion	
Catholic	47 (38.5%)
Spiritist	6 (4.9%)
Evangelical	32 (26.2%)
Other religion	23 (18.9%)
No religion	14 (11.5%)
Marital status	
Married	59 (48.4%)
Divorced	13 (10.7%)
Single	45 (36.9%)
Widow	5 (4.1%)
Family income	
1 to 3 minimum wages	15 (12.3%)
more than 3 to 5 minimum wages	52 (42.6%)
more than 5 to 7 minimum wages	23 (18.9%)
more than 7 to 9 minimum wages	16 (13.1%)
more than 9 minimum wages	16 (13.1%)

Concerning the professional position 43 were nursing technicians (35.2%), 40 nurses (32.8%) and 39 auxiliary nurses (32.0%). The average number of jobs for these professionals was 1.25 (standard deviation 0.45) and the average time worked in months was 170.59+103.07. Regarding working hours, it was observed that most professionals work at night (37.7%).

Regarding cardiovascular risk factors, it was observed that the majority was sedentary, with high prevalence of symptoms of excessive daytime sleepiness, obesity, with mild symptoms of depression and hypertension (Table 2).

In the analysis of anthropometric measurements, it was observed that the mean BMI of the sample studied is classified as overweight (mean of 26.24, standard deviation of 4.09) and the mean abdominal circumference was 87.02 cm (sd 12.18).

After alcohol-related disorders have been analyzed, the average score identified was 2.69+3.62 (zone I – low risk) with a range from zero (low risk) to 16 (zone III – harmful/high risk). When applying the Fagerström questionnaire it was observed that the average score was 3±2.65 (low degree of dependence) with a variation from zero (very low degree of dependence) to seven (high degree of dependence). Regarding the stress score, a mean of 15.84 points was observed (standard deviation of 7.17).

In the analysis of the associations of risk factors with sociodemographic characteristics, it was observed that sedentary behavior was more present in professionals with family income above three minimum wages ( $p=0.01$ ). Obesity was associated

with older professionals ( $p=0.04$ ), longer working hours ( $p<0.01$ ) and married professionals ( $p<0.01$ ).

The professionals with previous diagnosis of hypertension were older ( $p<0.001$ ), longer professional time ( $p=0.006$ ), non-white ( $p=0.01$ ) and nursing assistants and technicians ( $p=0.04$ ) and in relation to DM it was observed that when the couple is responsible for the income, the prevalence of this risk factor was higher than when the one responsible for the income is a professional or another ( $p=0.04$ ). In relation to smoking it was observed that the lowest mean of years studied ( $p<0.01$ ) and the highest prevalence of nursing assistants ( $p=0.02$ ) were smokers.

The presence of high risk of sleep apnea was associated with higher mean age ( $p=0.04$ ), longer working hours in months ( $p=0.01$ ) and higher family income ( $p=0.02$ ). The stress level was related to female gender ( $p=0.02$ ) and higher prevalence in nursing assistants and technicians ( $p=0.02$ ). The depression symptoms were more associated with females ( $p=0.02$ ). Excessive daytime sleepiness had a higher association among nurses compared to nursing assistants and technicians ( $p=0.03$ ). There was no association between the sociodemographic characteristics with DLP and alcoholism.

## DISCUSSION

The results of our study showed significant prevalence of cardiovascular risk factors among nursing professionals and several RF presented associations with sociodemographic characteristics that in many identified situations can be reduced with the implementation of nursing interventions related to educational processes.

The RF identified are closely related to the lifestyle adopted when we observe that the lack of physical activity leads to the accumulation of fatty tissue and consequently the development of comorbidities such as SAH, DM and DLP and these comorbidities can be aggravated in the presence of habits such as smoking, alcohol use and in the presence of depression symptoms, stress and excessive daytime sleepiness.

Sedentary behavior was the most prevalent RF among nursing staff and this finding corroborates with world epidemiological data, in which this factor is considered as the fourth major risk factor for global mortality<sup>(13)</sup> and with other studies evaluating this risk factor among nursing professionals<sup>(8,10,12)</sup>. This RF presented association with the highest family income, where this result may be associated with the fact that the professional to have an adequate income for sustenance ends up assuming long working hours reducing motivation to practice physical activity, reason identified as one of the major causes of sedentary behavior, besides the greater use of private transportation as a means of driving to work, as identified in literature<sup>(14,15)</sup>.

**Table 2.** Prevalence of cardiovascular risk factors in the nursing team of the Cardiology units. São Paulo, Brazil, 2016–2017.

Cardiovascular risk factors	n (%)
Sedentary behavior	69 (56.6)
Excessive Daytime Sleepiness	57 (46.7)
Obesity	49 (40.2)
High risk for Obstructive Sleep Apnea	22 (18)
Systemic Arterial Hypertension	21 (17.2)
Smoking	13 (10.7)
Dyslipidemia	10 (8.2)
Diabetes Mellitus	7 (5.7)
Alcohol drinking practices	3 (2.5)
Depression	52 (42.7)
Mild symptoms	38 (31.1)
Moderate symptoms	12 (10)
Severe symptoms	2 (1.6)

Obesity was the second most prevalent RF in the population studied and this RF was associated with age, marital status and time of profession. This prevalence identified in the present study corroborates other findings in national and international literature, especially in nursing professionals<sup>(3,8,10-12)</sup> and in its association with age and consequently with longer professional time<sup>(16)</sup>, which may be explained by excessive work hours with consequent increase in intake of hypercaloric foods<sup>(17)</sup>, sedentary behavior<sup>(9-12)</sup>, reduction in lean mass, gradual increase in body fat, and decrease in glucocorticoids release in individuals with higher age<sup>(18)</sup>.

Unlike another study<sup>(15)</sup> in which obesity was associated with marital status, in the present study and in other studies<sup>(17)</sup> this RF presented an association with married marital status and this finding is not yet clear and needs further investigation, however some studies point out possible justifications for this result, such as the increase in carbohydrate intake and the increase in sedentary behavior in married couples<sup>(17)</sup>.

Smoking was identified in the studied nursing team with lower frequency than other RFs already discussed and with very close frequency when compared to other studies with nursing professionals, where we can identify frequency from 4.7%<sup>(18)</sup> to 10.9%<sup>(3)</sup>. It was identified that the lower number of years studied and the nursing assistants presented a higher frequency of smoking, corroborating some studies that affirm that smoking can be explained by lack of instructions on adequate living habits<sup>(19)</sup>.

The prevalence of SAH, DM and DLP in the nursing team was consistent with the findings in studies with nursing professionals<sup>(3,11,12,18)</sup>. The SAH presented a significant association with age and non-white race, and DM in the professionals responsible for the couple's income, consistent with other studies in which age and inadequate lifestyle with high hypercaloric intake, lack of physical activity<sup>(19)</sup> and increase of fast foods in couples with higher income<sup>(20)</sup> and excessive number of hours of work, favoring the development of these risk factors.

As previously mentioned, this study, in addition to evaluating the risk factors studied in nursing professionals, expanded this mapping with the risk factors considered to be emerging, *i.e.*, the sleep pattern, the risk of developing obstructive sleep apnea and depression.

Excessive daytime sleepiness was identified in almost half of the sample and there was association with the nursing position. The presence of EDS increases the prevalence of obesity, symptoms of depression and increased abdominal circumference<sup>(21)</sup> and is directly related to cardiovascular mortality and overall mortality<sup>(22)</sup>. Studies evaluating this risk factor in the nursing team were not identified, requiring other studies evaluating the impact on both cardiovascular disease development and quality of life among these professionals.

Regarding the risk of obstructive sleep apnea, this RF was more frequent than classical comorbidities for the development of CVDs, and this risk was associated with professionals receiving more than seven minimum wages, with higher age and consequently longer working hours, corroborating findings in the literature that present association of age with this RF<sup>(23)</sup>. The association of higher income with OSA was not identified in any study, but it can be reflected on the studies that individuals with higher income tend to have higher prevalence of obesity and consequently higher risk for OSA.

Almost half of the population studied had some degree of depression, a situation that affects about 322 million people in the world. Depression in our study presented a higher association with the female gender, which corroborates several studies, including a study evaluating 102 nursing professionals in which a high prevalence of stress and depression was found<sup>(24)</sup>, related to the own work environment itself and the social representations imposed on women.

It can be observed, in view of the results identified that most of the risk factors present in the study population are associated with inadequate living habits, which leads to a higher prevalence of comorbidities and exponentially increases the risk of cardio-cerebrovascular mortality; therefore, primary prevention measures should be adopted as an integral part of the worker's health programs.

Among the main primary prevention measures identified in a systematic review, behavioral change techniques including goal setting, information on health conditions and instructions on health consequences, action planning and self-monitoring of health behaviors performed in individual consultations, group consultations, delivery of printed materials and telephone sessions with relative reduction in cardiovascular risk factors stands out<sup>(25)</sup>.

In addition to educational measures, the development of policies that aim to promote the practice of physical activity and consequently reduce obesity with the promotion of environmental infrastructure that favors walking and cycling, development of natural environments in workplaces for the practice of physical activity, and orientation towards caloric restriction in the diet should be implemented<sup>(4,14)</sup>.

In view of the results identified in this study and the responses of primary prevention interventions, there is a need to create institutional investments for nursing team workers focused on risk factors control, especially those related to lifestyles.

The greatest limitation of this study is due to the fact that it is a cross-sectional study where the conditions associated with the risk factors analyzed and identified in this study could achieve more strength in evidence if a cohort study was conducted, and some of the risk factors such as SAH, DM and DLP were evaluated in a self-declared manner.

## CONCLUSION

We observed a high prevalence of RF in the sample of nursing team professionals and the RF identified presented a relationship with several sociodemographic variables, mainly age and time of profession. In addition to identifying the presence of classical cardiovascular risk factors in the assessed nursing team, this study also identified a high prevalence of depression, excessive daytime sleepiness and risk of developing obstructive sleep apnea, which further increases the risk of developing cardiovascular disease.

Although the factors associated with age and length of employment cannot be controlled, the risk factors identified in this study could be alleviated with educational interventions mainly related to incentive to physical activity with creation of institutional groups, correction of eating habits, smoking cessation groups and interventions with alternative practices to control the symptoms of depression and stress.

The development of primary cardiovascular prevention strategies is an indispensable activity for the promotion of worker health and this work allowed this mapping so that practical actions could be established in the institution.

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