



## WOMEN WITH CARDIOVASCULAR RISK: REVIEW OF RESEARCH FROM BRAZILIAN GRADUATE PROGRAMS

*Mulheres com risco cardiovascular: revisão das pesquisas das pós-graduações brasileiras*

*Mujeres con riesgo cardiovascular: revisión de las investigaciones de posgrados brasileños*

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### ABSTRACT

**Objective:** To identify the cardiovascular risk factors in women, studied in dissertations and theses defended in Brazilian graduate programs in the area of health sciences. **Methods:** Critical and descriptive review, carried out in May 2017, in the theses and dissertations repository of the Coordination for the Improvement of Higher Education Personnel (CAPES). As a search strategy, the keywords “cardiovascular risk factors” and “women” were used, without restriction on areas of knowledge. These keywords were used as a strategy to retrieve the largest number of publications on the object of study. National studies which addressed the research question and originated from graduate programs were included, and those with incomplete summaries or that were unavailable were excluded. No time limit was applied. Of the studies found, 23 were selected for analysis. **Results:** The main risk factors were: obesity, sedentary lifestyle, systemic arterial hypertension and the development of preeclampsia during pregnancy, also including hormonal aspects such as menopause. The studies have evidenced the importance of and the need for actions aimed at preventing and minimizing the risk factors, in addition to the development of specific strategies such as the consumption of vitamin A, eggplant flour and green tea. **Conclusion:** The risk factors prevalent among women are related to metabolic changes, multifactorial conditions, inadequate habits, and to life cycles such as gestation and the hormonal aspects, which suggests that health professionals need to develop preventive and control actions directed at such factors.

**Descriptors:** Risk Factors; Cardiovascular Diseases; Women’s Health.

### RESUMO

**Objetivo:** Identificar os fatores de risco cardiovasculares em mulheres, estudados em dissertações e teses defendidas em programas de pós-graduação brasileiros na área da saúde. **Métodos:** Revisão crítica e descritiva, realizada em maio de 2017, no banco de teses e dissertações da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). Como estratégia de busca utilizaram-se as palavras-chave “fatores de risco cardiovascular” e “mulheres”, sem restrição de área do conhecimento. A utilização dessas palavras-chave ocorreu como estratégia para alcançar o maior número de produções sobre o objeto de estudo. Foram incluídos estudos nacionais, oriundos de programas de pós-graduação e que respondiam à questão de pesquisa; e excluídos aqueles com resumos incompletos ou que estivessem indisponíveis. Não se determinou recorte temporal. Dos estudos encontrados, 23 foram selecionados para análise. **Resultados:** Os principais fatores de risco foram: a obesidade, o sedentarismo, a hipertensão arterial sistêmica e o desenvolvimento de pré-eclâmpsia durante a gestação, incluindo também os aspectos hormonais, como a menopausa. As pesquisas evidenciaram a importância e a necessidade de ações de prevenção e minimização dos fatores de risco, além do desenvolvimento de estratégias específicas, como o consumo da vitamina A, farinha de berinjela e chá-verde.



**Conclusão:** Os fatores de risco prevalentes em mulheres estão relacionados às alterações metabólicas, às condições multifatoriais, a hábitos inadequados e a ciclos de vida, como a gestação e os aspectos hormonais, sugerindo a necessidade dos profissionais da saúde desenvolverem ações de prevenção e controle desses fatores.

**Descritores:** Fatores de risco; Doenças Cardiovasculares; Saúde da Mulher.

## RESUMEN

**Objetivo:** Identificar los factores de riesgo cardiovasculares de mujeres los cuales han sido investigados en los trabajos de fin de master y tesis doctorales leídas en los programas de posgrado brasileños de la área de la salud. **Métodos:** Revisión crítica y descriptiva realizada en mayo de 2017 con el banco de tesis doctorales y trabajos de fin de master de la Coordinación de Perfeccionamiento de Personal de Nivel Superior (CAPES). Se utilizaron las palabras-clave “factores de riesgo cardiovascular” y “mujeres” como la estrategia de búsqueda sin restricción del área del conocimiento. La utilización de esas palabras-clave se dio como estrategia para alcanzar el mayor número de publicaciones sobre el objeto de estudio. Se incluyeron los estudios nacionales de programas de posgrado y que contestaban la pregunta de la investigación y se excluyeron aquellos con resúmenes incompletos o que no estuvieran disponibles. No se ha definido el recorte del tiempo. De los estudios encontrados, 23 han sido elegidos para el análisis. **Resultados:** Los principales factores de riesgo fueron la obesidad, el sedentarismo, la hipertensión arterial sistémica y el desarrollo de preeclampsia durante el embarazo incluyendo también los aspectos hormonales como la menopausia. Las investigaciones han evidenciado la importancia y la necesidad de acciones de prevención y disminución de los factores de riesgo además del desarrollo de estrategias específicas como el consumo de la vitamina A, la harina de berenjena y el té verde. **Conclusión:** Los factores de riesgo prevalentes en las mujeres se relacionan con las alteraciones metabólicas, las condiciones multifactoriales, los hábitos inadecuados y los ciclos de la vida como el embarazo y los aspectos hormonales lo que sugiere la necesidad del desarrollo de acciones de prevención y control de esos factores de parte de los profesionales sanitarios.

**Descritores:** Factores de Riesgo; Enfermedades Cardiovasculares; Salud de la Mujer.

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## INTRODUCTION

There has been a shift in the mortality profile of the population, with an increase in the number of deaths due to chronic noncommunicable diseases (CNCD) <sup>(1)</sup>. In Brazil, NCDs accounted for 72.7% of deaths in 2011, mainly circulatory system diseases (30.4%), neoplasias (16.4%), diabetes mellitus (DM) (5.3%) and respiratory diseases (6.0%)<sup>(2)</sup>. Among CNCDs, the cardiovascular diseases (CVD) affect the circulatory system, causing heart and blood vessel disorders<sup>(3)</sup>.

Among the implications for the onset of these pathologies are the risk factors<sup>(4)</sup>, which can be divided into modifiable (or controllable) and non-modifiable. The modifiable ones involve behavioral and environmental aspects, such as elevated serum cholesterol, systemic arterial hypertension (SAH), smoking, physical inactivity, DM, obesity, stress, and use of contraceptive pills. Non-modifiable risk factors have biological or genetic etiology, including heredity, sex and advanced age<sup>(5)</sup>.

In the female population, the high prevalence of CVD risk factors may be associated with the insertion of women into the labor market, which exposes them to stress, sedentary lifestyle, alcoholism, smoking and inadequate eating habits<sup>(6)</sup>. One can also highlight the overload of responsibilities with work, caring for the family and domestic tasks linked to the women<sup>(7)</sup>.

An epidemiological study showed a significant association between the use of oral contraceptives and the increased risk for development of CVD<sup>(8)</sup>. Diseases such as DM and SAH also prevail among women<sup>(9)</sup>.

Thus, the importance of studies involving the risk factors for CVD in the female population is understood. The justification for this study is related to the changes in habits in the population, the increasing incidence of risk factors in women, the high prevalence of CVD mortality, the severity of its complications and the high cost posed to the health system.

Furthermore, the aforementioned thematic is referenced in the National Agenda of Priorities in Health Research, which encourages the conduction of research aimed at contributing to the prevention of cardiovascular diseases and to the quality of life of the population. It is understood that recognizing the cardiovascular risk factors in women in Brazil makes it possible to direct actions and planning strategies for health promotion and, thus, to contribute to the prevention and control of CVD. Moreover, it becomes possible to point out possibilities for future research, contributing to teaching and professional practice.

The study had as a research question: which cardiovascular risk factors in women have been studied by the graduate programs in Brazil? In order to answer the research question, the objective was to identify the cardiovascular risk factors in women, studied in dissertations and theses defended in Brazilian graduate programs in the area of health sciences.

## METHODS

This is a critical and descriptive review, focusing on dissertations and theses defended in Brazilian graduate programs in the area of health sciences<sup>(10)</sup>. The search was developed in the thesis and dissertation repository of the Coordination for the

Improvement of Higher Education Personnel (CAPES), in May 2017.

As a search strategy, the keywords “cardiovascular risk factors” and “women” were used, without restriction on areas of knowledge. These keywords were used as a strategy to retrieve the largest number of publications on the object of study. No time limit was applied.

National inclusion criteria were used as inclusion criteria for post-graduate programs that answered the research question. Exclusion criteria included studies with incomplete abstracts or that were unavailable. No duplicate studies were found.

The inclusion criteria consisted of national studies, originated from graduate programs, which addressed the research question. The exclusion criteria comprised the studies with incomplete summaries or that were unavailable. No duplicates were found.

After finding and reading the titles of 652 pieces of research, 55 studies were selected. By applying the selection criteria, the final corpus for the present study consisted of 23 theses and dissertations (Figure 1).

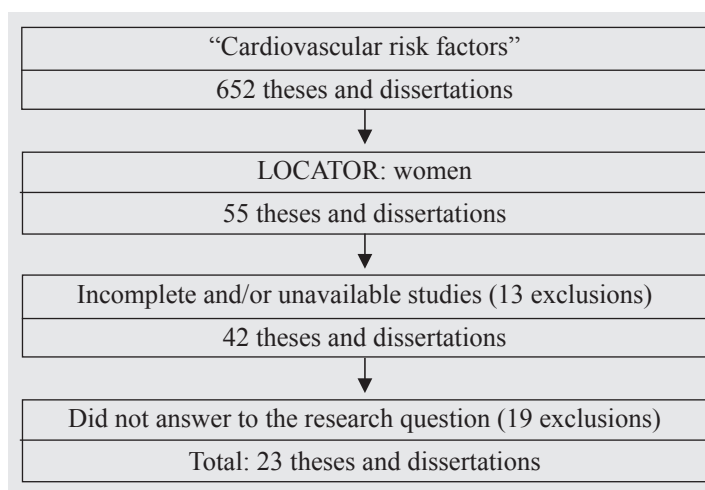


Figure 1 - Flowchart of selection of theses and dissertations about cardiovascular risk factors in women, indexed in the Coordination for the Improvement of Higher Education Personnel (CAPES).

The ethical aspects of this study have been preserved. All authors of the publications consulted were properly referenced, according to the Copyright Law no. 9,610/98<sup>(11)</sup>.

## RESULTS

After reading the selected studies, a synoptic chart was prepared containing the following data: author/year, type of study, objective and main results. The data was interpreted by a qualitative and descriptive approach, and a critical analysis of the results was performed. The main findings were divided into two thematic axes: characterization of studies related to cardiovascular risk factors in women; cardiovascular risk factors in women and the importance of prevention and control.

### Characterization of studies related to cardiovascular risk factors in women

As regards the region where the studies occurred, the Southeast predominated with 11 theses and dissertations, followed by the Northeast region, with six studies, and the South and Center-West regions, with three studies each. The records of the Research Group Directory in Brazil, referring to the period from 1993 to 2016, indicate the predominance of Research Groups in the Southeast region, which justifies the data found, which demonstrates the large number of researches conducted in the aforesaid region<sup>(12)</sup>.

A preponderance of studies in the year 2013 was verified, which may be related to the publication of the I Brazilian Guideline on Cardiovascular Prevention, which presents the cardiovascular risk factors and has as main objective the standardization of strategies for prevention of these diseases<sup>(5)</sup>. In addition to this guideline, in 2010, the Ministry of Health (MoH) launched the Primary Care Tracking Notebook, which addresses risk prevention and stratification in primary health care, with emphasis on CVDs and their risk factors<sup>(13)</sup>. Another issue to be highlighted is that all studies were defended from the 2000s, which is justified by the fact that there was an increasing incidence and prevalence of these diseases, mainly due to the aging of the population and changes in lifestyle<sup>(14)</sup>.

Regarding the methodological approach, quantitative studies prevail. The predominance of the quantitative design may be related to the fact that this approach seeks to raise frequencies, data, indicators and prevalences of a given problem or diseases<sup>(15)</sup>, which justifies its use by researchers. With respect to the classification of the studies, there were 13 dissertations and ten theses.

In regard to the area of knowledge, medicine predominated, with 12 studies. After this comes the area of Physical Education, with six productions; Nutrition, with three; and Nursing and Physiotherapy, with one study each. Given that, the importance of Nursing, particularly, in exploring and appropriating this theme should be emphasized, given the important role nurses can play in health education actions and their relationship with the community, with opportunity to act both in prevention and in the early identification and control of cardiovascular risk factors in the population<sup>(16)</sup>.

**Cardiovascular risk factors in women and the importance of prevention and control**

In the analysis, studies addressing metabolic alterations, such as dyslipidemia<sup>(17,18)</sup>, were identified, as well as other that addressed multifactorial conditions such as systemic arterial hypertension (SAH)<sup>(19)</sup>. Some studies relate to the individuals' behavior and lifestyle, such as obesity<sup>(18-22)</sup> and sedentary lifestyle<sup>(23)</sup>, in addition to those that involve women's life cycles and hormonal aspects such as preeclampsia (PE)<sup>(24,25)</sup>, Polycystic Ovary Syndrome (PCOS)<sup>(26-30)</sup>, menopause and postmenopause<sup>(31,32)</sup>. One survey<sup>(33)</sup> addressed the relation of cardiovascular risk caused by dyslipidemia in women with breast cancer, evidencing the need to routinely include the assessment of the lipid profile in this population.

One study showed an indirect association between migraine and the risk of developing CVD due to sedentary lifestyle, depression, obesity, and high cholesterol levels<sup>(23)</sup>. It was noticed that some studies refuted the association of factors investigated with cardiovascular risk, such as subclinical thyroid dysfunction<sup>(34)</sup> and sarcopenia<sup>(35)</sup>.

In addition to the described risk factors, the studies showed the importance and necessity of actions aimed at the prevention and minimization of cardiovascular risk factors<sup>(27)</sup>. Authors emphasize the importance of integrating strategies for CVD prevention, such as the development of interdisciplinary therapy<sup>(19,28)</sup>, besides the adoption of healthy habits such as the practice of physical activity<sup>(18,21,22,36)</sup>.

The studies also addressed specific strategies for prevention and control of cardiovascular risk factors, such as the consumption of eggplant flour<sup>(37)</sup> and the intake of vitamin A<sup>(20)</sup>. Both studies have shown that these components contribute to the antioxidant capacity and, consequently, facilitate the control of body mass. The consumption of isolated soy protein also improves total cholesterol levels in adult women<sup>(38)</sup>. Finally, one study<sup>(39)</sup> highlights the benefit of green tea on blood pressure, contributing to its control.

Chart I - Synoptic chart of the selected productions addressing the cardiovascular risk factors in women researched by the Brazilian graduate programs.

Author	Year	Type of study	Objective	Main results
Jose <sup>(17)</sup>	2016	Dissertation  Quantitative research	To verify the association between lipid profile and cardiovascular risk factors in women.	There was a high prevalence of SAH, hypercholesterolemia, elevated serum triglycerides and elevated blood sugar levels, and the predominant risk factors were excess weight, obesity and sedentary lifestyle.  Significant association between cholesterol and age, cholesterol and C-reactive protein, triglycerides and waist circumference, and triglycerides and waist-to-hip ratio.  Importance of evaluating serum cholesterol levels in women as a predictor of cardiovascular events.
Cerqueira <sup>(18)</sup>	2011	Dissertation  Quantitative research	To analyze the presence of risk factors in women practicing gymnastics.	High prevalence of cardiovascular risk factors in female students participating in a gymnastic project, excessive intake of saturated fatty acids, as well as inadequate lipid profile and fasting glycemia.
Queiroz <sup>(19)</sup>	2013	Dissertation  Quantitative research	To investigate the effects of an interdisciplinary therapy on body composition, cardiovascular risk factors and inflammatory markers.	After the intervention, there was a significant reduction in BMI, representing a weight loss around 5%.  Food consumption also decreased, showing an improvement in the quality of food, with each macronutrient remaining within the % of adequacy.



Bento <sup>(20)</sup>	2014	Thesis  Quantitative research	To investigate the nutritional status of vitamin A through biochemical and functional indicators and their association with body mass index and body adiposity, DM2 and oxidative stress in women with a recommended dietary intake of vitamin A.	Inadequate nutritional status of vitamin A was associated with excess weight, obesity, body adiposity and oxidative stress.  Knowledge of the nutritional status of vitamin A may contribute to support new effective dietary strategies for better control of body mass, as well as contribute to the increase of antioxidant capacity and prevention of cardiovascular risk factors.
Tibana <sup>(21)</sup>	2013	Dissertation  Quantitative research	To evaluate the acute and chronic effects of strength training (ST) on cardiovascular risk factors in overweight/obese women and/or with metabolic syndrome.	The acute ST session is capable of decreasing BP in clinical and outpatient environments, in both overweight/obese women and women with Metabolic Syndrome.  ST performed for eight weeks without dietary control and without aerobic exercise was poorly effective at altering blood glucose, BP, waist circumference, triglycerides and HDL.
Chagas <sup>(22)</sup>	2013	Dissertation  Quantitative research	To assess the effect of 20 weeks of continuous moderate intensity aerobic exercise combined with strength training on cardiovascular risk factors and IL10, IL6 and TNF-alpha inflammatory markers in postmenopausal women with obesity.	The reproduction of the recommendations on physical activity of the American College of Sports Medicine, based on indirect methods for evaluation, prescription and monitoring of physical exercise programs in Family Health Unit, proved effective in reducing the inflammatory process in obese postmenopausal women, especially TNF-alpha and IL6 concentrations; also decreasing the cardiovascular risk.
Rockett <sup>(23)</sup>	2013	Dissertation  Quantitative research	To investigate the presence of cardiovascular risk factors in adult women with migraine and to compare it with healthy controls.	The results clearly point to sedentarism and depression and potential sleep disorders in patients with migraine, with a plausible overlap of effects of obesity and migraine on serum levels of HDL-c and Framingham's risk score.
Ferreira <sup>(24)</sup>	2016	Thesis  Quantitative research	To assess the frequency of cardiovascular risk factors in women with a history of preeclampsia (PE) for 12 months and its association with myocardial hypertrophy and carotid intima-medial thickness (IMT); to evaluate the effect of myocardial hypertrophy on left ventricular function and functional capacity.	The prevalence of cardiovascular risk factors twelve months after the PE event is high. A high frequency of myocardial hypertrophy was observed, which was associated with changes in diastolic function indexes and impairment of functional capacity. Among the risk factors, excess weight and increased waist circumference have a prominent role in increasing the risk of myocardial hypertrophy 12 months after the PE event.
Andrade <sup>(25)</sup>	2013	Thesis  Quantitative research	To analyze the prevalence of metabolic syndrome (MS) and associated factors in women who had had pre-eclampsia (PE) and normotensive pregnancy five years ago.	Women with previous PE had a high prevalence of MS and its individual components compared to normotensive women; systolic and diastolic blood pressure were particularly altered, low levels of high density lipoprotein concentration and hyperglycemia.

Costa <sup>(26)</sup>	2009	Dissertation  Quantitative research	To analyze the diagnostic accuracy of waist circumference (WC), waist-to-height ratio (WtHR), waist-hip ratio and conicity index for detection of cardiovascular risk factors (CVRF) and metabolic syndrome (MS) in women with polycystic ovary syndrome (PCOS).	Our data emphasize the importance of anthropometric assessment in the screening of cardiovascular risk in women with PCOS, highlighting the relevance of the WtHR in the prediction of classic CVRF and the need to consider specific cut-off points for women with PCOS for discrimination of MS.
Azevedo <sup>(27)</sup>	2010	Dissertation  Quantitative research	To investigate the prevalence of elevated blood pressure levels in patients with polycystic ovary syndrome (PCOS) and to correlate blood pressure (BP) levels with other cardiovascular risk factors (CRF).	The PCOS group had significantly higher prevalence of altered BP than the control group.  Women with PCOS presented higher mean values of systolic BP, BMI, waist circumference (WC), triglycerides, fasting glucose, HDL, cholesterol compared to the control group.  Frequency of women with values above the normal limit of pressure loads was significantly higher in the PCOS group than in the control group.
Soares <sup>(28)</sup>	2007	Thesis  Quantitative research	To evaluate cardiovascular risk factors in Brazilian women with polycystic ovary syndrome (PCOS), using multiple parameters, including the determination of the prevalence of metabolic syndrome and its components and screening for microalbuminuria as a marker of potential early renal damage in these patients.	High prevalence of metabolic syndrome and its individual components in Brazilian women with PCOS.  High percentage of women with levels of urinary albumin excretion in ranges significantly associated with increased risk for cardiovascular events.
Soares <sup>(29)</sup>	2008	Dissertation  Quantitative research	To evaluate the presence of early markers of CVD in young and non-obese women with PCOS.	Young women with PCOS present alterations in vascular elasticity even in the absence of classic risk factors for CVD, such as insulin resistance, hypertension or obesity.
Santos <sup>(30)</sup>	2014	Thesis  Quantitative research	To assess Framingham's risk score and the prevalence of cardiovascular event in women with PCOS.	PCOS is associated with a higher Framingham's risk score in women of reproductive age. This association, however, did not correspond to a greater occurrence of cardiovascular events, which was attributed to the low age range of this population.
Colpani <sup>(31)</sup>	2015	Thesis  Quantitative research	Compare two physical activity level assessment instruments, International Physical Activity Questionnaire-short version (IPAQ-SF) and pedometer in menopausal women; to verify the level of physical activity through the pedometer and its effect on risk factors for CVD in menopausal women; to analyze the risk factors for mortality in this cohort of women.	The greatest cause of death was CVD.  Diabetes mellitus (DM) and central obesity were associated with higher total mortality.  Traditional risk factors such as sedentary lifestyle, higher alcohol consumption and obesity are directly associated with a worse cardiovascular profile in menopausal women.  DM in menopausal women is associated with an increased risk of total mortality.

Carvalho <sup>(32)</sup>	2013	Dissertation  Quantitative research	To evaluate the food consumption and the prevalence of metabolic syndrome (MS) in postmenopausal women, according to the level of physical activity.	Postmenopausal women had higher daily intakes of protective foods for cardiovascular disease (CVD), as well as foods that represent risk for such diseases were more consumed by inactive women.  The prevalence of MS in inactive women was higher than in active women.
Sousa EP <sup>(33)</sup>	2013	Dissertation  Quantitative research	To assess the risk of cardiovascular disease in middle-aged women with breast cancer.	The prevalence of cardiovascular risk factors was high in middle-aged women with breast cancer and most of them presented moderate and high cardiovascular risk.  Need to include in the follow-up routine of women with breast cancer the evaluation of lipid profile and risk of CVD, paying attention to the adequate control of serum lipid levels.
Olmos <sup>(34)</sup>	2007	Thesis  Quantitative research	To determine the frequency of subclinical thyroid dysfunctions and its association with traditional cardiovascular risk factors and with some psychosocial factors in women aged 40 years or older in their workplace.	No association was found between subclinical thyroid dysfunction and risk factors for cardiovascular disease.  There was no association between subclinical thyroid dysfunction and psychosocial factors (quality of life, somatic and psychological symptoms).
Castro <sup>(35)</sup>	2012	Dissertation  Quantitative research	To analyze indirect methods to evaluate body composition, as well as some changes it shows along the aging process, and to perform associations with coronary risk factors and functional mobility in sedentary women.	There was no significant relationship between sarcopenia and risk factors for CVD, except for BMI as a protection factor.
Sousa <sup>(36)</sup>	2010	Dissertation  Quantitative research	To verify the blood pressure response to a walking program controlled by two models of supervision.	Positive response in the reduction of BP and metabolic cardiovascular risk factors in hypertensive women submitted to a physical exercise program with different degrees of supervision.
Scorsatto <sup>(37)</sup>	2015	Thesis  Quantitative research	To evaluate the effect of the hypoenergetic diet, in association with consumption of eggplant ( <i>Solanum melongena L.</i> ) flour, upon the lipid profile and oxidative stress markers in overweight and obese individuals.	Eggplant flour (EF) presented high fiber content, good content of manganese, zinc and copper, as well as phenolic compounds and saponins with important antioxidant capacity in <i>in vitro</i> assays.  The hypoenergetic diet improved the lipid profile and atherogenic indexes (triglycerides, HDL, visceral adiposity index).  EF improved the antioxidant status in overweight women by increasing the antioxidant capacity.  In metabolically healthy obese women, EF increased the antioxidant capacity and, in metabolically unhealthy obese women, EF reduced fat mass.

Costa <sup>(38)</sup>	2009	Thesis  Quantitative research	To evaluate the effect of soy protein intake on serum lipid levels in adult women.	Positive effects in relation to the reduction of risk factors for cardiovascular diseases, especially serum levels of total cholesterol, LDL, after four weeks of intervention.  The consumption of soy protein isolate is more effective than total milk protein.
Nogueira <sup>(39)</sup>	2013	Thesis  Quantitative research	To evaluate, in obese pre-hypertensive women, the effect of green tea consumption on blood pressure, endothelial function, metabolic profile, inflammatory activity and body adiposity.	Green tea has a beneficial effect on blood pressure and possibly on the endothelial function.

SAH = systemic arterial hypertension; BMI = body mass index; DM2 = type 2 diabetes mellitus; ST = strength training; IL = interleukins; BP = blood pressure; PE = preeclampsia; IMT = carotid intima-media thickness; MS = metabolic syndrome; WtHR = waist-to-height ratio; CVRF = cardiovascular risk factors; PCOS = women with polycystic ovary syndrome. WC = Waist circumference; EF = Eggplant flour.

## DISCUSSION

The risk factors identified in the present review are mostly modifiable because they involve behavioral and environmental aspects, indicating that they can be controlled or even prevented<sup>(5)</sup>. Dyslipidemias are characterized by increased serum levels of total cholesterol (TC) and LDL, and decreased HDL<sup>(40)</sup>. A study of women with breast cancer highlighted the importance of continuous monitoring with biochemical tests in order to identify alterations during treatment. Such changes, when present, may be related to tumor alterations, in addition to the development of other diseases, such as CVDs<sup>(41)</sup>.

With respect to the SAH, this is a multifactorial clinical condition characterized by elevated blood pressure levels, associated with structural and/or functional alterations of the target organs (blood vessels, heart, kidneys and brain), metabolic changes and, consequently, an increased risk of fatal and non-fatal cardiovascular events<sup>(42)</sup>.

The MoH points to obesity and excess weight as important risk factors, since they present a harmful effect on health even when identified in isolation, being also associated with the development of heart diseases. Prevention and early diagnosis actions are crucial for reducing morbidity and promoting health<sup>(43)</sup>. Associated with obesity, sedentary lifestyle stands out, since physical activity is one of the main conducts for CVD prevention and control, in addition to contributing to the quality of life of the population<sup>(5)</sup>.

Regarding the risk factors related to the hormonal aspects and the life cycles of the woman, a study shows that women who had PE during pregnancy had a high frequency of hypertension, dyslipidemia, excess weight/obesity and metabolic syndrome. It is recognized that changes resulting from PE can be reversed after the end of gestation. Nevertheless, there are indications that many functional and metabolic changes might remain and constitute risk factors for CVD<sup>(44)</sup>.

A high amount of research related the development of PCOS in women with the presence of other cardiovascular risk markers. This finding associates this syndrome with several cardiovascular risk factors<sup>(45)</sup>. In this sense, the manifestations of the metabolic syndrome (MS) stand out, and can be observed in many patients with PCOS, involving arterial hypertension, obesity, impaired glucose tolerance and dyslipidemia<sup>(46)</sup>.

Another risk factor related to the hormonal aspect covered the menopause and postmenopausal period. According to the Brazilian Society of Cardiology, at this stage of life, women are more susceptible to other factors, such as obesity, dyslipidemia and metabolic syndrome, which can lead to a high cardiovascular risk<sup>(47)</sup>.

It is imperative to invest in actions of promotion and prevention that make it possible to inform the individuals about the risk factors, so that they can be sensitized and encouraged for behavioral changes, when necessary. These actions can contribute to the quality of life, in addition to preventing and controlling the CVDs<sup>(48)</sup>.

The results of the present review are in line with the I Brazilian Guideline on Cardiovascular Prevention, designed by the Brazilian Society of Cardiology (*Sociedade Brasileira de Cardiologia - SBC*), which addresses the magnitude of CVDs in Brazil and worldwide, and the importance of acting in its prevention, and also emphasizes the main risk factors present in the population<sup>(5)</sup>. It was evidenced the lack of research on some of the risk factors addressed by the SBC, such as smoking, diabetes mellitus, stress and use of contraceptives. This is a relevant finding, since it points out possibilities of new studies, as well as research paths that can be adopted by Nursing. It is emphasized that these are modifiable and/or controllable factors, which may imply health education actions.



It should be noted that some publications were incomplete, which hindered the analysis, and might be considered a limitation of this study. In contrast, the review allowed to recognize pieces of research on the subject, contributing to the construction of knowledge on health and Nursing, focusing on health promotion.

## CONCLUSION

The risk factors prevalent in women are related to metabolic alterations, multifactorial conditions, inappropriate habits and life cycles, such as gestation and hormonal aspects, suggesting the need for health professionals to develop actions for prevention and control of these factors.

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