Integrative Review

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Cardiovascular risk factors in people deprived of their liberty: an integrative review

Fatores de risco cardiovascular em pessoas privadas de liberdade: revisão integrativa

Factores de riesgo cardiovascular en personas privadas de libertad: revisión integradora

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ABSTRACT

Objective: To investigate the scientific evidence on the most frequent risk factors for cardiovascular disease in persons deprived of their liberty.

Methods: An integrative literature review carried out in the CINAHL, Medline/Pubmed, Scopus, LILACS, CUIDEN, Web of Science and Virtual Health Library portal databases using the following keywords: cardiovascular diseases, risk factors, prisons, prisoners.

Results: The final sample consisted of 17 primary articles published in English and Spanish. Overweight and obesity were the most cited cardiovascular risk factors besides diabetes, hypertension, smoking, dyslipidemia, consumption of alcohol and other drugs, physical inactivity, metabolic syndrome, anxiety, depression and unhealthy heart diet.

Conclusions: The most frequent risk factors for cardiovascular disease in persons deprived of their liberty were those classified as modifiable. In the prison setting, these factors are enhanced due to an environment with little modification of these opportunities.

Keywords: Cardiovascular diseases. Risk factors. Prisons. Prisoners.

RESUMO

Objetivo: Investigar as evidências científicas sobre os fatores de risco mais frequentes para doenças cardiovasculares em pessoas privadas de liberdade.

Métodos: Revisão integrativa de literatura realizada nas bases de dados CINAHL, Medline/Pubmed, Scopus, LILACS, CUIDEN, Web of Science e no portal da Biblioteca Virtual de Saúde utilizando os descritores doenças cardiovasculares, fatores de risco, prisões, prisioneiros.

Resultados: A amostra final foi de 17 artigos originais publicados nas línguas inglesa e espanhola. O sobrepeso e a obesidade foram os fatores de risco cardiovascular mais citados além da diabetes, hipertensão, tabagismo, dislipidemia, consumo de álcool e outras drogas, sedentarismo, síndrome metabólica, ansiedade, depressão e dieta pouco saudável para o coração.

Conclusões: Os fatores de risco mais frequentes para as doenças cardiovasculares nas pessoas privadas de liberdade foram os classificados como modificáveis. No meio prisional, esses fatores são potencializados em virtude de um ambiente com poucas oportunidades de modificação desses.

Palavras-chave: Doenças cardiovasculares. Fatores de risco. Prisões. Prisioneiros.

RESUMEN

Objetivo: investigar la evidencia científica sobre los factores de riesgo más frecuentes de enfermedades cardiovasculares en personas privadas de libertad.

Métodos: revisión integradora de la literatura de las bases de datos CINAHL, Medline / Pubmed, Scopus, LILACS, CUIDEN, Web of Science y el portal de la Biblioteca Virtual en Salud utilizando los descriptores de enfermedades cardiovasculares, factores de riesgo, prisiones, prisioneros.

Resultados: La muestra final fue de 17 artículos originales publicados en inglés y español. El sobrepeso y la obesidad fueron los factores de riesgo cardiovascular más citados, además de la diabetes, la hipertensión, el tabaquismo, la dislipidemia, el consumo de alcohol y otras drogas, el estilo de vida sedentario, el síndrome metabólico, la ansiedad, la depresión y una dieta poco saludable para el corazón.

Conclusiones: Los factores de riesgo más frecuentes de enfermedades cardiovasculares en personas privadas de libertad se clasificaron como modificables. En la prisión, estos factores se potencian en virtud de un entorno con pocas oportunidades para modificarlos.

Palabras clave: Enfermedades cardiovasculares. Factores de riesgo. Prisiones. Prisioneros.

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INTRODUCTION

Cardiovascular Diseases (CVDs) are the main cause of morbidity and mortality in Brazil and in the world and include different Risk Factors (RFs), classified as modifiable and non-modifiable. The modifiable RFs include those that are subject to modification by the individual and are related to lifestyle habits, such as dyslipidemia, Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM), smoking, alcohol and other drug consumption, sedentary lifestyle, inadequate diet, overweight and obesity, metabolic syndrome and psychosocial risk factors such as stress, depression and anxiety[1–2]. The non-modifiable risk factors are intrinsically linked to the individual and his family background and include age, gender, ethnicity and family background[1].

People deprived of their liberty and those recently released from prison have a higher risk of hospitalization and death related to CVDs when compared to the general population[3]. There seems to be a connection between having an incarceration background and cardiovascular risk factors, morbidity and mortality[4].

In the USA, the country with the largest prison population in the world, a high rate of chronic diseases has been found in people entering prison, with CVDs ranking second in terms of the most prevalent diseases[5]. In Brazil, a study carried out in prisons in the state of Rio de Janeiro showed that CVDs were among the five most prevalent conditions[6].

This situation may be related to several factors that impact on the cardiovascular health of people deprived of their liberty, as penitentiaries tend to be an unhealthy environment due to overcrowding, poor hygiene conditions, poor ventilation, reduced sunlight and poor quality food[7], in addition to the risky behaviors practiced by inmates, including violence and drug use and insufficient access to health care, which are often precarious[8].

The permanence of people in prisons, with all the aforementioned peculiarities, combined with risky health behaviors, make this place conducive to an increased harm to cardiovascular health. Thus, it is believed that the prison setting may be an enhancer of the risk factors for cardiovascular diseases[9].

The in-depth knowledge on the main risk factors of the population by the health professionals and, especially, by the nurses, allows for the planning and implementation of interventions aimed at prevention. When these factors are reduced or eliminated, morbidity and mortality can be significantly reduced[2].

In Brazil, the role of nurses in prison settings is established through the National Policy for Comprehensive Health Care for Persons Deprived of their Liberty in the Prison System (*Política Nacional de Atenção Integral à Saúde das Pessoas Privadas de Liberdade no Sistema Prisional*, PNAISP), which recommends that the prison health units function as part of the Health Care Network of the Unified Health System. The nurses' activities should be geared towards stimulating actions to promote health and to prevent communicable and non-communicable diseases, in addition to the consequences of imprisonment[10]. In this context, health education is presented as a tool that can be used by the nurses with a view to health promotion and protection, and prevention of diseases, as well as of their complications[11].

Considering all the peculiarities of the population deprived of their liberty, the unhealthy setting, the current illness profile and health risk behaviors, it is justified to carry out studies that investigate the health of this population, especially the cardiovascular one. These findings may contribute to support strategies for the prevention of cardiovascular risk factors in prison settings. Thus, this study aims to investigate the scientific evidence on the most frequent risk factors for CVDs in people deprived of their liberty.

METHODS

This is an integrative literature review carried out according to the following stages: 1) elaboration of the research question; 2) literature search; 3) data evaluation – focus on quality; 4) data analysis – division, exposure and comparison; 5) presentation of the results[12].

The literature search took place during the period of October 1st-31st 2017. The research question was built based on the PICo strategy (P- Population: people deprived of their liberty; I- Interest: risk factors for cardiovascular diseases; Co- Context: deprivation of liberty), which resulted in the following guiding question: What are the risk factors for cardiovascular diseases in people deprived of their liberty?

The databases used were the following: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (Medline/Pubmed), Scopus, Latin American and Caribbean Health Sciences Literature (*Literatura Latino-Americana e do Caribe em Ciências da Saúde*, LILACS), CUIDEN, Web of Science and the Virtual Health Library (*Biblioteca Virtual em Saúde*, BVS) portal.

The descriptors used were the following: *cardiovascular diseases* (*doenças cardiovasculares*), *risk factors* (*fatores de risco*), *prisons* (*prisões*), *prisioners* (*prisioneiros*), all consulted in the Health Sciences Descriptors (*Descritores em Ciências da Saúde*, DeCS) and in the Medical Subject Headings (MeSH). For the crossing of descriptors, the Boolean operator "AND" was used, in the following order: first "*cardiovascular diseases*"

AND "*risk factors*" AND "*prisons*", second "*cardiovascular diseases*" AND "*risk factors*" AND "*prisioners*". Subsequently, crosses were performed in pairs, namely: "*cardiovascular diseases*" AND "*prisons*"; "*risk factors*" AND "*prisons*". In all crossings, the *all fields* search field was selected.

The inclusion criteria of the studies were the following: answering the research question, primarily being observational studies and published in the last five years (2013-2017) for knowledge of the most up-to-date evidence on the subject in question. Reflection articles and experience reports, letters to the editor, systematic and integrative reviews of literature, dissertations, theses and editorials of journals without scientific characteristics were excluded.

The search for articles was performed independently by two researchers. First, the titles and abstracts were read, with a careful selection of articles according to the eligibility criteria. Subsequently, the works selected in the previous stage were read in full. Finally, these studies were reread and analyzed according to the eligibility criteria, only then were the publications that made up the final sample selected. In this sampling process, the results of the two researchers were compared and the differences resolved by consensus or with the inclusion of a third reviewer, when necessary, in order to favor the validation of the selection of studies for analysis.

The search in the databases resulted in 7,834 publications, which were selected according to the eligibility criteria, resulting in the final sample of 17 articles (Figure 1).

To collect data from the articles of the final sample, a previously validated form was used and adapted to this research with the inclusion of a question about cardiovascular risk factors in people deprived of their liberty[13].

Regarding the level of evidence, the studies were evaluated using the methodological approach that was based on the recommendations of the Agency for Health Care Research and Quality (AHRQ). According to their classification, the quality of the scientific evidence is categorized as follows: level 1, meta-analysis of multiple controlled and randomized clinical trials; level 2, individual study with experimental design; level 3, quasi-experimental studies; level 4, descriptive studies (non-experimental) or qualitative approach; level 5, case reports or experience; level 6, expert opinion[14].

In order to facilitate the understanding and schematization of the information obtained, a summary chart of the articles in the final sample was constructed (Chart 1).

RESULTS

Chart 1 presents the synthesis of the articles in the final sample.

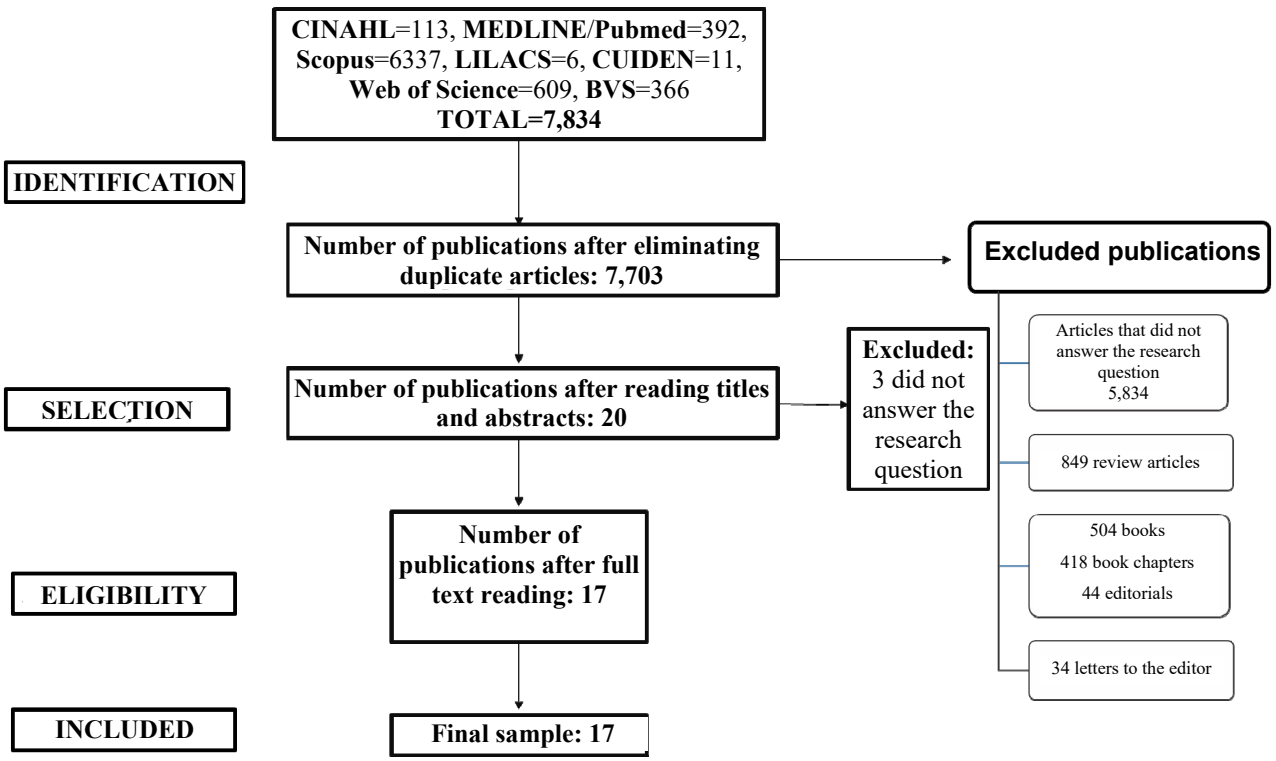

Figure 1 – Flowchart of the selection process and exclusion of the studies in the period between 2013 and 2017.
Source: Research data, 2017.

Author/Year/Level of evidence	Methodological characteristics
Silverman-Retana O et al., 2015[15] Level of evidence = 4	A cross-sectional study conducted with 15,517 prisoners from two large male prisons in the prison system of Mexico City.
Abera SF, Adane K, 2016[16] Level of evidence = 4	A cross-sectional quantitative study in nine large prison configurations in the cities of the Tigray region, in Ethiopia, with 809 inmates.
Voller F et al., 2016[17] Level of evidence = 4	A cross-sectional study, in which a specific clinical record was created using the Python programming language to include the sociodemographic, health and medical diagnoses data of 17,279 prisoners.
Silverman-Retana O et al., 2016[18] Level of evidence = 4	A cross-sectional study including 496 prisoners with hypertension or diabetes from two large male prisons in Mexico City.
Nowotny KM, Rogers RG, Boardman JD, 2017[19] Level of evidence = 4	Comparable physical health indicators were examined using two large and representative cross-sectional samples of adults in and out of prisons at the national level, namely: survey of insiders from 2004 state and federal justice statistics institutions and the National Health and Nutrition Examination Survey (NHANES).
Pont MM et al., 2014[20] Level of evidence = 4	A cross-sectional epidemiological study with 71 patients, >45 years old, infected with HIV, carried out in 2008 at the outpatient clinic of the Terrassa hospital (Barcelona) and in 2009 at the Brians I Penitentiary Center (PC) in Barcelona.
Martínez-Delgado MM, Ramírez-López C, 2016[21] Level of evidence = 4	A cross-sectional descriptive study carried out at the Soria Penitentiary Center with 33 prisoners. An intervention was carried out in 4 sessions, the first being an individual interview and the remaining 3, in groups.
Baldwin N, Clarke JG, Roberts MB, 2016[22] Level of evidence = 4	A descriptive study conducted from May to August 2014, with 103 men who were in the Rhode Island Correctional Institution for Adults.
Gates ML, Bradford RK, 2015[23] Level of evidence = 4	A retrospective longitudinal study for 2005-2011, conducted with 2,932 individuals from a department of state corrections in the United States. The data were extracted from a state electronic health and infraction management system of the department of state corrections.
Lagarrigue A et al., 2017[24] Level of evidence = 4	A descriptive, cross-sectional study carried out with 51 prisoners from the correctional institution for adults in *Seysse*, France.
Hannan-Jones M, Capra S, 2016[25] Level of evidence = 4	A cross-sectional study with a convenience sample of prisoners in an Australian prison facility.
Vera-Remartínez EJ et al., 2014[26] Level of evidence = 4	A multi-centre cross-sectional descriptive study carried out in 9 penitentiary centers in Spain with a sample of 1,077 individuals.
Bai JR et al., 2015[5] Level of evidence = 4	A cross-sectional study in which medical records and interview questionnaires of 759 newly admitted inmates in two maximum security prisons were analyzed: the Penitentiary Institute of Bedford Hills for Women and the Sing Sing Correctional Facility for Men, both in New York City.
Geitona M, Milioni SO, 2016[27] Level of evidence = 4	A cross-sectional, descriptive research in the department of female detention in Korydallos (Greece).

Chart 1– Summary of the studies according to authorship, year, level of evidence and methodological characteristics

Author/Year/Level of evidence	Methodological characteristics
Bautista-Arredondo S et al., 2015[28] Level of evidence = 4	A cross-sectional, descriptive study conducted with 15,517 men and 1,779 women in two male and two female prisons in Mexico City.
Drach LL et al., 2016[29] Level of evidence = 4	A cross-sectional study conducted in June 2014. Height and weight measurements were taken of 134 inmates of the Coffee Creek Correctional Facility.
Martínez-Vicente JR, Baile JI, González-Calderón MJ, 2014[30] Level of evidence = 4	A cross-sectional study in which 122 inmates of a Spanish prison center were selected systematically between November and December 2013.

Chart 1– Cont.
Source: Research data, 2017.

Eight articles were found in Medline/Pubmed[5,15,17–18,21,23,25,28], seven in Scopus[16,19–20,22,24,29,30], one in CUIDEN[26] and one in Web of Science[27]. All the articles had an evidence level of 4[5,15–30]. The USA[5,19,22–23,29] presented more publications on the theme, followed by Spain[20–21,26,30], Mexico[15,18,28], Australia[25], Greece[27], Ethiopia[16], Italy[17] and France[24]. Regarding the language of the publications, English prevailed[5,13–17,20–23,25–27], followed by Spanish[20–21,26,30].

Chart 2 shows the cardiovascular risk factors found in the articles and the countries where the studies were conducted. The cardiovascular risk factors most frequently found in the articles were overweight and obesity (n=14), followed by diabetes (n=11), hypertension (n=10), smoking (n=10), dyslipidemia (n=7), consumption of alcohol and other drugs (n=5), physical inactivity (n=4), metabolic syndrome (n=3), anxiety and depression (n=3), and unhealthy heart diet (n=2).

Cardiovascular risk factors	Number of articles	Studied countries
Overweight and Obesity[5,15,17,19–26,28–30]	14	Mexico, Italy, Spain, USA, France and Australia
Diabetes[5,15,17–21,23,25,26,28]	11	Mexico, Italy, Spain, Australia and USA
Hypertension[15,17–21,23,25–26,28]	10	Mexico, Italy, Spain, Australia and USA
Smoking[5,16,17,20–21,24–28]	10	Mexico, Greece, Italy, Spain, Australia, USA and Ethiopia
Dyslipidemia[17,20–21,23,25,26,28]	7	Mexico, Italy, Spain, Australia and USA
Consumption of alcohol and other drugs[5,21,26–28]	5	Mexico, Greece, Spain and USA
Sedentarism[20,24,26,28]	4	Mexico, Spain and France
Metabolic syndrome[15,24–25]	3	Mexico, France and Australia
Anxiety and Depression[24,27–28]	3	Mexico, Greece and France
Unhealthy heart diet[15,20]	2	Mexico and Spain

Chart 2 – Description of the cardiovascular risk factors and countries where the studies were conducted
Source: Research data, 2017.

DISCUSSION

Most of the studies in this review have shown overweight and obesity in the prison population as important RFs for the onset of CVDs[5,15,17,19–26,28–30]. Obesity has a multi-factorial nature and is considered one of the relevant factors for the increase of chronic diseases, as it is often associated with other diseases, such as arterial hypertension, dyslipidemia and type 2 diabetes[2].

A study conducted in a prison in France found that incarceration worsened the obesity rate in both genders (21.2% in women and 16.7% in men). Abdominal obesity, estimated

through waist circumference, was particularly prevalent in women (69.7%) versus men (27.8%) and was associated with low physical activity, higher blood pressure and eating disorder[24]. It is important to highlight that, when compared to the body mass index, abdominal obesity is a stronger predictor of diabetes risk, health risk associated with obesity and global risk factors of cardiovascular risk[31].

A meta-analysis study showed that men deprived of their liberty are less likely to be obese than men in the general population, while women prisoners are more likely to be obese than women who are not in prison[32]. This condition can be justified by the more sedentary lifestyle of women in the prison setting when compared to men since, during the period of incarceration, women have limited opportunities for recreational and physical activities[23]. Accordingly, a research study conducted in prisons in France and Mexico found that women had a more sedentary lifestyle, with less physical activity than men during incarceration[24,28].

Other contributing factors to the increased cardiovascular risk found in some studies in this review were unhealthy heart diet[15,20] and dyslipidemia[17,20–21,23,25–26,28]. According to the World Health Organization, insufficient intake of fruits, vegetables, legumes and dyslipidemia associated with hypertension, overweight or obesity, physical inactivity, and smoking are among the most relevant RFs for morbidity and mortality associated with chronic diseases[33]. In this review, a study carried out in a Penitentiary Center in Barcelona showed that 89.7% of the prisoners did not follow healthy heart diet[20].

It is necessary to consider that the food provided by prison institutions is sometimes nutritionally inadequate with high concentrations of sodium, calories and lipids, and low in fiber and vitamins. In addition, prisoners are often able to purchase other foods, which are almost always low in nutrients and high in sodium and lipids, which are not good for cardiovascular health. It is believed that this may also be a contributing factor to weight gain in prison settings, coupled with the low rate of physical activity[34].

Regarding dyslipidemia, seven studies showed significant levels of this condition among prisoners[17,20–21,23,25–26,28]. In a survey conducted in Italian prisons in 2016, dyslipidemia was the most prevalent condition (3.7%) among the endocrine, nutritional and metabolic diseases[17].

Regarding SAH, ten studies highlighted it as cardiovascular RF in prisons[15,17–21,23,25–26,28]. Two large studies carried out respectively in Italian and American prisons have shown that SAH is the chronic disease that most affects individuals deprived of their liberty, with percentages of 7.1% and 21%, respectively[17,23]. SAH is the main RF for CVDs, being a clinical condition associated with high mortality. It is considered a worldwide public health problem, with low control rates and high prevalence rates[35].

Another RF listed by the articles in this review was diabetes[5,15,17–21,23,25–26,28]. The articles showed very similar percentages of this disease in prisoners, with a prevalence of around 5% in some studies[19,23,25–26]. This prevalence is expected to increase in the prison population in the coming years, due to their aging and to the early onset of the disease[36].

Knowledge about cardiovascular risk factors, especially pathologies such as dyslipidemia, hypertension and diabetes, must be promoted and disseminated since behavioral changes are capable of having a positive impact, especially in the prison environment. One way to promote this knowledge is through the implementation of educational interventions by the nurses, interventions which may also contribute to their empowerment, better management of their own health, and the consequent change in behavior[37].

All the RFs discussed here contribute significantly to the development of metabolic syndrome, another RF presented in three articles of this review[15,24–25]. The percentage of prisoners with this disease in a study conducted in France in 2017 was 33% in women versus 0% in male prisoners[24]. Metabolic syndrome, associated with mental stress, depression, smoking and low estrogen levels after menopause, strongly contribute to the cardiovascular disease of women deprived of their liberty[38].

Regarding drug use, the studies have discussed smoking and alcohol and other drug use in prison settings. Ten studies[5,16–17,20–21,24–28] showed significant data about smoking, which appeared as the most prevalent RF in people deprived of their liberty, with percentage values above 50% in most of the studies[5,17,20–21,24–28]. Smoking is the main RF for CVDs worldwide. In the prison population, smoking has been reported as a factor associated with a higher risk of death among prisoners[39].

A study carried out with Brazilian women deprived of their liberty presented the initiated/increased smoking abuse and the compromised health-seeking behavior among the most frequent nursing diagnoses. These findings corroborate the data from the studies in this review and announce the relevance of the evaluation by nurses in prison settings[40]. Through these nursing diagnoses, nurses can implement actions aimed at smoking cessation, also contributing to the promotion of cardiovascular health for people deprived of their liberty.

Regarding the consumption of alcohol and other drugs, a study carried out at the penitentiary center in Spain showed a rate of 15.1% consumption of alcohol and of

30.3% consumption of other drugs[21]. Crack and cocaine are among the most consumed drugs, with percentages above 30%[5,26]. The reported use of illicit substances was highly present among the study participants in Mexico, in which 69.9% of men and 59.1% of women reported having used drugs[28]. Drug use before, during and after imprisonment may pose risks for CVDs[41].

The consumption of illicit drugs has a high potential to promote changes in the cardiovascular system, which depend on the type of drug. Among the main cardiovascular changes are acute myocardial infarction, arrhythmias, aortic dissection and sudden cardiac death[42].

The high consumption of substances such as alcohol and illicit drugs among women should be a highlight in some articles included in this review[28–29]. A study carried out with women deprived of their liberty in the USA found that 49% of them reported one or more episodes of compulsive drinking (more than four drinks at a time) and 81% reported illicit drug use in the three months prior to incarceration[29].

Psychosocial risk factors need to be considered in populations deprived of their liberty, since excessive stress can lead to psychological reactions that trigger depression and anxiety, both factors also involved in the genesis of the CVDs and discussed in three studies of this review[24,27–28]. The clinical symptoms of depression are related to the increased incidence and recurrence of cardiovascular events, which highlights this morbidity when it comes to the cardiovascular risk factor[43].

The psychosocial risk factors are related to mechanisms of biological changes such as endocrine, autonomic, hemostatic, inflammatory, endothelial activity, among others, that participate in the genesis of cardiovascular diseases[2].

Most of the cardiovascular risk factors presented by the studies are classified as modifiable, since they are subject to modification through behavioral changes, which can be stimulated through health education actions. Nurses are professionals trained to act with these actions and to promote healthy habits, to protect cardiovascular health, such as healthy eating, weight control, smoking cessation and physical activity, helping individuals to be proactive in minimizing their risk, with the objective of reducing their exposure to the modifiable risk factors[44].

In the prison setting, the cardiovascular RFs are enhanced due to this environment of deprivation not only of freedom, but also of opportunities to modify the RFs since, in these scenarios, the development of actions that impact on these factors is often limited. In view of this, the assistance of the nurses in the prison system becomes necessary with the planning and implementing measures that promote a healthy lifestyle and contribute to the control of the cardiovascular RFs in people deprived of their liberty.

No Brazilian study was found, a fact that announces the scarcity of studies related to this theme in that country, thus being a suggestion for the development of future research. Among other gaps identified, the lack of description in the articles of how the prison units minimized the identified risk factors stands out.

The results of this review should be considered in light of its limitations: only the use of controlled descriptors and the limitation of the search to the 2013-2017 period. However, it is understood that these are current and quality results, found in important health databases and representative of the state of the art on the subject. It is also noteworthy that, although only observational studies were included in the sample, few experimental research studies on the topic were found in the search process, which should be a guide for the development of studies.

CONCLUSIONS

The most frequent RFs for CVDs in people deprived of their liberty were those classified as modifiable. Noteworthy are overweight and obesity, diabetes, hypertension, smoking, dyslipidemia, consumption of alcohol and other drugs, physical inactivity, metabolic syndrome, anxiety, depression and unhealthy heart diet. Older individuals and women were more affected by the cardiovascular risk factors, so they should receive special attention with the development of new research and specific prevention measures. No studies were found in Brazil, also suggesting the development of studies with this population in that country.

The considerable prevalence of all the aforementioned risk factors puts prison populations on alert for the development/aggravation of the CVDs, especially when considering all the burden that the prison situation promotes on the health of the prisoners.

This study contributes to the practice of the nurses working in prison institutions to subsidize for the planning and development of educational interventions aimed at promoting cardiovascular health and at minimizing the modifiable cardiovascular risk factors.

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