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PROTECTIVE FACTORS RELATED TO MYOCARDIAL INFARCTION: INTEGRATIVE REVIEW

FATORES DE PROTEÇÃO RELACIONADOS AO INFARTO DO MIOCÁRDIO: REVISÃO INTEGRATIVA

PROTECTIVE FACTORS RELATED TO MYOCARDIAL INFARCTION: INTEGRATIVE REVIEW

FACTORES DE PROTECCIÓN RELACIONADOS CON EL INFARTO DE MIOCARDIO: REVISIÓN INTEGRADORA

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ABSTRACT

Objective: to identify, in the scientific literature, measures that are established as protective factors to prevent the development of acute myocardial infarction. **Methods:** this is an integrative review with searches in two databases, without the use of filters. Original articles published between 2014 and 2018 were included, without additional searches and in Portuguese, English and Spanish. Data collection was performed manually by two researchers independently. The analysis was performed descriptively, highlighting the protective factors listed by the authors. **Results:** six studies were considered eligible that presented physical activity, vaccination against influenza, social integration and the inclusion of olive oil or extra virgin olive oil in the diet, as protective factors. **Conclusions:** it was possible to evidence four protective factors that can prevent the development of acute myocardial infarction, which, combined with preventive measures widely discussed in the literature, can collaborate to reduce the incidence of obstructive events.

Descriptor: Protective Factors; Myocardial Infarction; Nursing Care; Nursing.

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RESUMO

Objetivo: identificar, na literatura científica, as medidas que se estabelecem como fatores de proteção para evitar o desenvolvimento do infarto agudo do miocárdio. **Métodos:** trata-se de uma revisão integrativa com as buscas em duas bases de dados, sem a utilização de filtros. Foram incluídos artigos originais publicados entre 2014 e 2018, sem buscas adicionais e nos idiomas português, inglês e espanhol. A coleta de dados foi realizada de forma manual por dois pesquisadores de forma independente. A análise foi realizada de forma descritiva, evidenciando os fatores de proteção elencados pelos autores. **Resultados:** foram considerados elegíveis seis estudos que estes apresentaram a atividade física, a vacinação contra influenza, a integração social e a inclusão do azeite de oliva ou azeite extra virgem na alimentação, como fatores de proteção. **Conclusões:** foi possível evidenciar quatro fatores protetivos que podem evitar o desenvolvimento do infarto agudo do miocárdio, que aliados às medidas preventivas amplamente discutidas na literatura, podem colaborar para redução na incidência dos eventos obstrutivos.

Descritores: Fatores de Proteção; Infarto do Miocárdio; Cuidados de Enfermagem; Enfermagem.

RESUMEN

Objetivo: identificar, en la literatura científica, las medidas que se establecen como factores de protección para prevenir el desarrollo del infarto agudo de miocardio. **Métodos:** se trata de una revisión integradora con búsquedas en dos bases de datos, no se usaron filtros. Se incluyeron artículos originales publicados entre 2014 y 2018 en portugués, inglés y español, no se realizaron búsquedas adicionales. La recolección de datos fue realizada manualmente por dos investigadores de forma independiente. El análisis se realizó de forma descriptiva, destacando los factores de protección enumerados por los autores. **Resultados:** se consideraron elegibles seis estudios que presentaron como factores de protección la actividad física, la vacunación contra la influenza, la integración social y la inclusión de aceite de oliva o aceite de oliva extra virgen en la dieta. **Conclusiones:** se detectaron cuatro factores de protección que pueden prevenir el desarrollo de infarto agudo de miocardio, los cuales, combinados con medidas preventivas ampliamente discutidas en la literatura, pueden colaborar para reducir la incidencia de eventos obstructivos.

Descriptor: Factores de Protección; Infarto del Miocardio; Atención de Enfermería; Enfermería.

INTRODUCTION

Among the main causes of mortality in the world, cardiovascular diseases (CVD) stand out, being also responsible for outcomes with irreversible damage to health, causing limitations and dependencies, which influence the quality of life of patients.[1] According to the World Organization of Health (WHO), approximately 23.6 million people will die in 2030 from CVD.[2]

Among these diseases, acute myocardial infarction (AMI) stands out for its incidence, which is characterized as an abrupt ischemic condition, which reflects in the death of cardiac cells, resulting from the imbalance between the supply and demand of nutrients and oxygen to the heart muscle, due to obstruction of coronary flow, for a

short or prolonged time, sufficient to cause necrosis of cardiac cells, requiring immediate interventions.[3]

Risk factors for AMI are divided into two non-modifiable groups that include age, ethnicity, sex and family history; and modifiable such as smoking, obesity, diabetes mellitus, sedentary lifestyle, arterial hypertension, alcohol consumption and inadequate diet.[4] Its main physical manifestations are: intense chest pain that can radiate to the left upper limb; epigastric pain; nausea; vomiting; tachypnea; sweating; and pallor.[5]

AMI has a high rate of morbidity and mortality, whether in the phase of exacerbation of symptoms, as well as in the post-infarction period, since secondary problems can be evidenced that reflect the need for immediate intervention.[6] To this end, minimize modifiable risk factors and the adoption of a lifestyle focused on protective factors against potential future ischemic events are essential for reducing morbidity and mortality rates.

Thus, the present review is justified, given that knowing the protective factors related to AMI can favor the adherence to preventive measures in order to minimize modifiable risk factors, with the objective of reducing the incidence of the disease, and of possible impacts on quality of life. To this end, the objective was to identify, in the scientific literature, the measures that are established as protective factors to prevent the development of acute myocardial infarction.

METHOD

This is an integrative review, as it gathers findings from studies developed using different methodologies, with the aim of deepening knowledge about the investigated topic, through the following phases: problem formulation; data collect; data evaluation; analysis and interpretation of data; disclosure of data.[7]

The search process included six organizational and sequential phases, namely: identification of the theme and/or research question; definition of criteria for inclusion and exclusion of studies and literature search; definition of the information to be extracted from the selected studies in order to answer the research question; selection after evaluation of the studies included in the review; interpretation of results; and synthesis of findings.[8]

The elaboration of the search strategy was verified through the development of the guiding question, through the PICO strategy, represented by an acronym, being (P) for Population or Patient, (I) for Intervention, (C) for Control or Comparison and (O) for the Outcome or "Outcomes". Thus, the guiding question was structured: "Which measures are

established as protective factors for the prevention of acute myocardial infarction described in the literature?"

To answer the guiding question, searches were carried out in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE®), via PubMed®, as it indexes important journals in the area of health sciences; and SCOPUS®, since this is an interdisciplinary base widely used by the scientific community and indexer of important journals in the health area. Access to the databases occurred through the CAPES Periodicals Portal, via the Federal University of Rondonópolis.

Descriptors were defined according to the Medical Subject Heading (MeSH) in both databases, namely: "prevention and control", "myocardial infarction" and "protection". All combinations between the descriptors were performed using the Boolean operator AND.

The inclusion criteria defined for the selection of articles were: articles available in full in the selected databases, published between the period 2014 to 2018, with levels of evidence9 1, 2, 3 and 4, according to the Oxford Center for Evidence- based Medicine,[9] being considered only articles from research, as they were primary studies that brought in their results some protection factor from a consistent statistical analysis. Articles that presented the results in the form of brief communications were excluded.

Data collection took place between the months of May and October 2019, by two researchers independently and a third to assist in the constitution of the final sample. The articles were selected by reading the titles, which were related to the theme in question. Subsequently, the analysis of the titles, the eligibility process was carried out through a careful reading of the abstracts, being included in the final sample those who approached the central subject in line with the guiding question.

The data extracted from the articles included in the final sample of this review allowed the synthesis of the scientific production on the subject, based on the use and adaptation of the questionnaire8 constructed and validated by Brazilian researchers containing the following characteristics: authors' names, year of publication, level of evidence, country where the research took place, title of the manuscript, journal in which the study was published, study design, study sample and the protective factors referenced by the authors.

The qualitative analysis of the findings was based on the collection of information presented by the six articles selected to compose the review, regarding the protection factors for AMI, without the use of instruments that attribute metrics to

the protection factors found in the literature, since this is an integrative literature review.

For the description of the study, the flowchart Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA)10 was used, which organized the search and selection of studies, as shown in Figure 01.

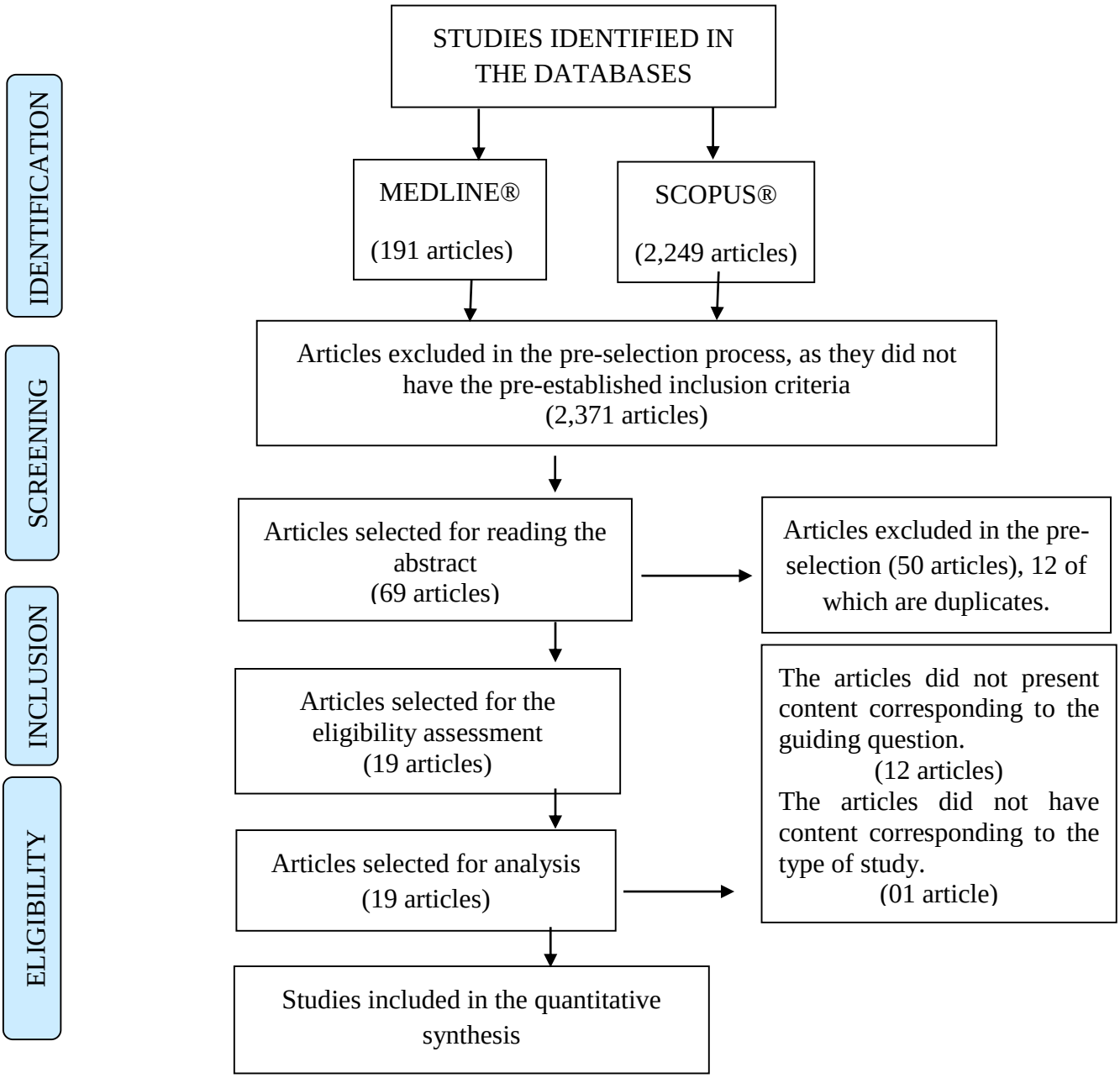

Figure 01: Flowchart for selecting the studies found, according to PRISMA, Rondonópolis - MT, Brazil, 2019.

RESULTS

Initially, 2,440 productions were found in the databases. Of these, 2,371 were excluded for not meeting the proposed inclusion criteria. Thus, sixty-nine articles were selected for reading the title and abstract, excluding fifty articles, so

proceeded to read in full and evaluate nineteen articles, of these, six responded to all the criteria established in this review and made up the corpus of this study.

A total of six scientific articles were found that brought the protective factors for the prevention of AMI, through research carried out in different countries. The articles were classified according to the level of evidence, with two randomized clinical trials, level of evidence 2, three case-control studies and a cohort study, level of evidence 4.

These were studies carried out in different countries on the European, American and Asian continents: China (03), Spain (01), Taiwan (01), United States (01). All studies aimed to evidence at least one protective factor to prevent the development of AMI, in populations with or without comorbidities.

Table 01 presents the characteristics of the articles found, from the name of the authors, year of publication, level of evidence, country that developed the study, title of the manuscript in the language of origin, published journal, database, objective of the study, methodological design, population or sample, methodological compliance scale, and finally the protective factors evidenced in the literature.

Table 01: Characterization of the articles found to compose the corpus of the review, Rondonópolis – MT, Brazil, 2019.

Author, Year of Publication, Level of Evidence, Country of Origin	Title of the manuscript and published journal	Design, Objective and Sample	Main results
Cheng et al. (2014)[11] NE: 04 China	Physical activity levels, sport activities and risk of acute myocardial infarction: results of the interheart study in china. Coronary Heart Disease.	A case-control study aimed at evaluating physical activity at work and leisure in relation to acute myocardial infarction (AMI) in the Chinese population. A total of 2909 patients with infarction and 2947 controls, free of CVD, participated in the study.	Moderate work-related physical activity (PA) (walking) (OR: 0.80; 95% CI: 0.65-0.98) and leisure-time exercise (4 to 5 hours of sports per week reduces the risk of AMI) (OR: 0.74 95% CI: 0.61-0.90).
Guasch-ferré et al. (2014)[12] NE: 02 Espanha	Olive oil intake and risk of cordiovascular diase and mortality in the predimed study. BMC Medicine	Randomized Clinical Trial with the objective of evaluating the association between olive oil consumption and the risk of CVD for a specific and global cause. A total of 7,447 participated in the study, being men between 55-80 years old and women between 60-80 years old.	Higher consumption of olive oil and extra virgin olive oil is associated with reduced CVD and risk of mortality. Being a protective factor in the prevention of CVD (RR: 0.66; 95% CI: 0.48-0.91), as well as for reducing CVD mortality (RR: 0.56; 95% CI: 0.31-1.02).

Chiang et al. (2017)[13] NE: 04 Taiwan	Association between influenza vaccionation and reduced risks of major adverse cardiovascular events in elderly patients. Am Heart J	A case-control study aimed at determining the protective effect of the influenza vaccine against adverse cardiovascular events in elderly patients. A total of 80,363 Cases (patients with adverse cardiovascular events) and 80,363 controls participated in the study.	Influenza vaccination was associated with reduced risk of myocardial infarction (AMI) OR: (0.80, 95% CI: 0.78-0.82).
Chang et al. (2017)[14] NE: 04 Estados Unidos	Social integration and reduced risk of coronary heart diase in womwn: the role of lifestyle behaviors. Cir Res	Cohort study aimed at examining the associations between social integration and risk of incident coronary heart disease in a prospective female cohort. A total of 76,362 women participated in the study.	Social integration may reduce the risk of developing nonfatal myocardial infarction, as it leads to improved health-promoting behaviors (OR: 0.55, 95% CI: 0.41–0.73).
Gong, Chen, Li (2015)[15] NE: 02 China	Efficacy of a community-based physical activity program km2h2 for stroke and heart attack prevention a among senior hypertensive patients: a cluster rondomized controlled phase –II Trial. PLoOne	Randomized Clinical Trial with the objective of evaluating the effectiveness of the "move" to a healthy brain program in encouraging physical activities to prevent myocardial infarction and stroke in patients enrolled in the community-based hypertension control program. The study included 232 patients from the intervention group and 218 control groups (hypertensive patients aged over 55 years).	Physical activity (KM2H2 Program) for hypertensive patients (RR: 0.51 for AMI; RR: 0.36 for hypertension).
Zhao et al. (2017)[16] NE: 04 China	Association between time of day of sports-related physical activity and the onset of acute myocardial infarction in a chinese population. PLoOne	A case-control study aimed at investigating the association between time of day of sport-related physical activity and the onset of acute myocardial infarction in a population with coronary artery disease in China. A total of 348 patients (non-AMI group) and 348 patients (AMI group) participated in the study.	Physical activity, with activity time greater than 60 minutes per day (OR: 0.67; 95% CI: 0.55-0.82).

Source: Research data.
Legend: NE: Level of Evidence; OD: Odds ratio; RR: Relative Risk; CI: Confidence interval; CVD: Cardiovascular disease; AMI: Acute myocardial infarction.

Based on the findings, it was possible to identify moderate physical activity, consumption of olive oil or extra virgin olive oil, influenza vaccination and social integration, as protective factors described by the authors of the studies included in this review and discussed in the next section of this manuscript as thematic categories. Thus, these factors were divided into thematic categories for a better discussion of the findings.

DISCUSSION

For the description of the evidence found, we chose to categorize the protective actions, namely: "Performance of moderate physical activity", "Vaccination against influenza", "Consumption of olive oil or extra virgin olive oil" and "Social integration".

Moderate physical activity

Physical inactivity has been considered one of the biggest public health problems, with a sedentary lifestyle being strongly associated with mortality from CVD. In this sense, one of the studies brought the adoption of a more active lifestyle as fundamental in the fight against different chronic conditions[17], including CVD.

As evidenced by three Chinese studies, the practice of regular physical activity was considered a protective factor for the prevention of AMI, since in the respective studies this measure showed statistical significance.[11,15,16]

According to research carried out in China, moderate physical activity related to work, especially when walking during work, was considered a protective factor to prevent cardiovascular diseases, including AMI. The study revealed that the practice of leisure exercises, four to five hours a week, considered as sports practice, proved to be efficient in the prevention of CVD when compared to the sedentary population.[11]

Another study carried out in China showed positive aspects inherent to the implementation of the KM2H2 Program for hypertensive patients with a view to preventing AMI in this population. The research consisted of implementing physical activity in a group of 232 patients (intervention group) and comparing it with the group of 218 (control group), three and six months after the start of the intervention. In this way, the researchers evidenced the effectiveness of the program in terms of reducing the systemic blood pressure of each study participant to prevent AMI.[12]

Still regarding the practice of physical activity, another Chinese study revealed the effectiveness of practicing sports for more than sixty minutes a day as a protective measure to avoid AMI.[16]

It is possible to say that the practice of regular physical activity activates local and systemic circulation, through vasoconstriction, allowing adequate blood flow throughout the body.17,18,19 Physical activity is linked to body movement, energy expenditure in relation to the resting condition, being classified as light, moderate and high.[16,19] Exercise itself is defined as a set of structured activities, with the objective of improving cardiorespiratory fitness, balance, strength,

flexibility and stimulation of function. cognitive.[17]

Influenza vaccination

From another perspective, it is important to highlight that the risks of adverse cardiovascular events increase in the presence of installed infectious processes, such as infectious agents similar to influenza.[20] Thus, another protective factor evidenced in the literature was vaccination against influenza. According to the study carried out in Taiwan, in which 80,363 patients with cardiovascular events and 80,363 without a history of cardiovascular disease participated in the study, influenza vaccination was considered a protective measure, with a view to verifying the odds ratio, when comparing the two populations studied by the authors.[13]

The Brazilian Society of Cardiology emphasizes that the influenza vaccine is of great importance to patients with heart disease in order to reduce their morbidity and mortality, being a priority for individuals who have coronary artery disease (angina pectoris or AMI) and systemic arterial hypertension, if they have a lesion in target organ[17], in Brazil, indicated for any chronic condition.

According to the Brazilian Immunization Society, everyone is susceptible to infection by the Influenza virus, however, some groups are considered priority groups, as they are more likely to develop the most severe forms of the disease. The priority groups are formed by: children under five years old, pregnant women, postpartum women, adults over sixty years old and individuals with chronic diseases, especially CVD.[21]

Consumption of olive oil or extra virgin olive oil

Regarding nutritional and dietary aspects, a diet rich in nutrients and restriction of the intake of foods with high lipid content was considered a protective factor[17,19], corroborating the national consensus and Brazilian guidelines for the prevention of dyslipidemia. The reduction in the percentage of fat in the diet directly interferes with the serum levels of low-density lipoproteins and triglycerides, together with the total restriction of foods with a high content of transsaturated fatty acids, become protective factors against the ischemic event.[17]

Also with regard to nutritional aspects, the study carried out in Spain showed the consumption of olive oil or extra virgin olive oil as a protective factor for the risk of CVD, especially AMI, as well as a reduction in mortality when compared to individuals who use of other types of oils (oils).[12]

With the objective of controlling dyslipidemia and preventing obstructive events (atherosclerosis), nutritional therapy should be implemented by individuals predisposing to the accumulation of lipids in the walls of the vessels, especially in the coronary arteries, as a protective factor, associated with weight loss and cessation of smoking.[17]

Social integration

Finally, the protection factor with a focus on social integration was evidenced in the study with North American women, in which it was identified that the improvement in behaviors aimed at health promotion based on social interaction, favored the reduction of the risks of developing AMI in women said population studied.[14]

Social integration has collaborated positively both in coping with individuals with CVD and in constructive relationships with other people, permeating a life purpose based on individual and collective achievements, including the family and the relationships that are established in it.[17]

Although the objective of this review was achieved through the synthesis of the knowledge already produced on the subject, it was considered that the studies carried out with different methodologies partially indicated the protective measures to avoid AMI. Furthermore, few methodologically consistent studies were found. In this perspective, observational studies in the Brazilian scenario are necessary to facilitate the identification of protective factors in the local community, so that future interventions can be devised in order to meet health needs, encouraging appropriate practices of health promotion and prevention of new ischemic events.

CONCLUSION

The present review showed four protective factors aimed at the prevention of acute myocardial infarction, with emphasis on the importance of regular physical activity inserted in the activities of daily living of individuals with cardiovascular disease or not; social integration in order to favor the adoption of health promotion measures from an active social life; the use of olive oil and/or extra virgin olive oil, however, with moderate use and the vaccination against influenza recommended annually to priority groups, in which patients with CVD are included.

The limitations of the study are related to temporal delimitation, language delimitation and the absence of searches in national databases, so that the discussion was aligned with the scope of national consensus.

REFERENCES

1. Teston EF, Cecilio HPM, Santos AL, Arruda GO, Radovanovic CAT, Marcon SS. Fatores associados às doenças cardiovasculares em adultos. Medicina (Ribeirão Preto) [Internet]. 2016 abr [citado em 22 mar 2019]; 49(2):95-102. Disponível em: http://www.revistas.usp.br/rmrp/article/view/118390

2. Organização Pan-Americana da Saúde. Organização Mundial da Saúde. Doenças cardiovasculares [Internet]. Brasília: OPAS, OMS; 2017 [citado em 12 ago 2020]. Disponível em: https://www.paho.org/bra/index.php?option=com_content&view=article&id=5253:doencas-cardiovasculares&Itemid=839

3. Costa FAS, Parente FL, Farias MS, Parente FL, Francelino PC, Bezerra LTL. Perfil demográfico de pacientes com infarto agudo do miocárdio no Brasil: revisão integrativa. Sanare (Sobral, Online) [Internet]. 2018 jul/dez [citado em 16 mar 2019]; 17(2):66-73. Disponível em: https://sanare.emnuvens.com.br/sanare/article/view/1263/671

4. Ferreira EF, Assis RC, Faria AKN, Chaves CG, Souza ASD, Zani HP, et al. Perfil epidemiológico e avaliação de fatores de risco para doença cardiovascular em pacientes atendidos em uma clínica escola de fisioterapia. Rev Educ Saúde [Internet]. 2017 dez [citado em 24 jan 2019]; 5(2):19-25. Disponível em: http://periodicos.unievangelica.edu.br/index.php/educacaoemsaude/article/view/2642/2161

5. Smeltzer SC, Bare BG, Hinkle JL, Cheever KH. Tratado de enfermagem médico-cirúrgica. 14ed. Rio de Janeiro: Guanabara Koogan; 2019. 27 p.

6. Vargas RA, Riegel F, Oliveira Junior N, Siqueira DS, Crossetti MGO. Quality of life of patients after myocardial infarction: literature integrative review. Rev Enferm UFPE on line [Internet]. 2017 Jul [citado em 29 jan 2019]; 11(7):2803-09. Disponível em: https://periodicos.ufpe.br/revistas/revistaenfermagem/article/view/23456/19171

7. Whittemore R, Knafl K. The integrative review: updated methodology. J Adv Nurs. [Internet]. 2005 [citado em 08 jul 2021]; 52(5):546-53. Disponível em: https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2648.2005.03621.x

8. Ursi ES, Galvão CM. Prevenção de lesões de pele no perioperatório: revisão integrativa da literatura. Rev Latinoam Enferm. [Internet]. 2006 jan/fev [citado em 29 mar 2019]; 14(1):124-31. Disponível em: https://www.scielo.br/j/rlae/a/7hS3VgZvTs49LNX9dd85VVb/?format=pdf&lang=pt

9. Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & healthcare. A guide to best practice. 4th ed. Philadelphia: Wolters Kluwer; 2019. 08 p.

10. Moher D, Shamseer L, Clarke M, Ghersi D, Liberrati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev. [Internet]. 2015 Jan [citado em 27 out 2019]; 4(1):1-9. Disponível em: https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/2046-4053-4-1

11. Cheng X, Li W, Guo J, Wang Y, Gu H, Teo K, et al. Physical activity levels, sport activities, and risk of acute myocardial infarction: results of the INTERHEART study in China. Coronary Heart Disease [Internet]. 2013 Jan [citado em 27 jul 2019]; 65(2):113-21. Disponível em: https://journals.sagepub.com/doi/pdf/10.1177/0003319712470559

12. Guasch-Ferré M, Hu FB, Martínez-González MA, Fitó M, Bulló M, Estruch R, et al. Olive oil intake and risk of cardiovascular disease and mortality in the PREDIMED study. BMC Med. [Internet]. 2014 May [citado em 23 jul 2019]; 12(78):1-11. Disponível em: https://bmcmedicine.biomedcentral.com/track/pdf/10.1186/1741-7015-12-78.pdf

13. Chian MH, Wu HH, Shih CJ, Chen YT, Kuo SC, Chen TL. Association

between influenza vaccionation and reduced risks of major adverse cardiovascular events in elderly patients. Am Heart J. [Internet]. 2017 Nov [citado em 10 jun 2019]; 193:1-7. Disponível em: https://www.sciencedirect.com/science/article/pii/S000287031730220X?via%3Dihub
14. Chang SC, Glymour M, Cornelis M, Walter S, Rimm EB, Tchetgen ET, et al. Social integration and reduced risk of coronary heart disease in women: the role of lifestyle behaviors. Circ Res. [Internet] 2017 Jun [citado em 10 jun 2019]; 120(12):1927-37. Disponível em: https://www.ahajournals.org/doi/epub/10.1161/CIRCRESAHA.116.309443
15. Gonj J, Chen X, Li S. Efficacy of a Community-based physical activity program KM2H2 for stroke and heart attack prevention among sênior hypertensive patients: a cluster randomized Controlled Phase II Trial. Plos One [Internet]. 2015 Oct [citado em 10 jun 2019]; 10(10):e0139442. Disponível em: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0139442
16. Zhao S, Zhang Z, Long Q, Ma Y, Lian X, Yang Y, et al. (2016) Association between time of day of sports-related physical activity and the onset of acute myocardial infarction in a chinese population. Plos One [Internet]. 2016 Jan [citado em 17 jul 2019]; 11(1):e0146472. Disponível em: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0146472
17. Précoma DB, Oliveira GMM, Simão AF, Dutra OP, Coelho OR, Izar MCO, et al. Atualização da diretriz de prevenção cardiovascular da Sociedade Brasileira de 2-190318.pdf

Cardiologia – 2019. Arq Bras Cardiol. [Internet] 2019 [citado em 21 jul 2019]; 113(4):787-891. Disponível em: http://publicacoes.cardiol.br/portal/abc/portugues/2019/v11304/pdf/11304022.pdf
18. Anderson L, Thompson DR, Oldridge N, Zwisler AD, Rees K, Martin N, et al. Exercise based cardiac rehabilitation for coronary heart disease. Cochrane Database Syst Rev. [Internet] 2016 Jan [citado em 08 jul 2021]; (1):CD001800. Disponível em: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD001800.pub3/epdf/full
19. Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. [Internet]. 2016 Aug [citado em 08 jul 2021]; 37(29):2315-81. Disponível em: https://academic.oup.com/eurheartj/article/37/29/2315/1748952
20. Clar C, Oseni Z, Flowers N, Keshtkar-Jahromi M, Rees K. Influenza vaccines for preventing cardiovascular disease. Cochrane Database Syst Rev. [Internet]. 2015 May [citado em 05 jan 2020]; (5):CD005050. Disponível em: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD005050.pub3/epdf/full
21. Ballalai I, Kfouri R, Cunha J, Levi M, Feijó R. Sociedade Brasileira de Imunização. Nota Técnica: Vacinas influenza no Brasil em 2019. São Paulo, SP: SBIM; 2018. Disponível em: https://sbim.org.br/images/files/notas-tecnicas/nota-tecnica-influenza-v

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