

## Profile of men submitted to myocardial revascularization surgery

### Perfil de homens submetidos à cirurgia de revascularização miocárdica

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**RESUMO | OBJETIVO:** descrever características sociodemográficas e clínicas de homens submetidos à cirurgia de revascularização miocárdica. **MATERIAL E MÉTODO:** estudo descritivo que analisou 39 prontuários de homens no período de janeiro a dezembro do ano de 2015, em um hospital privado especializado em cardiologia no município de Salvador, no estado da Bahia. Os dados foram tabulados e processados por meio de um software e apresentados descritivamente em tabelas e figuras. **RESULTADOS:** observou-se predominância de homens acima dos 60 anos ou mais (66,6%), com média de idade de 65,13 (dp 9,35). A maioria tinha como principais comorbidades, hipertensão arterial sistêmica (94,8%) e dislipidemia (77,0%). Todos tinham doença arterial coronariana com lesões graves em coronárias e a artéria mais revascularizada foi a descendente anterior (97,4%). Apenas 12,8% tiveram somente uma artéria coronária revascularizada. Salienta-se que 82% tiveram tempo de circulação extracorpórea menor ou igual a 90 minutos. **CONCLUSÃO:** homens submetidos à cirurgia de revascularização miocárdica são em sua maioria idosos com presença de comorbidades, levando ao desenvolvimento de fatores de risco e doença grave do coração.

**DESCRIPTORES:** Saúde do homem. Revascularização miocárdica. Doenças cardiovasculares.

**ABSTRACT | OBJECTIVE:** To describe the sociodemographic and clinical characteristics of men submitted to coronary artery bypass grafting (CABG). **MATERIAL AND METHOD:** a descriptive study that analyzed 39 medical records of men. Data were tabulated and processed using the SPSS 21.0 software and presented descriptively in tables and figures. **RESULTS:** a predominance of men over 60 years of age or older (66.6%), with a mean age of 65.13 (dp 9.35). The majority had comorbidities, systemic arterial hypertension (94.8%) and dyslipidemia (77.0%). All had CAD with serious coronary lesions and the most revascularized artery was the anterior descending artery (AD) (97.4%). Only 12.8% had only one coronary artery revascularized. It is noted that 82% had extracorporeal circulation time less than or equal to 90 minutes. **CONCLUSION:** men undergoing CABG are mostly elderly with comorbidities, leading to the development of risk factors and severe heart disease.

**DESCRIPTORS:** Human health. Myocardial revascularization. Cardiovascular diseases.

## Introduction

Cardiovascular diseases (CVD) represent the highest cause of morbidity and mortality worldwide<sup>1</sup>. Characterized mainly by coronary artery and cerebrovascular diseases, these occur due to different factors, ranging from the person's genetics, life habits, age and even to lack of early control of risk factors related to the phenomena of arteriosclerosis.

Both in United States of America (USA) as in Brazil, coronary artery disease (CAD) is the main form of presentation of the CVDs and is the main cause of death with higher risk in the population, mainly for the male gender. During 2014, around 81 million adult people, in the USA had some type of cardiovascular disease<sup>1</sup>. In Brazil, in accordance with the SIM (mortality information system) there were 604,692 cases of mortality due to myocardial infarction in the years 2010 to 2016<sup>3</sup>.

This significant increase in the incidence of individuals with CAD diagnosis is observed in as a consequence of various factors, such as increased survival rates for acute ischemic events, ageing population, higher number of diagnoses performed and the prevalence of risk factors occasioned by the behaviors of modern times (stress, smoking, high blood pressure, lack of physical activities, dyslipidemia, overweight and obesity, excess consumption of alcoholic beverages)<sup>4</sup>. A relevant fact is that diseases of the circulatory system affect working-age individuals, contributing towards the loss of economic productivity, loss of years of healthy living and for the high rates of hospitalization in coronary units<sup>5</sup>.

Countless studies indicate CAD as the most common cardiovascular disease, and the acute myocardial infarction (AMI) being the main global form of clinical manifestation of this disease<sup>1,5,6</sup>.

CAD treatment may be clinical (pharmacological agents, changes in lifestyle), minimally invasive and/or surgical<sup>6</sup>. In the Brazilian health organizations, the minimally invasive treatment is performed through percutaneous coronary intervention (PCI),

the most frequently used being the percutaneous transluminal coronary angioplasty (PTCA). And the surgical treatment is through coronary artery bypass grafting (CABG) which is a reconstructive surgery. Both treatments have the same purpose, to improve cardiac function, relieve the symptoms of angina and improve the quality of life<sup>4,6</sup>.

When discussing the gender issue, many studies point out to a higher morbidity and mortality by cardiovascular diseases in the male population than in the female population<sup>7-9</sup>. This standard is a reflection of the unhealthy lifestyle adopted by men such as the behavior related to the practice of physical activity, preparation and consumption of food, smoking, consumption of alcoholic beverages and to complying with the medical prescriptions, associated to cultural issues which impose a perception of invulnerability of men, favoring the development of such chronic diseases<sup>9</sup>. In relation to food consumption, national studies point out that men present a higher prevalence of ingestion of salt, soft drinks and of meat with excess fat, as well as a lower ingestion of fruit and vegetables when compared to women<sup>10</sup>.

It is understood that the first step to establish preventive actions and control is the recognition of the assisted population. In this sense, factors related to the individual, such as socioeconomic conditions and associated co-morbidities need to be considered as risk conditions for cardiovascular disease, once these can be directly related to compliance to postoperative medication and non-medication treatments. On behalf of the quality of the nursing care rendered, the nurse must organize and plan the care through the application of methodological phases of the nursing process, in order to intervene in accordance with the needs of the patient, in an individualized manner, in other words, regarding the patient as a holistic being, promoting quick recovery and early discharge from hospital. Associated to this context, I have observed in my professional experience the number of individuals that are readmitted to hospital (emphasis given to the men in the study) due to coronary events due to lack of knowledge on effective measures and control of the cardiovascular risk factors.

In view of this scenario, the following question is raised: What is the sociodemographic and clinical profile of men submitted to coronary artery bypass grafting?

The results of this study may contribute towards the definition of preventive strategies and postoperative control guided specifically to the male patients. A study determined that men are more vulnerable and die more precociously than women due to the low use by men of the primary healthcare services guided towards chronic disease such as CVDs. Many health problems could have been avoided had the patients regularly been assisted at health services. We live in a society with a predominance of healthcare spaces comprised of a predominantly female public and in view of the manner in which male socialization can weaken or even distance men from healthcare concerns or from seeking for health services<sup>11</sup>.

Lack of time, impossibility of leaving their working activities or fear that a health problem and the lack of medical treatment could affect them and result in losing their jobs, are concerns of men who have occupational or other diseases. Furthermore, in terms associated to losing jobs or difficulty in relocating there are behaviors associated to the excessive use of alcohol, stress, inadequate diets that accentuate the risk of occurrence and death due to cardiovascular diseases<sup>11</sup>.

Accordingly, the purpose of this study is to describe the sociodemographic and clinical profile of men submitted to coronary artery bypass grafting surgery.

## Method

A descriptive and retrospective study, of a quantitative approach, by means of a documental analysis. Data collection was guided by a specific instrument, having as source of data the electronic and physical medical records located at the medical and statistical archive service (SAME Serviço de Arquivo Médico e Estatística) of a private hospital specialized in cardiology in the municipality of Salvador, state of Bahia. All patients of the male gender, above 18 years of age, with medical

diagnosis of coronary artery disease (CID-I25.0), submitted CABG, hospitalized in the period between January and December 2015.

There were 96 records of patients submitted to CABG, of these 57 were excluded for being patients of the female gender, another surgical approach or because they were not located on the SAME for access to information. In this manner, the sample of this study comprised 39 records of individuals of the male gender who went through CABG.

The variables studied were sociodemographic characteristics (age, race/color, civil status, schooling and origin), personal background of risk factors for cardiovascular diseases, specific symptoms of CAD manifested internally, main reason for indication of the CABG, type of admission to hospital, coronaries involved, type of by-pass, extracorporeal circulation time and anoxia, immediate postoperative complications, time of hospitalization in the coronary unit and outcome.

The data collected was tabulated and processed using the SPSS (Statistical Package for Social Science) software, version 21.0 for Windows. Variables were presented descriptively on tables containing absolute (n) and relative (%) frequencies and figures.

The study was approved by the Research Ethics Committee of Escola Bahiana de Medicina e Saúde Pública under number 1.601.101, respecting Resolution 466/2012 on researches involving data on human beings.

## Results

### Sociodemographic characteristics

The findings reveal that in the 39 patient records of men submitted to CABG, the prevailing age was of 60 years or above (66.6%), average age of 65.13 ( $\pm 9.35$ ), race/color brown (38.5%), married (76.9%), secondary school completed (35.9%) and origin from the capital city of Bahia and metropolitan region (66.7%), as described in Table 1.

**Table 1.** Sociodemographic information of men submitted to CABG between January and December 2015. Salvador, BA, 2016

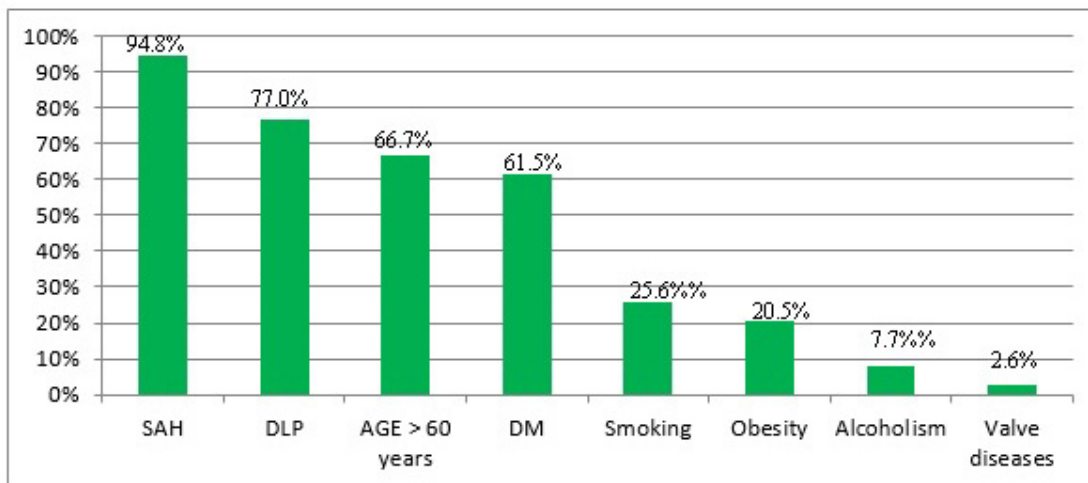
Sociodemographic data	Nr.	%
<b>Age</b>		
<50 years	2	5.1
51-60 years	11	28.2
> 60 years	26	66.6
<b>Race/color</b>		
Black	11	28.2
Brown	15	38.5
White	11	28.2
Other	1	2.6
<b>Civil status</b>		
Married	30	77
Widower	2	5.1
Single	1	2.6
Other	4	10.3
<b>Schooling</b>		
Secondary school completed	14	35.9
Undergraduate degree	8	20.5
Elementary school completed	4	10.3
Secondary school uncompleted	3	7.7
<b>Origin</b>		
Capital and metropolitan region	26	66.7
Interior of Bahia	13	33.3

### Clinical characteristics

With reference to the arrival at the hospital, 38.5% of the men were admitted electively, 35.9% were transferred from hospitals of the interior which did not have hemodynamic support and could not perform major surgeries such as CABG, and 25.6% were admitted through emergency.

Among the identified risk factors emphasis is given to systemic arterial hypertension (94.8%), dyslipidemia - DLP (77%), age > 60 years (66.7%) and diabetes mellitus- DM (61.5%), as demonstrated in Figure 1.

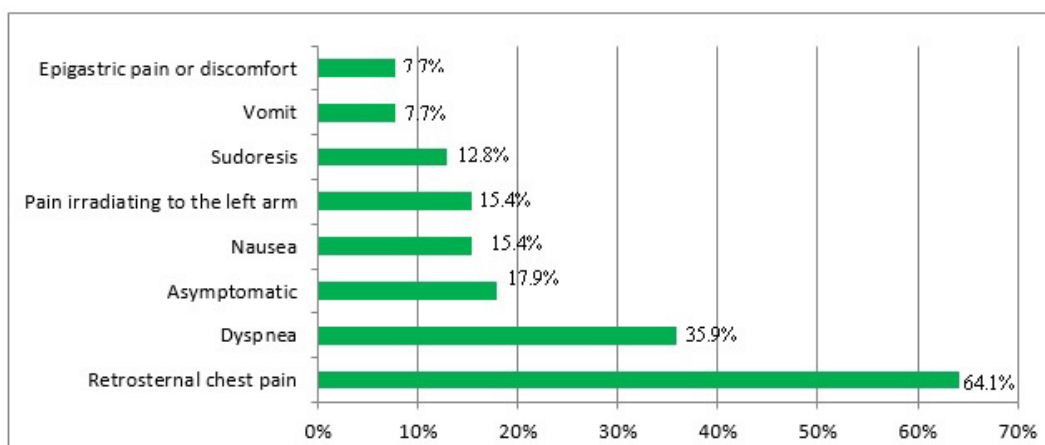
**Figure 1.** F Cardiovascular risk factors of men submitted to CABG between January and December 2015. Salvador, BA, 2016



As can be observed in Figure 2, it is possible to perceive that the predominant clinical manifestation was pain in the thoracic retrosternal region (64.1%), followed by dyspnea (35.9%).

It was also possible to observe that 17.9% of the men denied having presented any symptomatology at the moment of being admitted to hospital. In the collected information, many patients received indication from the clinical doctor, when being attended at the outpatient clinic, to go to a hospital emergency unit due to some findings in their clinical exams, such as echocardiogram and myocardial scintigraphy.

**Figure 2.** Specific symptoms for cardiovascular diseases manifested during hospitalization of men submitted to CABG between January and December 2015. Salvador, BA, 2016



## Surgical characteristics

In relation to the motive for indication of the CABG, 100% of the men in the study presented serious lesions to the coronaries, of which 53.8% com three-vessel lesions, 17.9% with two-vessels, 15.4% with multi-vessel lesions and 12.8% with single-vessel lesion.

In relation to the characteristics of the procedure, it was observed in this group that the type of artery mostly addressed for revascularization was the anterior descending artery (DA) identified in 97.4% of the men.

With reference to the surgery, 82.1% of the men received bilateral internal thoracic artery (ITA) and

great saphenous vein grafts. It was observed that only 12.8% (five patients) had only one vein revascularized.

In relation to extracorporeal circulation (ECC) time 82.1% of the patients had ECC time lower or equal to 90 minutes and only 17.9% of the patients had ECC time of over 91 minutes. Average ECC time was of 68.69 min ( $\pm 30.16$ ).

Regarding the time of treatment at the coronary unit, 100% of the patients had hospitalization periods of between 2 and 7 days.

The surgical characteristics are described under Table 2.

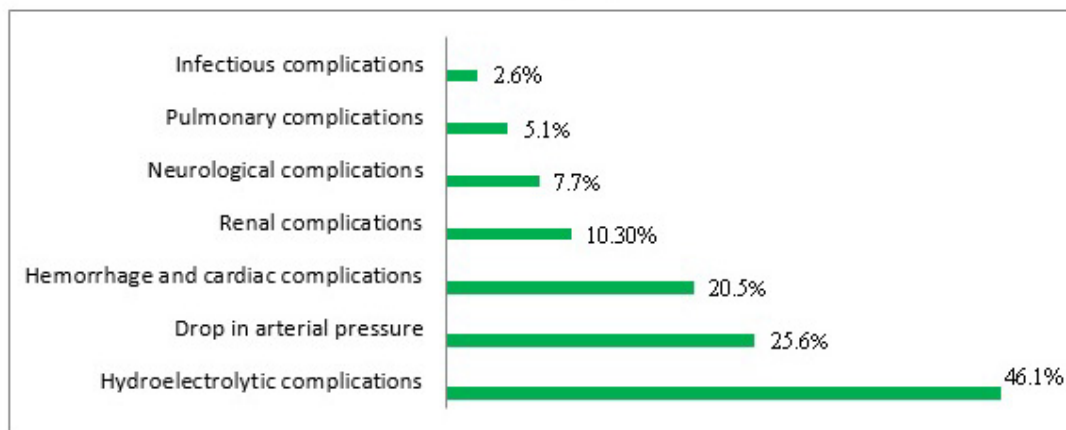
**Table 2.** Surgical characteristics of men submitted to CABG between January and December 2015. Salvador, BA, 2016

Surgical characteristics	Nr.	%
<b>Serious CAD lesions</b>		
Multi-vessel lesions	6	15.4
Three-vessel lesions	21	53.8
Two-vessel lesions	7	17.9
Unilateral lesions	5	12.8
<b>Type of bypass</b>		
Mammary	5	12.8
Saphenous	2	5.1
Mammary and saphenous	32	82.1
<b>ECC time</b>		
20min - 90 min	32	82.1
>90 min	7	17.9

## Postoperative complications

Immediate postoperative complications occurred in 30 patients, representing 76.9% of the sample, with the most prevalent being fluid and electrolyte disturbances (46.1%), followed by drop in the blood pressure (25.6%), hemorrhage and cardiac complications (20.5%), renal complications (10.3%), neurological complications (7.7%), pulmonary complications (5.1%) and infections (2.6%), as described in Figure 3.

**Figure 3.** Immediate post operative complications of men submitted to CABG between January and December 2015. Salvador, BA, 2016



Out of the total amount of patients presenting complications, 12.8% died.

## Discussion

In this study it was the predominance of men in the age group of over 60 years was verified, which information was also observed in other national studies on myocardial revascularization in which most of the individuals were elderly<sup>4,12,13</sup>.

The average age of 65.13 years (dp 9.35) corroborates with a study carried out in São Paulo, in the period between July 2009 and July 2010 with a sample of 3010 patients submitted to CABG of both genders, with average ages of 62.2 years (dp 9.4)<sup>2</sup>.

Most of the men submitted to CABG in this study has as main comorbidities for the development of CAD, systemic arterial hypertension and dyslipidemia. Such result matches the study performed in an institute of reference in the state of Santa Catarina, with a sample comprising 48 individuals of both genders, where the predominance of patients of the male gender was evidenced with comorbidities such as systemic arterial hypertension (83.3%) and dyslipidemia (72.9%)<sup>14</sup>.

The higher the quantity of risk factors present, the greater is the probability of developing the disease, once they are associated<sup>15-18</sup>. In this study it became evident that 100% of the men have more than one risk factor, which in turn could have increased the possibility of a coronary event.

In relation to the symptoms reported at the time of hospitalization, it is possible to observe that the men referred, mainly, to thoracic pain and dyspnea, similar to the findings of another national study<sup>19</sup> performed with 150 patients, bearers of acute coronary syndrome, in which the main manifestations described were chest pain (93.3%), followed by dyspnea (46.7%).

In this study, the most common type of obstruction was in the anterior descending artery (97.4%) and 69.2% of the patients had over three coronaries treated. The results of an international study performed in California, USA<sup>13</sup> reconfirm this finding, in which most of the patients were submitted to three or more saphenous grafts and atherosclerotic lesions were found mainly on the anterior descending artery. Also compatible with this data is another study performed in Brazil, in 2012<sup>17</sup> which demonstrated that the anterior descending artery is the one with most affected, corresponding to 43% of their sample.

In the study it was observed that for 100% of patients who went through CABG the extracorporeal circulation (ECC) technique was used. A research on the background of the patients reveals that the use of ECC in CABG was efficient in the past, in other words, no complications were discovered and with the changes occurred in the last decades and technological innovations that have revolutionized the treatment for CAD, the technique without the use of ECC presents countless advantages and lower immediate postoperative complications for CABG<sup>20</sup>. The results obtained in this study<sup>16</sup> confirm these findings, with a higher mortality in individuals in which the ECC technique was used. Other national researches reveal, on the other hand, that independently of the technique used during CABG, complications may occur raising both morbidity and mortality of patients in the postoperative period of these surgical procedures in relation to costs for the health system<sup>15,21</sup>.

In relation to the duration of the ECC, in this study it was possible to observe that the average period of time in patients submitted to CABG was of 68.69 min ( $\pm 30.16$ ). Diverging from another study carried out in Recife, Pernambuco, where the average time of ECC was of over 94.46 min (dp 33.51)<sup>12</sup>. Literature reveals that the longer the period of time of ECC the greater the health risks associated to an increase in complications (organ failures, immune system

activation, lung injury) and consequently the increase in the number of deaths<sup>12,21,22</sup>.

Complications with higher incidences in the immediate CABG postoperative period corroborate a research in the southern region of Brazil<sup>23</sup> with the prevalence for hydroelectrolytic, hypotension, hemorrhage and cardiac complications, such as, infection to the surgical wound of the saphenectomy. A possible explanation for this difference is that complications may be directly related to pre-existing pathologies in each individual<sup>23-24</sup>.

The period of permanence for treatment in the coronary unit for this study was of between 2 and 7 days. A recent national study determined the same average period in the coronary unit for hemodynamically stable individuals<sup>24</sup>. It is clear that for the individual to obtain an improved prognosis when submitted to CABG, returning to daily activities and to joining their families, an early discharge from hospital is important, favoring the reduction of the period of permanence in the coronary unit and improving the quality of life of the individual<sup>23</sup>.

The prevalence of cardiac surgeries is high, the costs are high and, furthermore, directly affect the quality of life of mainly elderly men<sup>15</sup>. Accordingly, it is essential that these individuals be guided by nursing professionals who are predictors of the care, contributing towards an improved understanding and valorization of the inherent multidimensionality of CADs, mainly regarding the perception of the disease and consequent collaboration in order to recommend more adequate healthcare planning, compatible with the needs of this specific population.

A considered for this study could be the size of the sample and not having investigated people of the female gender for possible comparison.

## Conclusion

Men submitted to CABG are mostly elderly, with the presence of comorbidities such as hypertension and dyslipidemia, leading to the development of diseases to the circulatory system and consequently to cardiovascular risk symptoms, with emphasis to pain to the chest and dyspnea. The men in this study presented serious CAD, with three or more lesions



to coronaries, and also immediate postoperative complications, with hospitalization of between 2 and 7 days in the coronary unit.

The study contributed towards greater knowledge on the sociodemographic and clinical characteristics of men submitted to CABG in a reference hospital for cardiology in Salvador/BA and reinforces the importance of formulating strategies for the control of postsurgical complications guided towards the male gender, as well as the preparation of protocols with systemized routines with the purpose of obtaining an integrated preventive approach to clinical treatment.

### Contributions of the Authors

Silva LCJ took part in the planning, design, data research and analysis of the research, interpretation of results, writing and forwarding the scientific article Gama GGG participated in the interpretation of results, writing and review of the scientific article.

### Conflicts of interest

No financial, legal or political conflict of interest involving third parties (government, companies and private foundations, etc.) was declared for any of the aspect of the study submitted (including, but not limited to, subventions and financing, participation in advisory boards, design of the study, preparation of the manuscript, statistical analysis, etc.).

## References

1. Cesar LA, Ferreira JF, Armaganijan D, Gowdak LH, Mansur AP, Bodanese LC et al. Diretriz de Doença Coronária Estável. Arquivos Brasileiros de Cardiologia. 2014;103(2 supl 2).
2. Colósimo FC, Sousa AG, Silva GS, Piotto RF, Pierin AMG. Hipertensão arterial e fatores associados em pessoas submetidas à cirurgia de revascularização do miocárdio. Rev Esc Enferm USP. 2015;49(2):201-208. doi: [10.1590/S0080-623420150000200003](https://doi.org/10.1590/S0080-623420150000200003)
3. Sociedade Brasileira de Cardiologia. Cardiômetro. Morte por doenças cardiovasculares no Brasil. [Internet]. 2018. Disponível em: <http://www.cardiometro.com.br/anteriores.asp>
4. Tonial R, Moreira DM. Perfil clínico-epidemiológico dos pacientes submetidos à cirurgia de revascularização do miocárdio no instituto de cardiologia de Santa Catarina, São José – SC. Arq Catarinenses Med. 2011;40(4):42-46.
5. Tsai W, Chien DK, Huang CH, Shih SC, Chang WH. Multiple Cardiac Biomarkers Used in Clinical Guideline for Elderly Patients with Acute Coronary Syndrome. International Journal of Gerontology. 2017;11:104-108. doi: [10.1016/j.ijge.2017.04.004](https://doi.org/10.1016/j.ijge.2017.04.004)
6. Camponogara S, Soares SGA, Silveira M, Viero CM, Barros CS, Cielo C. Percepção de pacientes sobre o período pré-operatório de cirurgia cardíaca. Rev Min Enferm. 2012;16(3):382-390. doi: [S1415-27622012000300010](https://doi.org/S1415-27622012000300010)
7. Teixeira DC, Brambilla DK, Adamy EK, Krauzer IM. Concepções de enfermeiros sobre a política nacional de atenção integral à saúde do homem. Trab educ saúde. 2014;12(3):563-576. doi: [10.1590/1981-7746-sip00009](https://doi.org/10.1590/1981-7746-sip00009)
8. Souza LPS, Almeida ER, Queiroz MA, Silva JR, Souza AAM, Figueredo MFS. Conhecimento de uma equipe da estratégia saúde da família sobre a política de atenção à saúde masculina. Trab Educ Saúde. 2014;12(2):291-304. doi: [10.1590/S1981-77462014000200005](https://doi.org/10.1590/S1981-77462014000200005)
9. Oliveira PSD, Barbosa HA, Rodrigues RM. Never bothered with no health-health perspective the phenomenon of man. Rev Rede de Cuid Saúde. 2015;9(3).
10. Assumpção D, Domene SMA, Fisberg RM, Canesqui AM, Barros MBA. Differences between men and women in the quality of their diet: a study conducted on a population in Campinas, São Paulo, Brazil. Ciência & Saúde Coletiva. 2017;22(2):347-358. doi: [10.1590/1413-81232017222.16962015](https://doi.org/10.1590/1413-81232017222.16962015)
11. Gama GGG, Mussi FC, Portela PP. Atenção à Saúde do Homem: Um Desafio para Prevenção e Controle das Doenças Cardiovasculares. In: Reis A, Pereira A. Saúde de Homens: Conceitos & Práticas de Cuidados. Rio de Janeiro: Águia Dourada; 2017.
12. Araújo NR, Araújo RA, Oliveira RC, Bezerra SMMS. Complicações pós-operatórias em pacientes submetidos a cirurgia de revascularização miocárdica. Rev enf UFPE. 2013;7(5):1301-10. doi: [10.5205/reuol.3960-31424-1-SM.0705201307](https://doi.org/10.5205/reuol.3960-31424-1-SM.0705201307)
13. Miller PS, Evangelista LS, Giber JN, Dracup K, Doering LV. Clinical and socio-demographic predictors of postoperative vital exhaustion in patients after cardiac surgery. Heart Lung. 2013;42(2):98-104. doi: [10.1016/j.hrtlng.2013.01.002](https://doi.org/10.1016/j.hrtlng.2013.01.002)
14. Cani KC, Araujo CLP, Karloh M, Alexandrino DFH, Palú M, Rojas DB, Bonorino KC. Clinical characteristics of patients undergoing myocardial revascularization surgery. ASSOBRAFIR Ciência. 2015;6(3):43-54.
15. Beccaria LM, Cesarino CB, Werneck AL, Correio NCG, Correio KSS, Correio MNM. Complicações pós operatórias em pacientes submetidos à cirurgia cardíaca em hospital de ensino. Arq Ciênc Saúde. 2015;22(3):37-41. doi: [10.17696/2318-3691.22.3.2015.216](https://doi.org/10.17696/2318-3691.22.3.2015.216)
16. Koerich C, Lanzoni GMM, Erdmann AL. Factors associated with mortality in patients undergoing coronary artery bypass grafting. Rev Lat Am Enfermagem. 2016;24:e2748. doi: [10.1590/1518-8345.0708.2748](https://doi.org/10.1590/1518-8345.0708.2748)

17. Leão AMOS, Vilagra MM. Perfil dos Pacientes Submetidos à Intervenção Coronariana Percutânea no Serviço de Hemodinâmica do Hospital Universitário Sul Fluminense, Vassouras – RJ. Rev de Saúde. 2012;3(1):27-32. doi: [10.21727/rs.v3i1.78](https://doi.org/10.21727/rs.v3i1.78)
18. Lima FET, Araújo TL, Lopes MVO, Silva LF, Monteiro ARM, Oliveira SKP. Fatores de risco da doença coronariana em pacientes que realizaram revascularização miocárdica. Rev Rene. 2012;13(4):853-60.
19. Araújo DF, Araújo ERM, Silva MRV, Silva NC, Guimarães MSO, Amorim Neta FL. Perfil clínico e epidemiológico de pacientes com síndrome coronariana aguda. Rev Enferm UFPI. 2014;3(2):78-84. doi: [10.26694/reufpi.v3i2.1895](https://doi.org/10.26694/reufpi.v3i2.1895)
20. Baikoussis NG, Papakonstantinou NA, Apostolakis E. The “benefits” of the mini-extracorporeal circulation in the minimal invasive cardiac surgery era. J Cardiol. 2014;63(6):391-396. doi: [10.1016/j.jjcc.2013.12.014](https://doi.org/10.1016/j.jjcc.2013.12.014)
21. Oliveira EL, Westphal GA, Mastroeni MF. Demographic and clinical characteristics of patients undergoing coronary artery bypass graft surgery and their relation to mortality. Rev Bras Cir Cardiovasc. 2012;27(1):52-60. doi: [10.5935/1678-9741.20120009](https://doi.org/10.5935/1678-9741.20120009)
22. Cordeiro ALL, Brito AAOR, Santana NMA, Silva INMS, Nogueira SCON, Guimarães ARF et al. Análise do grau de independência funcional pré e na alta da uti em pacientes submetidos à cirurgia cardíaca. Revista Pesquisa em Fisioterapia. 2015;5(1):21-27. doi: [10.17267/2238-2704rpf.v5i1.574](https://doi.org/10.17267/2238-2704rpf.v5i1.574)
23. Silveira CR, Santos MBK, Moraes MAP, Souza ENS. Desfechos clínicos de pacientes submetidos à cirurgia cardíaca em um hospital do noroeste do Rio Grande do Sul. Rev Enferm UFSM. 2016;6(1):102-111. doi: [10.5902/2179769216467](https://doi.org/10.5902/2179769216467)
24. Dallazen F, Windmoller P, Berlezi EM, Winkelmann ER. Aspectos clínicos-demográficos de pacientes submetidos à cirurgia cardíaca eletiva. Rev enferm UFPE. 2016;10(6):1971-9. doi: [10.5205/1981-8963-v10i6a11208p1971-1979-2016](https://doi.org/10.5205/1981-8963-v10i6a11208p1971-1979-2016)