

## Clinical-epidemiological profile of patients undergoing cardiac catheterization procedures at a university hospital in *Rio de Janeiro* state

Perfil clínico e epidemiológico de usuários submetidos a cateterismo cardíaco num hospital universitário do Rio de Janeiro

Perfil clínico y epidemiológico de los usuarios sometidos a um cateterismo cardíaco en el hospital universitario de Río de Janeiro

Karolyne Marotto Vila<sup>1</sup>, Ronilson Gonçalves Rocha<sup>2</sup>, Camila Benicá de Oliveira Carvalho Naves<sup>3</sup>, Luana Ferreira de Almeida<sup>4</sup>, Cristiano Bertolossi Marta<sup>5</sup>, Claudia Silvia Rocha Oliveira<sup>6</sup>.

### How to cite this article:

Vila KM, Rocha RG, Naves CBOC, Almeida LF, Marta CB, Oliveira CSR. Clinical-epidemiological profile of patients undergoing cardiac catheterization procedures at a university hospital in *Rio de Janeiro* state. Rev Fun Care Online. 2019 jul/set; 11(4):894-899. DOI: <http://dx.doi.org/10.9789/2175-5361.2019.v11i4.894-899>.

### ABSTRACT

**Objective:** The study's purpose has been to delineate the clinical-epidemiological profile of patients undergoing cardiac catheterization; furthermore, to propose a management technology to create a database with information of epidemiological relevance. **Methods:** It is a retrospective study with a quantitative approach, which considers the databases and medical records of 1,890 patients who underwent cardiac catheterization at a hemodynamic unit from April 2014 to April 2016. Microsoft Office Excel<sup>®</sup> software was used to both organize and analyze the data. CAAE No. 55615616.0.0000.5282. **Results:** The average age was 61.45 years

- 1 Nursing Graduate by the Universidade do Estado do Rio de Janeiro (UERJ), Specialist's Degree in Cardiovascular Nursing by the UERJ, Nurse at Hospital da Unimed.
- 2 Nursing Graduate by the Universidade Federal do Estado do Rio de Janeiro (UNIRIO), MSc in Nursing by the UNIRIO, PhD in Nursing by the Universidade do Estado do Rio de Janeiro (UERJ), Adjunct Professor of the Nursing Department at UERJ, Professor of the Medical Sciences Postgraduate Program at Instituto D'Or de Pesquisa e Ensino (IDOR), Coordinator of the Scientific Committee from the Health Area at IDOR.
- 3 Nursing Graduate by the Universidade do Estado do Rio de Janeiro (UERJ), Specialist's Degree in Cardiovascular Nursing by the UERJ, Specialist's Degree in Cardiology and Hemodynamics by the Faculdade Israelita de Ciências da Saúde Albert Einstein (FICSAE), Nurse-in-Chief of the Radiology and Diagnostic Imaging Services at Hospital Universitário Pedro Ernesto, Nurse of the Hemodynamics Service at HUPE - UERJ.
- 4 Nursing Graduate by the Universidade Federal do Estado do Rio de Janeiro (UNIRIO), Specialist's Degree in Intensive Care by the Universidade do Estado do Rio de Janeiro (UERJ), Specialist's Degree in Higher Education by the Universidade Estácio de Sá (UNESA), Specialist's Degree in Patient's Health and Safety Quality by the Fundação Oswaldo Cruz (Fiocruz), MSc in Nursing by the UERJ, PhD in Science and Health Education by the Universidade Federal do Rio de Janeiro (UFRJ), Adjunct Professor of the Nursing Department at UERJ, Professor of the Nursing Postgraduate Program at UERJ, Coordinator of the Patient's Safety Board at Hospital Universitário Pedro Ernesto.
- 5 Nursing Graduate by the Universidade do Estado do Rio de Janeiro (UERJ), MSc in Nursing by the UERJ, PhD in Nursing by the UFRJ, PhD in Nursing by the UFRJ, Adjunct Professor of the Nursing Department at UERJ, Research Director and Coordinator of the Nursing Postgraduate Board at Universidade Veiga de Almeida (UVA).
- 6 Nursing Undergraduate by the Universidade do Estado do Rio de Janeiro (UERJ)

old. The majority of the assisted population is indicated by the National Regulation System (63%) with the following distribution: (52.86%) male and (47.14%) female. It was identified that 79.5% of the users have high blood pressure. It was found that the current strategy for monitoring the assisted users shows information deficiencies. **Conclusion:** The nursing consultation contributes to the improvement of the *Sistema Único de Saúde (SUS)* [Unified Health System] when capable of obtaining both relevant and determinant information for the professional nursing performance.

**Descriptors:** Cardiac catheterization, nursing, risk factors, hemodynamics, epidemiological profile.

## INTRODUCTION

According to the Brazilian Ministry of Health (MOH), diseases of the circulatory system cause approximately 30% of deaths in the country, accounting for more than 308 thousand deaths per year. The main causes are Acute Myocardial Infarction (AMI) and stroke, reaching the adult population and in full productive phase.<sup>1</sup>

Circulatory diseases require numerous tests, and Cardiac Catheterization (CC) is the test of choice for identifying changes in the coronary arteries, the main vessels of the heart and allowing the blood supply to the myocardial tissue.

The CC consists, specifically, of a procedure that allows visualization of the coronary arteries, with the diagnostic and therapeutic purpose (coronary angioplasty). It is performed by insertion of catheters through the inguinal region (through the femoral vessels) or through the radial vessels that “reach the right and left atria of the heart”.<sup>2,3</sup>

Therefore, it is an invasive examination that must be performed in a suitable environment, usually in hemodynamic units, which are increasingly present in health services around the world. Its accomplishment requires the local anesthetic procedure, with a view to minimizing pain due to insertion of the catheter through the skin until reaching the desired vessel.

The importance of conducting this examination in cases of diseases of the circulatory system is reinforced, since two-thirds of all deaths in the world come from Non-Communicable Chronic Diseases (NCDs) such as heart disease, strokes, diabetes and as a result of the aging of the population and the spread of risk factors associated with globalization, living habits and urbanization.<sup>4</sup>

Risk factors associated with circulatory diseases, such as smoking, sedentary lifestyle, poor diet and excessive alcohol use make the problem even more serious, as recent national studies point out,<sup>5,6</sup> converging with information from the World Health Organization (WHO), which reports that about four out of ten men, and one in eleven women are using tobacco and about one in eight adults are obese.<sup>7</sup>

Considering the hypothesis where “users undergoing cardiac catheterization are predominantly elderly and males,” it was hoped to identify the profile of this population in the proposed scenario, since the reality presented

in the unit will allow professionals to broaden their knowledge about the population in it and the description of characteristics that allow the use of strategies favorable to the increase of the quality of care and provision of health services in this segment.

A better understanding of the profile of this population assisted by the referenced unit is able to contribute to a better systematization of nursing actions and multidisciplinary team, which collaborates to better practices and pieces of evidence in the assistance and educational scope, helping the users and tea linked to the services hemodynamics.

Bearing in mind the aforementioned considerations and also the ongoing concern to contribute to a better understanding of the health-disease-prevention processes, it was sought to investigate the clinical-epidemiological profile of *Sistema Único de Saúde (SUS)* [Unified Health System] users undergoing cardiac catheterization in the hemodynamic unit of a University Hospital from the *Rio de Janeiro* State. The study's goal was to delineate the clinical-epidemiological profile of patients undergoing cardiac catheterization at the aforesaid place.

## METHODS

This is a quantitative, documentary, retrospective study since the data were obtained through the analysis of the medical records of users of the hemodynamic service to perform cardiac catheterization. All records from April 2014 to April 2016 (24 months) were analyzed.

The study population consisted of 1,890 service users, who underwent CC within 24 months for both diagnostic and therapeutic purposes. The patients treated in the hemodynamic unit studied are from different regions of the *Rio de Janeiro* State, since this is a referral hospital in Interventional Cardiology procedures for the *SUS*.

Considering that users who perform cardiac catheterization should be directed to the prevention and early detection of complications, it is important to point out that limitations were encountered in relation to the information fills in the document itself and difficulties can be perceived in the assistance performed in an unsystematic manner. Hence, no records were excluded, including those that were incomplete, in order not to limit the inclusion of information from users attended in the hemodynamics unit. It is understood that several situations require of this professional technical-scientific competence, ethics, speed in decision making and responsibility, affecting in completing the clinical form in a complete and systematized form.

All patients scheduled to perform procedures in the hemodynamic service are initially attended by the nurse of the unit that performs the nursing consultation. This care takes place in a doctor's office with a specific environment, suitable for conducting the consultation in all its complexity and with total privacy. In this first nursing visit, the users' understanding about the procedure is also evaluated, for instance, if the patient is fasting, according to the recommendation; if there is any underlying disease;

which medications are routinely used and whether or not there has been suspension of any of these (anticoagulants, antiplatelet agents, hypoglycemic agents and others), and if there is a report of allergies, mainly iodine, considering that the contrast used in the procedure has this element. In cases where the user reports being allergic, desensitization is initiated, which allows minimizing the risk of reactions related to the contrast used.

The data collection instrument used in this research was developed based on a form used in the Nursing consultations, carried out in the investigated hemodynamics sector. From the data contained in these records, completed during the nursing consultations, it was possible to characterize the clinical and epidemiological profile of the users submitted to percutaneous intervention.

Data were collected from June to September 2016. Microsoft Office Excel<sup>®</sup> spreadsheets were used in order to organize the information for data analysis. This allowed us to describe the absolute frequency, relative frequencies and other information of interest for the survey as average, mode, median and standard deviation, in addition to the percentage of specific occurrences.

Concerning the ethical and legal aspects, all were respected, as provided in the Resolution 466 of December 12<sup>th</sup>, 2012, from the National Health Council.<sup>8</sup> It was evaluated and approved by the Research Ethics Committee from the *Hospital Universitário Pedro Ernesto*, under the *Certificado de Apresentação para Apreciação Ética (CAAE)* [Certificate of Presentation for Ethical Appreciation] No. 55615616.0.0000.5282.

## RESULTS

The information from the 1,890 users' medical records of the hemodynamics service was scrutinized. The *Sistema Nacional de Regulação (SISREG)* [National Regulation System] was responsible for the referral of 810 users (42.9%); the Polyclinic *Piquet Carneiro*/Ambulatory Care service from the *Hospital Universitário Pedro Ernesto* indicated 398 users (21%); and the University Hospital/hospitalized indicated 78 users (4%). Considering the external origin, it was observed 380 (20%) and 224 users (12%) of non-informed origin.

The information coming from the variables "external origin" and "origin via *SISREG*", although individualized, correspond to the same finding, and implies that of the 1890 procedures in the users, 1,190 (63%) occur in users referred by the Regulation System of vacancies in *Rio de Janeiro* State.

When the distribution of the users was made according to race, gender, and age, the sociodemographic information of the studied population was obtained (**Table 1**).

**Table 1** - Sociodemographic characteristics of the population under study.

Variable	Average and SD	n (%)
<b>Gender</b>		
Female		868 (45.9)
Male		999 (52.8)
Not Informed		324 (17.1)
<b>Age Group (years old)</b>		
	<b>61.3 and 11.1</b>	
Less or equal to 40		45 (2.4)
From 41 to 80		1,722 (91)
More or equal to 81		58 (3.1)
Not Informed		65 (3.4)
<b>Race (skin color)</b>		
White		734 (38.8)
Black		331 (17.5)
Brown		501 (26.5)
Not Informed		325 (17.1)
<b>Gender x Race</b>		
Female x White		335 (38.6)
Female x Black		165 (19.0)
Female x Brown		223 (25.7)
Male x White		372 (37.2)
Male x Black		153 (15.3)
Male x Brown		270 (27.0)
<b>Average age by race</b>		
White	68.1	
Black	56.0	
Brown	57.7	

Source: The authors, 2017.

The data indicate the predominance of male and white patients as those who are most submitted to Cardiac Catheterization. Considering the mean age directly associated with the breed, it was verified that black and brown users are submitted to percutaneous procedures earlier compared to those of white, considering the average age of 56 and 57.7 years old respectively for these groups, while white users are submitted with an average age of 68.1 years old. The results also indicated that the white race is more subject to percutaneous intervention regardless of gender, followed by brown race, reflecting the investigated unit.

The information related to the tests performed by the users was then appraised and showed in **Table 2**:

**Table 2** - Results of laboratory tests from the study population according to reference value standards.

Considered variable	Inside the reference	Outside the reference
Glucose (70 a 110 mg/dL)	937 (49.58%)	953 (50.42%)
Urea (from 10 to 40 mg/dL)	1,089 (57.62%)	801 (42.38%)
Creatinine (from 0.60 to 1.30 mg/dL)	1,335 (70.63%)	555 (29.37%)
Male hematocrit level (from 40 to 50%)	466 out of 999 (46.65%)	533 (53.35%)
Female hematocrit level (from 35 to 45%)	510 out of 868 (58.76%)	358 (41.24%)

Source: The authors, 2017.

The results of laboratory tests according to reference standards indicate the high number of patients undergoing cardiac catheterization with altered glycemia, which are directly related to the risk of contrast nephrotoxicity. Another relevant fact is the change in hematocrit values, in both men and women, showing an inadequate transport of oxygen, which correlates with the ineffective pattern of metabolic demand.

**Table 3** shows the frequency of risk factors for cardiovascular diseases, which corroborate the increase in the number of cardiac problems and, consequently, the number of cases submitted to cardiac catheterization.

**Table 3 -** Distribution of risk factors in the population under study.

Current Disease	Group (n = 1,890) Fa	%
Hypertension	1,494	78.9
Diabetes mellitus	605	32.0
Dyslipidemia	219	11.6
Alcohol consumption	217	11.5
Angina	320	16.9
Smoking	151	8.0
Cardiomyopathies	37	2.0
Renal insufficiency	6	0.3

Source: The authors, 2017.

The data presented in **Table 3** refer to the variables considered risk factors for Coronary Artery Disease (CAD) and their percentage of occurrence according to the related comorbidity. It should be noted that the risk factors are associated with the occurrence of procedures performed in the users, and, in this case, hypertension was identified as the most recurrent disease in patients undergoing cardiac catheterization in the hemodynamic sector, followed by Diabetes Mellitus (DM), then converging with data found in the literature.

**Table 4** displays the list of users known to be hypertensive and using medications, with those who are not hypertensive. The increase in blood pressure, measured after the procedure, was evidenced.

**Table 4 -** Users bearing SAH X Users not bearing SAH.

Users Type	f	%
Users bearing SAH	1,494	79.05
Users not bearing SAH	150	7.94
Not Informed	246	13.02
Total	1,890	100.00

Source: The authors, 2017.

The table shows the high prevalence of hypertension, which allows bringing implications to the daily clinical practice of nursing by considering the use of new approaches.

## DISCUSSION

The current clinical records are not adequately filled, limiting the collection of complete data, which was indicated, for instance, by the lack of definition of 324

users' race (17.14%) of the study population and 23 (1.2%) due to lack of gender characterization.

The studied population consisted of 52.9% of male users and 45.9% of female users. The predominance of the male gender was observed in the literature available,<sup>5,6,8-11</sup> which converges with the findings of this research.

The ages of users assisted at the unit ranged from 15 to 94 years old, with average  $\pm$  standard deviation equal to 61.5 $\pm$ 32.86 years old. The predominant mean age among men and women who undergo cardiac catheterization is 61.86 years old, evidencing the finding as described in other published studies.<sup>5-10</sup> The user, aged 15 years old, male and female, performed the procedure for diagnostic purposes. The mean age of the study population corresponded to 61 years old, confirming the findings described in the literature, which indicate that the majority of the users who underwent the CC are aged from 60 to 69 years old.<sup>8,9</sup>

It was possible to characterize the origin of the users served in the service, being representative the origin via SISREG (63%). This result shows that the health unit studied is really one of the references in the procedure for the Rio de Janeiro State, because of the greater number of examination schedules and provenance of the state's own system of regulation of vacancies.

The distribution of users by race included the description of whites (38.84%), brown (26.51%) and blacks (17.51%), totaling 1,566 records. The races of 324 (17.14%) users were not described. Considering the clinical files assessed, those that contained both race and gender records totaled 1,518; while 349 had no information related to race, and 23 related to gender. The majority of users were characterized as being of white race converging with the literature.<sup>5,8</sup>

With regards to the catheter insertion route for the procedure, it was identified that the first-choice and therefore the most used access route was the right radial artery.<sup>12</sup> This pathway consists of more accessible access compared to the femoral, leading her to be chosen by the interventionist physician. This technique is also more cost-effective, both for the user and for the unit. In relation to the user, access by the right radial artery presents no restriction in physical mobility, since only the handled one remains with a compressive dressing for 24 hours, being discharged within a period of up to 2 hours after CC and after being hemodynamically stable. For the unit, this is important because there is also a reduction in hospital costs for not retaining beds and still with human resources.

There were also analyzed the results of laboratory tests performed by users such as glucose, urea, creatinine, and hematocrit, aiming to verify deviations from the normal values.

Considering the need for an absolute fasting of at least 6 hours before the test, the results of the study indicated fasting glycemia as out of the desirable standard for 953 users (50.42%), and comorbid diabetes diagnosed 605 users (32%). The urea results were also identified as out of the desired standard for 801 users (42.38%); the same occurring in relation to creatinine, since 555 users (29.37%) presented values outside the standard considered normal.

Regarding the renal function, there was a predominance of users with preserved function (renal insufficiency only for 0.3% of users). It is believed that there is also the efficacy of the nursing consultation in this detection of renal dysfunction in users, noting that CC is not performed in these users, since they are also usually at increased risk of heart failure, requiring other evaluations.

The hematocrit values of the users (1867) were also verified in two subgroups (male and female), since 23 clinical records did not present this information. Regarding the male gender, 533 (53.35%) were non-standard (between 40 and 50%) and for the female gender, 466 (46.65%) were out of the normal range, which is considered between 35 and 45%.

From the results, we also verified the comorbidities presented by the population served, and there is a convergence with what the national literature already presents in relation to the diseases that most affect the health of Brazilians, according to the consensus of the cardiology and endocrinology societies.

In the general context, it was verified that 1,494 (79.5%) of the users were diagnosed as hypertensive; 606 (32.06%) were diagnosed as type II diabetics; 219 (11.6%) were dyslipidemic; 217 (11.5%) were consumers of alcoholic beverages; 151 (8%) were smokers; 320 (16.9%) had angina; 6 (0.3%) had renal insufficiency. Among the users, 37 (2%) had some cardiomyopathy. The most prevalent comorbidity was Systemic Arterial Hypertension (SAH), which had a great impact on the related studies.<sup>5,6,9,11</sup>

Another identified and easily corrected flaw from the instrument proposed in this study was the correct information on blood pressure levels before and after CC, since these values are not always recorded before the procedure.

Patients' Blood Pressure (BP) was evaluated after the procedure, which allowed verifying that 20.73% of the users who had BP were hypertensive, according to the definitions from the III Brazilian Consensus on Systemic Arterial Hypertension.

Considering the total number of users, 28.78% did not have their BP recorded, which made it impossible to point out the actual percentages in relation to all users served at the unit. It was also pointed out that 16.47% of the users who were known to be hypertensive had their BP increased after the procedure and 8% of the users who did not report being hypertensive showed increased BP after being submitted to cardiac catheterization.

These results have significant implications and lead to a more in-depth reflection on the problem, since comorbidities are the risk factors for serious diseases of the circulatory system, especially when there is an association between these factors, thus increasing the chance of further health problems.

The results pointed out that these users need to be monitored in a systematized way and it is understood that one way of doing this may be through the use of an algorithm, such as a management technology to evaluate

these users when answered by the service, which would inhibit the presence of records miscarriages.

## CONCLUSIONS

The confirmed hypothesis that "users undergoing cardiac catheterization are mainly elderly and males", added to the fact that the profile of the Brazilian population demonstrates its reality, it all comes along to allow the use of strategies favorable to increase the quality of care and provision of health services.

The users' profile description who underwent to the CC might have a high impact insofar the professionals are trained to put up with the characteristics of the population assisted, then providing assistance that is closer to reality, according to the needs of the SUS users. According to the identified profile, professionals must present technical-scientific competence, correlate their practice with the demands and needs of users, present agility in decision-making process and proceed with specific interventions according to their realities.

The insertion of nurses in the process of prevention and early detection of aggravations is considered as both important and essential. It can positively impact on the adverse events reduction, implying also the use of best practices supported by the national scientific literature. In short, this study reached its purpose by presenting the reality of the SUS belonging unit.

## REFERENCES

- BRASIL, Ministério da Saúde. *Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis no Brasil 2011-2022*. Brasília. 2011. [acessado em: 20 de julho de 2017] Available at: <http://portalsaude.saude.gov.br/index.php/o-ministerio/principal/portal-dcnt/mais-sobre-portal-dcnt>
- SBHCI. Sociedade Brasileira de Hemodinâmica e Cardiologia Intervencionista. *Cateterismo cardíaco*. [acessado em: 29 de junho de 2017] Available at: <http://sbhci.org.br/publico-leigo/o-cateterismo-cardiaco/>.
- Freitas MC, Oliveira MF. *Assistência de enfermagem a idosos que realizam cateterismo cardíaco: uma proposta a partir do modelo de adaptação de Calista Roy*. Revista brasileira de Enfermagem, 2006; 59(5):642-6.
- ONU BR. Nações Unidas no Brasil. *Novo relatório da Organização mundial de saúde traz informações sobre estatísticas de saúde em todo o mundo*. [acessado em: 22 de julho de 2017] Available at: <http://nacoesunidas.org/novo-relatorio-da-oms-traz-informacoes-sobre-estatisticas-de-saude-em-todo-o-mundo/>.
- Mendes FCO, Mendonça AEO, Nascimento PBR, Araújo AM, Souza FMLC. *Perfil Epidemiológico de pacientes submetidos a cateterismo cardíaco em uma unidade de Hemodinâmica em Natal/RN*. FIEP Bulletin On-line. 2011 Special Edition - article II; 81(1):1-
- Sousa SM, Bernardino E, Vicelli RMM, Kalinowski CE. *Perfil de pacientes submetidos ao cateterismo cardíaco: subsídio para prevenção de fatores de risco cardiovascular*. Cogitare Enfermagem. 2014; 19(2):304-8.
- ONU BR. Nações Unidas no Brasil. *Relatório da OMS aponta doenças não transmissíveis como principais causas de mortes no mundo*. [acessado em: 07 de junho de 2017.] Available at: <http://nacoesunidas.org/relatorio-da-oms-aponta-doencas-nao-transmissiveis-como-principal-cao-de-mortes-no-mundo/>.
- Barbosa MH, et al. *Aspectos clínicos e epidemiológicos dos clientes submetidos à cineangiocoronariografia*. Revista Mineira de Enfermagem. 2011; 15(1):42-6.

9. São Leão AMO, Vilagra MM. *Perfil dos Pacientes Submetidos à Intervenção Coronariana Percutânea no Serviço de Hemodinâmica do Hospital Universitário Sul Fluminense, Vassouras-RJ*. Revista de Saúde, Vassouras. 2012; 3(1):27-32.
10. Kuhn OT. *Análise do perfil de pacientes submetidos à cateterismo cardíaco e angioplastia com stent em um hospital geral porte IV*. 2012. [acessado em: 05 de julho de 2017] Available at: <http://bibliodigital.unijui.edu.br>.
11. Galon MZ, et al. *Perfil clínico-angiográfico na doença arterial coronariana: desfecho hospitalar com ênfase nos muito idosos*. Arq Bras Cardiol. 2010; 95(4):422-9.
12. Gottschall CAM. *1929-2009: 80 anos de cateterismo cardíaco-uma história dentro da história*. Revista Brasileira de Cardiologia Invasiva. 2009; 17(2):246-68.

Received in: 01/08/2017

Required revisions: 12/09/2017

Approved in: 03/11/2017

Published in: 01/07/2019

---

**Corresponding author**

**Karolyne Marotto Vila**

**Address:** Estrada Adhemar Bebiano, 4906, bloco H,  
apartamento 402, Engenho da Rainha, Rio de Janeiro,  
Rio de Janeiro, Brazil

**Zip Code:** 20.766-721

**E-mail address:** karu.lynemarotto@gmail.com

**Telephone numbers:** +55 (21) 2592-5944 / 9 9486-7904

---

**Disclosure: The authors claim  
to have no conflict of interest.**