

Prevalence of Heart Disease Demonstrated in 60 Years of the Arquivos Brasileiros de Cardiologia

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Abstract

Considering the historical and academic relevance of the Brazilian Archives of Cardiology (ABC), as its MEDLINE indexing began in 1950, it was assumed as a hypothesis that the analysis of the publications over the last 60 years could reflect the changing trends of heart disease in Brazil.

The study data were collected using a program developed for this purpose, allowing the automatic extraction of information from the MEDLINE database. The study information were collected by searching "Brazilian Archives of Cardiology AND selected parameter in English". Four observational groups were determined: (1) major groups of heart diseases (coronary artery disease, valvular heart disease, congenital heart disease and cardiomyopathies); (2) relevant diseases in clinical practice (cardiac arrhythmias, cor pulmonale, myocardial infarction and congestive heart failure); (3) cardiovascular risk factors (hypertension, diabetes, dyslipidemia and atherosclerosis); and (4) group determined due to the growing trend of publications on congestive heart failure seen in previous groups (congestive heart failure, myocardial infarction, rheumatic heart disease and Chagasic heart disease)

All publications within the established groups were described, highlighting the increasing importance of heart failure and diabetes as risk factors. A relatively easy search was carried out, using the computer program developed for literature search covering six decades. Emphasizing the limitations of the study, we suggest the existence of an epidemiological link between cardiac diseases that are prevalent in Brazil and the publications of the Brazilian Archives of Cardiology.

Introduction

The Brazilian Archives of Cardiology (ABC) memorial reports that in the first years of its existence, the great challenge for the Brazilian Society of Cardiology (SBC) was to organize

Keywords

Cardiovascular Diseases; Prevalence; Periodicals as Topic; Coronary Artery Disease; Heart Defects, Congenital; Heart Valve Diseases; Cardiomyopathies, Myocardial Infarction.

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their congresses to make them regular and productive, which, at that time, was a complex and comprehensive task, mainly due to the difficulties in transportation and effective communication at that time.

The second most important task was the creation of its own self-publicizing vehicle, as those in Europe and the United States had great penetration in the Brazilian academic environment, but did not reach the mass of physicians who practiced Cardiology here, especially those represented by general practitioners. The idea of a self-publicizing vehicle was soon put into practice by creating a journal which, at the time, represented a genuine bold action, as it belonged to a still developing specialty, considering that in most medical centers, Cardiology still part of Internal Medicine. This initiative certifies that the founders of the SBC considered, from the beginning, the need for a vehicle that could record and publicize the events and scientific works produced by its members and this initiative was put into practice at its founding, on 14 of August 1943¹.

With over 60 years - exactly 70 years of existence since its foundation – the ABC is the official scientific publication of the SBC and the main vehicle for the dissemination of Brazilian scientific research in the area of cardiovascular sciences. Published in two languages (Portuguese and English) and indexed in major international databases (ISI Web of Science, Cumulated Index Medicus, MEDLINE, EMBASE, Scopus, SciELO and LILACS), the ABC has an average impact factor of 1.2 according to Thompson Reuters. This fact means a factor that is similar to most of the journals indexed in the ISI Web of Science in the field of Cardiology.

Additionally, ABC is currently classified as Qualis B2 by the Coordination of Improvement of Higher Education Personnel (Capes), a situation that contributes to a better score of Graduate Programs with lines of research in cardiovascular sciences².

Thus, considering the historical and academic relevance of ABC, with its indexing in MEDLINE in 1950, and convinced of the great possibility of the existence of important biases, it was assumed as a hypothesis that the analysis of the publications over a period of 60 years could reflect the changing trends of heart disease in Brazil. This hypothesis defined the rationale of this research, which, in other words, sought to establish the existence of a temporal association between prevalent heart diseases in Brazil and ABC publications.

Methods

The study data were collected with the help of a new software program using LINUX language, developed by one of the authors (JCN), which consisted of an automatic method

of MEDLINE database information³. For this purpose, it was sufficient to provide, as filters, a list of words and parameters of interest. Therefore, the information was processed and stored in a Microsoft Excel file with pre-defined formatting. It is worth mentioning that the creation of this program allowed us to collect a large amount of data within a short period of time, making it a tool that will surely be useful in further investigations.

The program is written in Python language, using some libraries as windmill (establishes the interface with the browser, can operate pages with Java, CSV (MEDLINE) and MS-Excel scripts. There is no graphic interface yet, which brings some difficulty, as the program must be handled entirely at the command terminal. The programming of the word list was performed in a text file (.txt) respecting the order of one word per line.

The collected data were manually specified, with this being the most difficult step, as one needs programming knowledge to do so. It is noteworthy that the program works on both Windows and Linux operating systems.

The study information were collected by searching "Brazilian Archives of Cardiology AND selected parameter in English". Filters were applied to the results and then the number of publications for each disease was counted. In order to calculate the percentages by decade, a search with the term "Brazilian Archives of Cardiology" was performed to count the total number of articles published by the journal and indexed in MEDLINE from 1950 on. We inserted a list of search words and parameters that needed to be extracted from each search result. These parameters could be names, dates, or any other word of interest. The program automatically opens all pages and harvests data of interest. The information is collected and then processed in different ways. In this case, the results were divided into decades, calculating the percentages of values in each period in relation to the total, creating an MS - Excel file with the final values .

Four observational groups were determined: (1) major groups of heart diseases (coronary artery disease, valvular heart disease, congenital heart disease and cardiomyopathies); (2) prevalent diseases in clinical practice (cardiac arrhythmias, Cor Pulmonale, myocardial infarction and congestive heart failure); (3) cardiovascular risk factors (arterial hypertension, diabetes, dyslipidemia and atherosclerosis), and (4) group determined due to the growing trend of publications on congestive heart failure (congestive heart failure, myocardial infarction, rheumatic heart disease and Chagasic heart disease).

Studies on human subjects were considered and the results were presented as compositions of vertical bar graphs (absolute values) and linear graphs (percentage values representing the timeline).

Results

The charts have decades as the abscissa and as ordinate as the number of results of the chosen parameter divided by the total number of results in the decade. Figure 1 portrays the evolution of large groups of cardiac diseases; Figure 2

shows publications related to four parameters determined by their importance in clinical practice. All curves, except that of arterial hypertension, start from zero because the publications start from 1960 on. Figure 3 shows cardiovascular risk factors in the general survey, and Figure 4 shows the curve of heart failure and possible causes.

Discussion

Chart data depicted in Figure 1 show that the percentage of publications on congenital heart disease decreased in the 1960s and increased in the 1970s and remained stable thereafter, with approximately 2% of incidence. The curve of valvular diseases had a peak in the 1950s, decreased sharply in the 1960s and since then has decreased steadily, to 10-14%. The curve of coronary diseases showed a great increase until the 1970s, when it decreased slightly, increasing again in the 1980s, reaching approximately 19% of cases and, since then, has shown a small decrease. Cardiomyopathies showed a great and almost linear increase until the 1980s, when there was a plateau with a maximum of approximately 13%, followed by a decrease until 2010-2013, when it represented approximately 8% of cases.

Thus, considering the main presumed groups of heart disease, we have the following observations:

- Congenital heart diseases, during the six decades, maintained a level of low and stable incidence. This trend continued in the first three years of the 2010s, coinciding with clinical practice;

- There was a predominance of valvular heart disease in the first 2 decades (1950-1970), when studies on coronary diseases reached and surpassed those on valvular heart diseases, probably coinciding with the advent of coronary angiography;

- It is worth mentioning the behavior of cardiomyopathies, of which publications increased and began to show similar incidence to that of valvular heart disease as early as the 1980s. Considering the decrease in Chagas' heart disease as a public health problem, would it not be possible to speculate that this increase is related to coronary disease and/or old age?

Data from the charts depicted in Figure 2 show that the curve of myocardial infarction increased in the 1960s and remained virtually unchanged in 1970s. There was another important increase in the 1980s and, as a result, a new plateau, followed by a decrease in the period of 2010-2013. The curve of arrhythmia increased greatly in the 1960s, reaching almost 16% of the articles, followed by an almost linear decrease to approximately 6%. Congestive heart failure only increased during the study period, and this increase was even more significant in the 1980s, reaching approximately 16% in the period of 2010-2013.

Cor Pulmonale remained below 2% until the 1990s, when it showed a small increase, returning to approximately 2% in 2010-2013. When considering the group of publications determined by its importance in clinical practice (arrhythmias, myocardial infarction, congestive heart failure and Cor Pulmonale) and excluding Cor Pulmonale, of which publications remained at a low and stable level, other three parameters showed patterns amenable to interesting discussion:

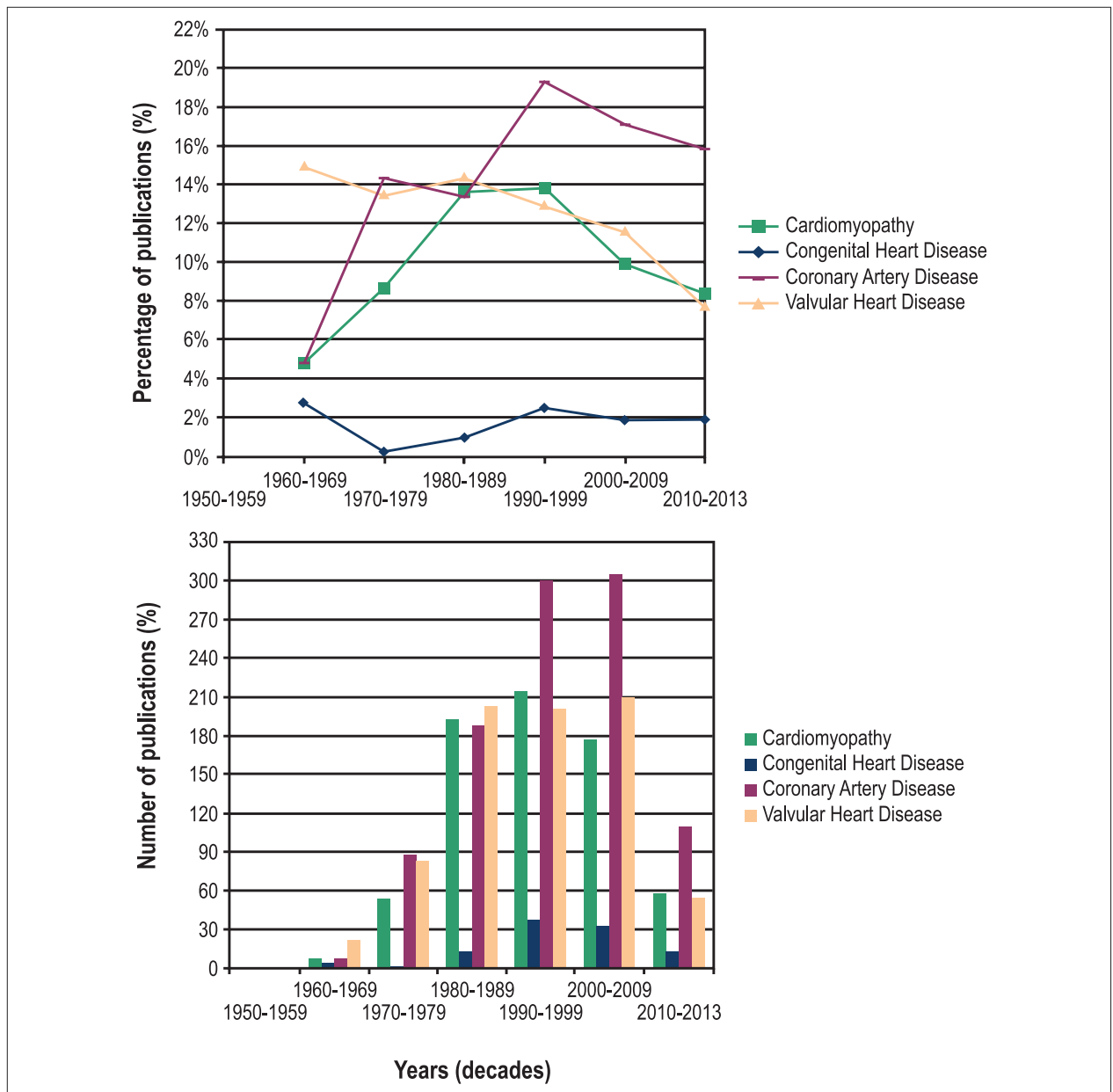


Figure 1 - Main groups of heart diseases (coronary artery disease, valvular heart disease, congenital heart disease and cardiomyopathies).

- the incidence of articles on cardiac arrhythmias was more prevalent until the 1990s, when it was equaled by publications on myocardial infarction and congestive heart failure, and started to show a steady decrease;

- in the 1990s, there was a perfect balance between the number of publications;

- from 2000 on, there was an extremely interesting fact, namely, the decrease in publications on myocardial infarction and the continuous increase in publications on congestive heart failure. This pattern coincided with the cardiomyopathy pattern, allowing us to repeat the comment on the influence of age and the development of coronary artery disease;

Another consideration between the patterns of incidence of publications on arrhythmias and Cor Pulmonale would be the emergence of other journals specialized in these subjects.

Chart data depicted in Figure 3 show that the curve of hypertension had a great increase in the study period, going from 4% of publications to over 18% in 2010-2013. Diabetes showed a low increase until the 1990s, when it increased significantly, reaching almost 10%. Dyslipidemia showed a low incidence of articles, less than 2% up to the 1980s, when it showed an approximate increase of 4%. Atherosclerosis remained low until the 1990s, when it showed a near linear increase, reaching about 4% of the publications.

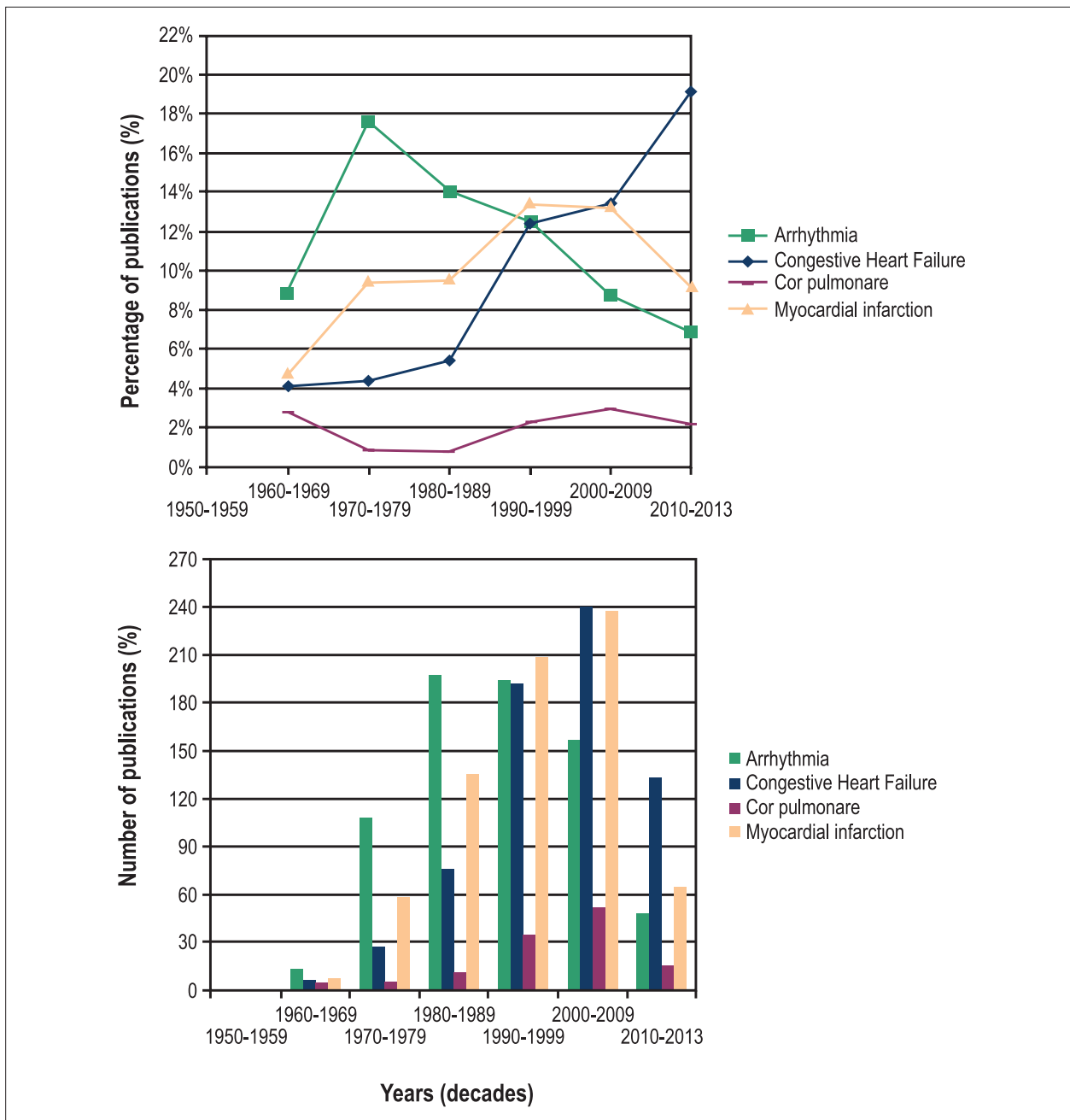


Figure 2 - Prevalent diseases in clinical practice (cardiac arrhythmias, Cor pulmonale, myocardial infarction and congestive heart failure).

Thus, the following were observed in the group of risk factors: clear prevalence of publications involving arterial hypertension, an already observed trend of increase in publications about diabetes, and, observing the first 3 years of the 2010s, an increasing trend of publications on diabetes and a slight decrease of studies on myocardial infarction were confirmed.

Finally, the data depicted in Figure 4 show that Chagasic heart disease remained on a plateau until the 1990s, when it showed an almost linear decrease, reaching 2010-2013

with approximately 4% of the results. Rheumatic heart disease decreased from the 1960s on, remaining below 2%. Myocardial infarction showed an increase in almost the entire study period, with plateaus in the 1970s and 1990s, and declined in the early 2010s. Congestive heart failure showed a high and continuous increase in percentage of articles, ranging from approximately 5% to nearly 20% in the 1980s.

Therefore, due to the increasing number of publications on congestive heart failure, a fourth observational group was created, which confirmed the upward trend, when compared

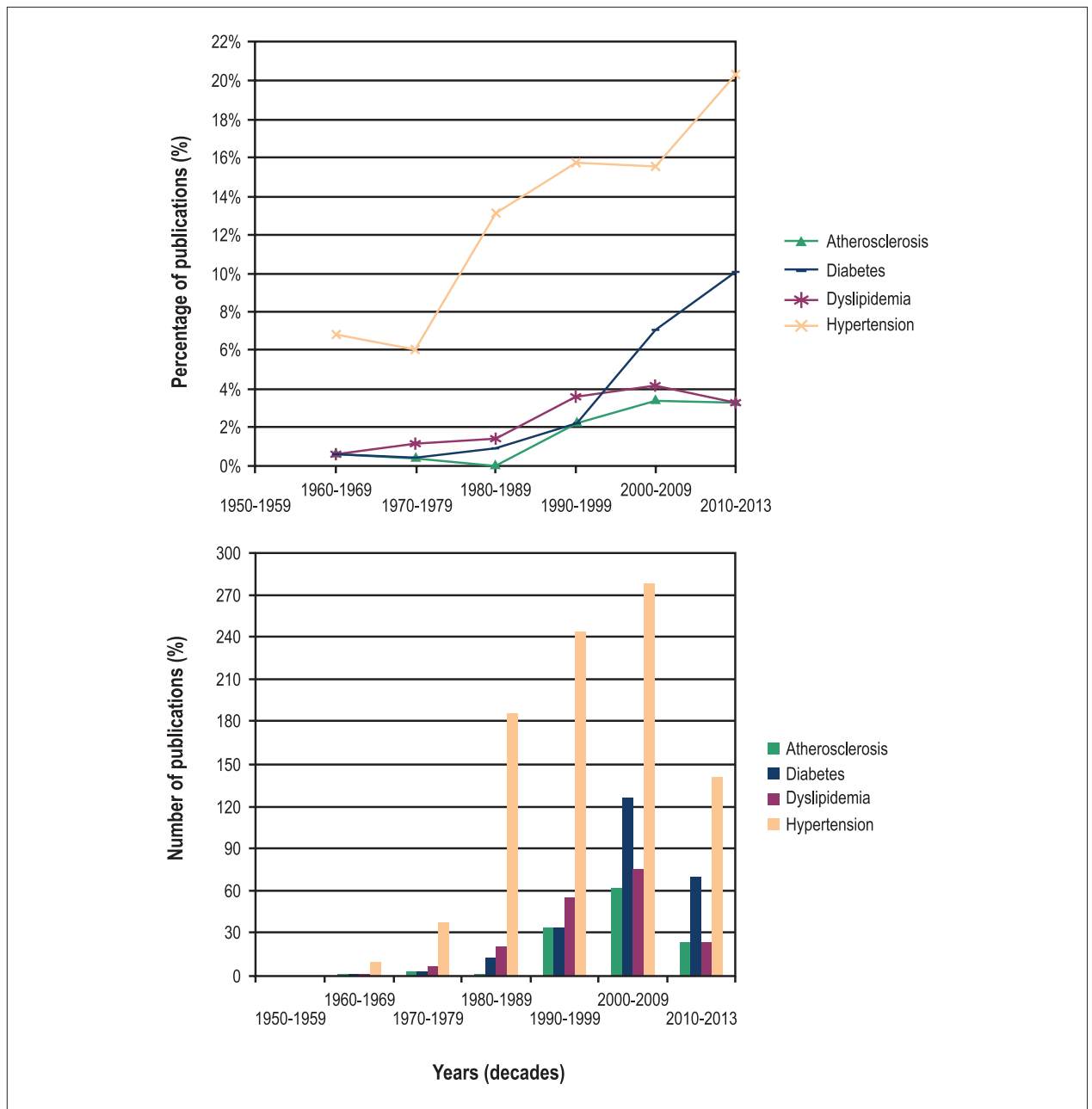


Figure 3 - Cardiovascular risk factors (arterial hypertension, diabetes, dyslipidemia and atherosclerosis).

with the number of publications on Chagasic heart disease, rheumatic heart disease and myocardial infarction. As we observed a lower frequency of rheumatic heart disease and a decreasing trend of publications on Chagas' disease, we still speculate about the importance of age and of dilated cardiomyopathy due to coronary artery disease.

Limitations

Some observations are relevant because the present is a manuscript that does not follow the conventional rules of a scientific article. There are, obviously, limitations to the

method: 1) one of them is counting certain articles more than once, as they may appear in the results of more than one selected parameter. For instance, the same article may appear in the results of "myocardial infarction" and "arrhythmia". Nevertheless, the charts clearly show trends of increase and decrease in the percentage of published articles related to selected indicators; (2) throughout its existence, the ABC had its periodicity changed over time and this increased frequency must certainly have some association with the number of articles published^{4,5}; (3) furthermore, from the 1960s on, there was a marked increase in the number of medical

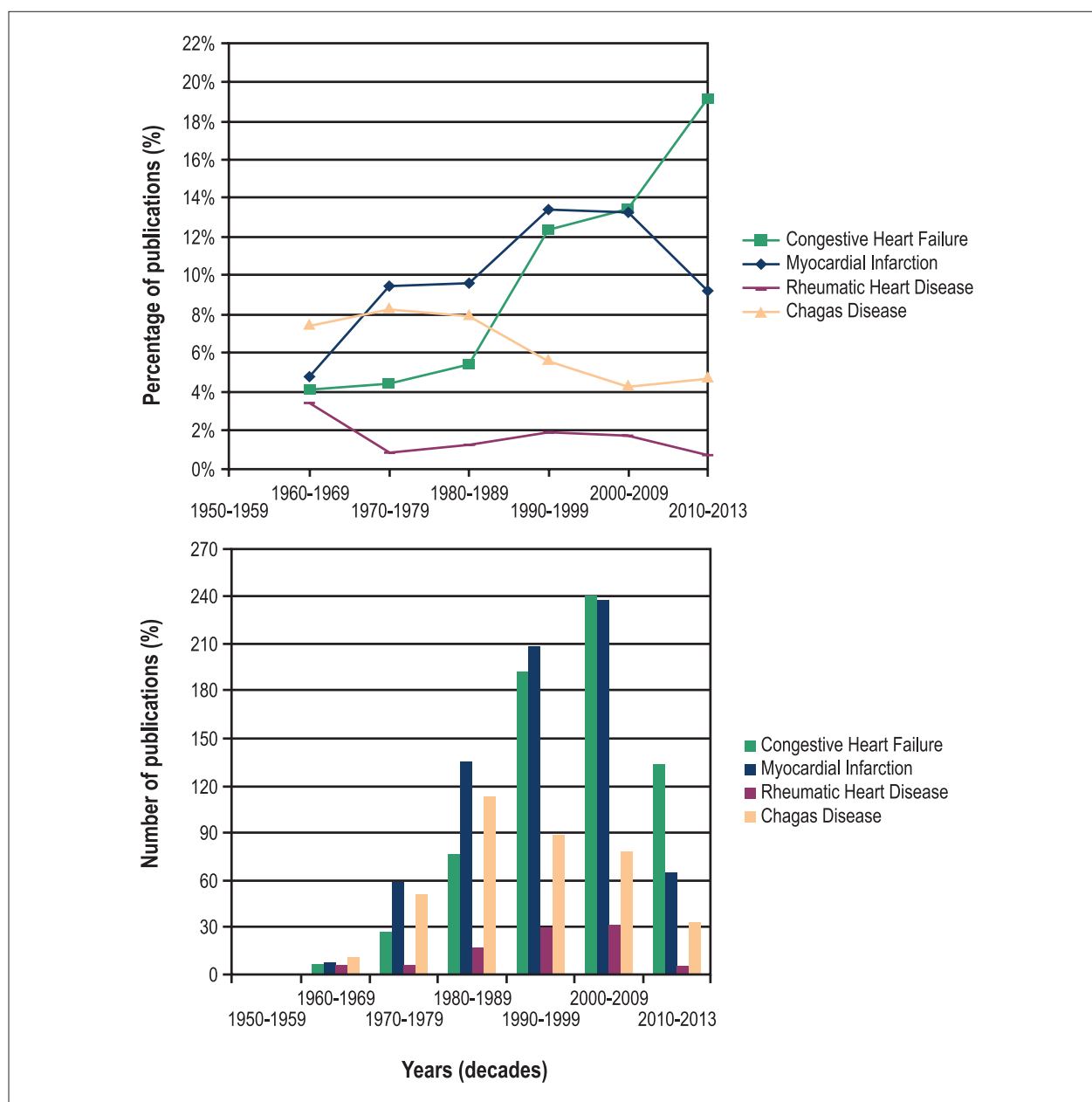


Figure 4 - Arbitrated group due to the growing trend of publications on congestive heart failure (congestive heart failure, myocardial infarction, rheumatic heart disease, Chagas heart disease).

schools in Brazil, with a higher number of cardiologists and the growth of institutions that contribute most to the ABC in the country; and (4) the categorizations were arbitrary and therefore it is necessary to admit them, in general, as simplifiers of reality. In the case of this manuscript, we used the categorization of interest at a time period, in a single vehicle of scientific communication and, of course, the authors' methodological interest. This type of categorization, when applied over decades, can fall upon an artificial classification.

In conclusion, it was relatively easily to perform a literature search of six decades with the aid of a computer program developed for this purpose. Emphasizing the limitations of the study, we suggest the existence of a temporal relationship between heart diseases that are prevalent in Brazil and ABC publications.

Author contributions

Conception and design of the research and Writing of the manuscript: Evora PRB; Acquisition of data: Nather JC;

Analysis and interpretation of the data and Critical revision of the manuscript for intellectual content: Evora PRB, Nather JC, Rodrigues AJ.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

This study is not associated with any post-graduation program.

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