

Coautoria e participação feminina em periódicos Brasileiros da área de cirurgia: Estudo bibliométrico

Co-authorship and female participation in Brazilian scientific journals in the surgery
field: Bibliometric study

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ABSTRACT

Studies on female co-authorship in the scientific production of various areas of knowledge are frequent in international scientific literature. However, this object of study has been little explored by Brazilian research in the field of Information Science. This article presents a contribution to this area by presenting the results of a research that investigated female co-authorship and the participation of women in the editorial staff of Brazilian scientific journals in the area of surgery published between 2010 and 2014. The corpus investigated consisted of 920 articles published in four scientific journals: Acta Cirúrgica Brasileira (ACB), Arquivos Brasileiros de Cirurgia Digestiva (ABCD), Revista Brasileira de Cirurgia Cardiovascular (RBCCV) and Revista do Colégio Brasileiro de Cirurgiões (RCBC). The bibliometric analysis is the methodological approach adopted and sample universe were 920 articles written by 5649 co-authors. Men appear as coauthors in 63.5% (n=585) of articles, while women show up as coauthors in 23.8% (219) of all articles. By investigating the gender of coauthorship in original and review articles, the results showed that women's participation is lower than men in both types and in all four journals. Observing the participation of women in editorial boards of the journals, the results revealed that in only one journal (ABCD) the female presence is unique and exclusive. The study showed that gender inequality persists in terms of authorship, co-authorships, types of articles, and also on the editorial board, scientific committee and board of reviewers.

KEYWORDS: Co-authorship; Bibliometrics; Gender in surgery; Gender in scientific production.

RESUMO

Estudos sobre a coautoria feminina na produção científica de várias áreas de conhecimento são frequentes na literatura científica internacional. Contudo, esse objeto de estudo tem sido pouco explorado nas pesquisas brasileiras do campo da Ciência da Informação. Esse artigo apresenta uma contribuição para essa área ao expor os resultados de uma pesquisa que investigou a coautoria feminina e a participação das mulheres no corpo editorial de periódicos científicos brasileiros da área de cirurgia publicados entre 2010 e 2014. O *corpus* investigado consistiu de 920 artigos publicados em quatro periódicos científicos: Acta Cirúrgica Brasileira (ACB), Arquivos Brasileiros de Cirurgia Digestiva (ABCD), Revista Brasileira de Cirurgia Cardiovascular (RBCCV) e Revista do Colégio Brasileiro de Cirurgiões (RCBC). A análise bibliométrica foi a abordagem metodológica adotada e os resultados obtidos apontaram que 920 artigos foram escritos por 5.649 coautores. Os homens aparecem como coautores em 63,5% (n=585) dos artigos, enquanto que as mulheres comparecem como coautoras em 23,8% (n=219) do total de artigos. Ao investigar o gênero da coautoria nos artigos originais e de revisão, os resultados mostraram que a participação feminina é inferior à masculina em ambos os tipos, e em todos os quatro periódicos. Em relação à participação das mulheres nos corpos editoriais dos periódicos, os resultados revelaram que apenas no periódico ABCD a presença feminina é única e exclusiva. O estudo realizado demonstrou que ainda persistem as assimetrias de gênero nas coautorias, corpos editoriais e de revisores, e no comitê científico de periódicos da área de cirurgia.

PALAVRAS-CHAVE: Coautoria . Gênero na cirurgia. Bibliometria. Gênero na produção científica.

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JITA: BB. Bibliometric methods.

1 INTRODUCTION

In the international scientific literature, gender representation in science has been approached in numerous researches showing that women are underrepresented in scientific production. Among other aspects, recent studies (eg, WEST et al, 2013, EISENBERG, WHALLEY, 2015, ZENG et al, 2016) have drawn attention to the subtle ways in which gender disparities can occur in authorship and scientific co-authoring. However, in Brazil, researches that address female representation in authorship and co-authorship are still scarce in the area of Information Science. In order to corroborate this argument, we conducted a quick survey in the SCIELO electronic library on December 2016, with the search terms "authorship" and "co-authorship". The results pointed out the existence of 27 articles published between 2005 and 2016, of which only one addressed the issue of female participation in the authorship of articles in the area of neurology, also published in a Health area periodical. Among the other 26 articles, although eleven were published in three journals in the area of Information Science, none of them approached authorship and co-authorship from a gender perspective, which justified the accomplishment of this study, which aims, among other aspects, fill a gap in metric studies in a gender perspective.

Among the other 26 articles, although eleven were published in three journals in the area of Information Science, none of them approached authorship and co-authorship from a gender perspective, which justified the accomplishment of this study, which aims, among other aspects, fill a gap in metric studies from a gender perspective. The choice of this area of knowledge is due to the fact that although the participation of women in the area of Medicine has increased during the last four decades, there are still questions about the gender disparity in this area when it comes to analyzing the academic scientific production of this field of knowledge. Numerous researches - for example, Jonasson, 2002; Jagsi et al., 2006; Morton; Sonnad, 2007; Amrein et al, 2011; Martins et al, 2012 - have shown that women still make up the minority of authors of original articles of investigation, and as members of editorial bodies of journals in the scientific literature in the area of Medicine.

Thus, the study carried out is justified by the possibility of knowing the profile of scientific production in a specific area of Medicine - surgery - and by the contributions it may offer to the field of gender studies, especially those dedicated to understanding the participation of women in different academic fields. Add to that, the possibility of contributing to the research agenda in the field of Information Science.

Thus, the objectives of the research were to identify, characterize and analyze the Brazilian scientific production consolidated in scientific articles published in four Brazilian periodicals between 2010 and 2014, according to the following parameters: a) articles and authors: temporal distribution of articles, total authors, types of articles (original or revision); gender of authors; position of the authors (first or last) by gender, as listed in the signature of

the articles; b) periodical and editorial body: mission of the periodicals; genre of editors, members of the editorial board, scientific committee and panel of reviewers.

The next topic presents the theoretical basis that guided the research, based on a literature review on the issue of gender in science and in the field of medicine.

2 LITERATURE REVIEW

The History of Medicine and Surgery in Brazil begins effectively with the coming of the royal family. Until the beginning of the 19th century, the license to Medicine was not compulsory, as argued by Moreira Junior, Figueiredo and Vieira (2012), but the courses that granted it did not accept women. Figueiredo (1999) reports that barbers were considered the forerunners of surgeons, and in the research he undertook on the subject, he found no reference to the presence of women in that trade. Over the last two centuries, this scenario has changed radically, with women's presence increasing in the practice of Medicine and in the academic environment, although this has not been accompanied by equality between men and women in relation to leadership positions, wage balance, And elimination of gender bias. (METAXA, 2013; WEINACKER; STAPLETON, 2013). In Brazil, as Avila (2014: 143) reports, "medicine was mostly exercised by men until the 1960s"; Moreover, from 1970 and throughout the following decades, "Medical Schools became a space of greater circulation of women, increasing more rapidly in the first decade of the 21st century."

In the medical field of surgery, the female presence in relation to men has also increased, but it is still far from reaching a gender balance. (PARK et al, 2005). The study by Sanfey et al (2006) showed that women accounted for almost half of all medical students in the United States, but this rate dropped to almost a quarter when women chose to pursue general surgery. More recent data compiled by Joliff, Leadley and Coakley (2012) in an evaluation report on women's participation in academic Medicine show that although the proportion of women has increased over the years among the various specialties in medical residency programs, such as Gynecology and Obstetrics, General Practice and Pediatrics, for example, the female presence in surgical specialties, such as Thoracic Surgery and Orthopedic Surgery, is lower. Faced with this reality, Harris, Chaikoff and Eidt (2007) argue that it is necessary to change the formation of residency training programs in Medicine.

As Ávila argues (2014, p.143), "occupational segregation initiated during the formation process reproduces male and female ghettos within the profession and limits women's access to specialties and areas of greater prestige and remuneration". That is, the feminization of Medicine, in the author's view, causes a devaluation of the profession, and the author resorts to Bourdieu (2007), to explain that the profession is less valued, and seen as inferior, when feminized. In analyzing the presence of women in medical schools, Bourdieu (2007, p.108) argued that "the number of women decreases as one moves up the hierarchy of

specialties, some of which, like surgery, are practically forbidden to them, while others, such as Pediatrics, or Gynecology, are almost reserved for them. "

Before approaching the insertion of women in Medicine, it is worth remembering quickly their trajectory in science recalling some challenges faced as well as some female achievements in this scientific universe.

Historically, Science has always been regarded as a male activity. During the fifteenth, sixteenth, and seventeenth centuries, women were kept out of the discussions that took place in scientific societies and academies; which were considered the main reference institutions of the world scientific community. Later, in the eighteenth century, some women began to have access to certain tasks considered to support science; but this only happened because of their family position, that is; if they were daughters or wives of any man of science. According to Schiebinger (2001), many women produced knowledge in laboratories assembled within their homes, and the results of these studies were disclosed with the names of their brothers, fathers or husbands or some other male representative, since men were allowed to produce scientific knowledge, which was denied to women. The absence of this connection with a male representative represented in practice the lack of opportunity for women to integrate into the scientific community. (HAYASHI et al, 2007). In addition, as Carvalho and Casagrande (2011) pointed out, science can be defined as a social construction that took place under parameters considered by western society at the time as masculine, such as objectivity and rationality. From this perspective, scientific rigor was considered a quality of men, not women.

Besides these challenges imposed on female scientists stemming from the patriarchal society and the androcentric code of science, one could not but comment on a very pertinent gender issue that directly interferes with women's possibilities to develop and produce scientific knowledge: it is the sexual division of labor. When they left their homes and their domestic activities to devote themselves to science, they were criticized and discriminated against for not fulfilling their role as a woman established by society. The solution found to combat these prejudices was to face the double working day, and obviously in this regard women suffer a disadvantage, because while men have full time to devote themselves to scientific activities, women, especially married and with children, do not have the same odds. (CARVALHO; CASAGRANDE, 2011).

This condition has resulted in the women in a huge accumulation of work; something that men have never faced, and the changes to a more egalitarian division of labor still walk at a slow pace. Even with all the difficulties encountered by women in building their scientific careers, it is noteworthy that they have overcome many barriers and have not been overwhelmed by prejudices and discrimination. Considering the present moment, it can be said that the difficult past for those who wanted to produce scientific knowledge is gone, since data indicate that currently women appear in more numbers than men in universities. Is

it possible to affirm then that currently women do not suffer more prejudices and discrimination in science?

According to Hayashi et al. (2007), strong elements of machismo, sexual stereotypes and prejudices against women still persist in society, coupled with the lack of conditions and incentives for her to continue her career. Pregnancy, for example, is often seen as a problem by researchers as many of them may not afford public day care or even affordable private day care to get support while they are doing their jobs. Due to the dedication to the family, the woman still finds it difficult to travel to participate in congresses that are so important for development in her career.

Other authors also claim that women still encounter barriers, even if almost imperceptible in scientific careers. These barriers become apparent when scientists have to present more credentials for the same benefit, be it a promotion, a research grant, or other academic advantage. Such a need is noticeable in situations where women are subjected to peer reviews. There are, therefore, several indications that, through various subtle mechanisms established in the scientific environment, various types of barriers are created that hamper the professional advancement of women. It is important to point out that many of these mechanisms are sometimes not perceived or aware by women themselves. (OLINTO, 2011).

Olinto (2011) then defines two types of mechanisms that are generally identified to describe the barriers faced by women: the horizontal segregation and the vertical segregation. Through horizontal segregation women are led to make choices and to follow different paths from those chosen or followed by men. Under the influence of family and school, girls end up evaluating themselves as more apt to perform certain activities over others and choose activities more compatible with what they consider, or are taken to consider, as more suitable for them. Horizontal segregation includes mechanisms that make career choices markedly segmented by gender. Horizontal segregation is related to another type of segregation denominated as vertical, since the female professions tend to be less valued in the labor market.

Vertical segregation is a social mechanism that can be considered more subtle, which tends to keep women in more subordinate positions, failing to progress in their professional choices. Both vertical and horizontal segregation may suggest a genuine difference in characteristics and abilities between the two sexes, which would explain the exclusion of women from some occupations and their difficulty in achieving positions of prominence in the occupational hierarchy. Such characteristics would also explain the gender differences in academia and scientific activity.

Analyzing historically the relationship of women to the knowledge produced by societies, and relating to the definition of horizontal segregation, we are faced with a pre-established concept that women are intellectually incapable of understanding the more

abstract sciences, such as Mathematics, Physics, and Philosophy. Such preconception can be found in all periods of human history, which considered the woman to be inferior and submissive to man. Even with the changes that have occurred in society in various aspects and women are present in different areas of work, in the 21st century the inheritance of certain concepts influences both the actions of women and the judgments suffered by them. (MOREIRA et al., 2010)

But some authors, such as Marinoff (2008, p. 358), claim that as women conquered their space, they quickly demonstrated all kinds of excellence in applied and experimental sciences, such as Medicine and Engineering as well as in other areas, showing equality skills and performance at the highest levels. The author further comments that the historical absence of women in contributions in these areas was a result of cultural prejudices against them, not any natural deficit of talent or genius. Even though the Enlightenment had argued that women had difficulty understanding the exact sciences, they demonstrated their talent both in learning and in the teaching and development of these sciences.

Moreira et al. (2010) raises an interesting question: they suggests that instead of asking "why so few women were great scientists?" We might ask "Why are so few women scientists known?" Then they concludes that the biographies of female scientists show that they encountered difficulties, prejudices, meanness and even persecution because of their sex. He is also noted that, in proportion to the obstacles encountered, the number of women scientists in all ages is relatively large and it would be totally wrong to think that scientific and technological progress have taken place without them. Thus, they believes that the greatest obstacle to women was certainly the instruction denied them for centuries, since they had access to universities only a century after the creation of the first university.

Regarding female leaders in the academic environment, Hayashi's study; Rigolin; and Hayashi (2012) presented the results of a research that aimed to analyze the category "gender", with the objective of studying projects led by women who participate in the National Institutes of Science and Technology (INCTs). The results showed, among other things, that among the 122 INCTs in the country, only 18 are led by women.

Turning then the look to the medical area and more specifically to the scientific production of the surgery, which is analyzed in this article, it becomes interesting to know a little about the insertion of women in the mentioned area, as well as to know some barriers found by them in several countries and which are portrayed in the literature.

According to França (2014), the role of women in the "art of healing" can be traced back through time, but traditionally only male figures are highlighted. In ancient times, women were not admitted to medical schools and thus the medical profession was considered exclusively male. The official entry of women into medical universities took place only in the nineteenth century in several countries. In Brazil, the women were able to continue in this career only after an authorization of D. Pedro II, in 1879.

Over time, the number of women in the medical profession gradually increased. In the United States, for example, data from the Association of American Medical Colleges (AAMC) indicate that in the 1960s, 90% of applications to Medicine were male; in the 1970s and 1980s there was a drop in male applications and a progressive increase in female applications. In 2001, half of medical students are women, both in the US and in other countries. (MACHADO, 2003).

The increase in the number of women in the medical field indicates that over the years, barriers have been overturned and they have been encouraged to progress. The histories of the European medical schools demonstrate the remarkable persistence of the feminine will since there were several difficulties to be faced in several European countries. One of the examples that can be mentioned is Russia, which in 1872 admitted 90 women in the Faculty of Medicine under such strict and difficult conditions that only 25 finished the course. In Italy in the fifteenth century, women could complete their medical degree, in addition to teaching through special license, but they could not observe patients or prescribe. (MILLER, 1994).

Regarding Medicine specialties, Santos (2010) points out that gender is a determining factor of the chosen option, since there are areas considered more feminine and others more masculine. Gynecology, Dermatology and Psychiatry may be considered specialties with the female profile and Cardiology, Orthopedics, Proctology and Urology, with the most masculine profile. In Pediatrics, there is a gender balance, but in surgery - the focus of this research - male dominance has always been and still is very pronounced. This area remains one of the greatest obstacles to female insertion, even with the increased presence of women in recent years.

In Brazil, one can cite the story of Angelita Habr Gama, who was the first woman to take up residence in surgery in the country, by the Medical School of USP. She entered college in 1951 and in the third year discovered her passion for surgery. In an interview with Fassa (2007), Angelita recalls that surgery was almost "reserved for men" and women then chose Pediatrics, Gynecology, Obstetrics and Medical Practice. For being one of the few surgeons of the time, Angelita went through some unusual situations. When attending the patient and after examining it, it was very common to hear the following question: "Where is the doctor, who is going to operate me, what time will the surgeon arrive?" The doctor still remembers that she completed her postdoc in London, where she was also a pioneer, but it took time to be accepted because there were only men in this specialty.

Some articles found in the literature consulted for this review sought to find out which factors contribute to medical students choosing a particular specialty in the residence, as well as seeking to verify the students' perception of the barriers and difficulties to perform in the area of surgery. According to Jesus (2008), there is a worldwide crisis in the quantitative formation of medical labor, especially among surgeons. This fact is related to the search for a

better quality of life as a priority for young adults. The surgeon has a stereotype of the professional with unrestricted dedication and implies a limited social and family life. Modern Young people do not want this lifestyle for themselves.

Although the proportion of women has increased in medical schools, few choose to pursue a career in general surgery. A study conducted in Canada shows that only 21% of the residents in General Surgery are women and the reasons why is due to the lack of models in which women may mirror, the considerations about the lifestyle and the their perceptions, about the discriminations based on the genders. (PARK et al, 2005)

Regarding the lack of models, it is unclear whether they need to be of the same sex to influence the student in the choice of specialty, but some surgeons believe that female students need models of female teachers who are successful. The students interviewed in the study by Park et al (2005) believe that the career of a surgeon is not compatible with a rewarding family life, a happy marriage, or raising children in the way they want. In addition to these factors, 25% of female students reported experiencing some form of discrimination due to gender, mainly coming from people in the surgical area. These factors were also relevant for the choice of the surgical career, as reported in the studies of Fitzgerald et al (2013) and Riska (2011).

Franco and Santos (2010) obtained in their researches, results similar to those of Park et al (2005) and point out that in addition to living with the barriers of discrimination, lack of models and low quality of life, the reliability factor and capacity of female surgical professionals appears to discourage the entry of women in this specialty. According to the authors, the male phenotype inspires 25% more confidence than the female. This means that, for any position that pleads, a woman must show she is at least 25% more capable than her nearest male competitor, in order to have the same chances of success. In addition, features considered favorable for surgeons, such as strong personality, Self-control, questioning mind, leadership ability and a certain aggressiveness are seen as qualities in men and as components extraneous to the female personality, often generating doubts even in relation to their femininity.

Through all the barriers pointed out in the works mentioned above that end up discouraging the choice of women by this specialty and aware that the number of female surgeons is considerably smaller in relation to male professionals, it remains to be seen if this panorama is reflected in the scientific publications in the area of surgery.

Cochran et al (2013) note that research publications in major medical journals have increased substantially over the past four decades, although female authors remain to be a minority. According to Olinto (2011), some international evidence suggests that there are productivity differences favoring men, but these differences end up focusing on the early phase of the scientific career. Women are more pro-active than men at a later stage, when men's careers tend to stabilize, and theirs get more breath and tend to grow. Thus, it can be

concluded that gender differences in scientific production do not point to a clear male supremacy.

Amrein et al (2011) points out that authorship in medical research has a predominance of the male gender, in several periodicals and several specialties although in recent years there has been an increase in the contribution of women. The authors draw attention to the low percentage of women as members of editorial boards when compared to the number of men involved in this activity. In their study, the objective was to obtain a description of the participation of women in the editorial boards of 60 well-qualified international journals from the year 2011 and to evaluate if there are differences between the journals. It was then observed that women are underrepresented in the editorial bodies of medical journals and thus it is clear that gender inequality still exists at many levels of medicine. The author explains that the positions of editorial board are among the highest positions a scientist can achieve in his career and it is difficult to point out the reasons for this gender difference, unless it is based on factors found in the literature, such as the existence of implicit and explicit prejudices, the scarce orientation for this activity, the lack of female models, and, finally, the subjective evaluation criteria that put women at a disadvantage in many aspects.

With regard to the positions of the editorial board, Amrein et al (2011) suggest that there should be more invitations for women to participate as contributors to the journals and, if they successfully do so, that they should be considered for editorial board members. On the other hand, in their view, female scientists could be more proactive and ask to contribute to the medical journals review process.

3 METHOD

The exploratory and descriptive research used the bibliometric approach as a methodological resource. In this type of study the phenomena of scientific communication - articles, books, book chapters, for example - are quantified through the construction of indicators that allow to characterize the scientific production on specific subjects and / or topics, and thereby understand and analyze the state of the art of a certain area of knowledge. It is worth mentioning, however, that the prior knowledge of the research object and the context of its production are elements to be taken into account the analysis to overcome the quantitative limits present in this type of study (SILVA, HAYASHI; HAYASHI, 2011).

The study chose as object of study articles published in four Brazilian journals of the surgical area of Medicine, and available online in the electronic library SCIELO: *Acta Cirúrgica Brasileira (ACB)*, *Arquivos Brasileiros de Cirurgia Digestiva (ABCD)*, *Revista Brasileira de Cirurgia Cardiovascular (RBCCV)* e *Revista do Colégio Brasileiro de Cirurgiões (RCBC)*. These journals were chosen based on their representativeness, visibility and comprehensiveness in the field of surgery, with a peer review system for the selection

and publication of scientific articles, in addition to maintaining a regular and uninterrupted pattern of their editions, with an expressive volume of published volumes, considering that the four periodicals together have published 385 numbers.

Three of these journals were created in the late 1980s - some titles are continuity of others that have existed for almost fifty years - and are edited by scientific societies of the area (Colégio Brasileiro de Cirurgiões, Sociedade Brasileira para o Desenvolvimento da Pesquisa em Cirurgia, Colégio Brasileiro de Cirurgia Digestiva). All are classified in the Qualis system of evaluation of CAPES journals. The selection of articles was based on the following criteria: 1) of inclusion - a) in relation to the chronological cut, articles published in the period between 2010 and 2014, considering that this temporal space offers an updated view of the scientific production of the area; b) "original" and "review" articles, as they present, respectively, the complete report of an investigation - for example, clinical or experimental, in the field of surgery – and a synthetic and relevant critical analysis of the scientific literature of a subject or specialty of interest to the area of focused knowledge; c) articles in co-authorship, as they reveal the interaction and collaboration between authors around a specific thematic domain, common research interests, resource sharing, and joint efforts to search for results. 2) of exclusion - a) articles of Chinese researchers, due to the difficulty in identifying the gender of the researchers only by the spelling of the names, since there is correlation between pronunciation and spelling; b) in addition to being present in only two of the four selected journals (ACB and ABCD), this type of document is composed by collections of texts that deal with specific topics, reports and annals of congresses, published in the form of supplementary or supporting editions that accompany some or all of the issues of the periodical; c) articles with authorship exclusively female - that is, without male authorship - and articles without female authorship - that is, with exclusively male authorship, since they prevent comparative analysis.

In addition to the articles selected, the corpus of analysis also included information about editorial bodies, reviewers and scientific committees of the four journals.

Based on these criteria, Figure 1 shows the flowchart of selection of the research *corpus*:

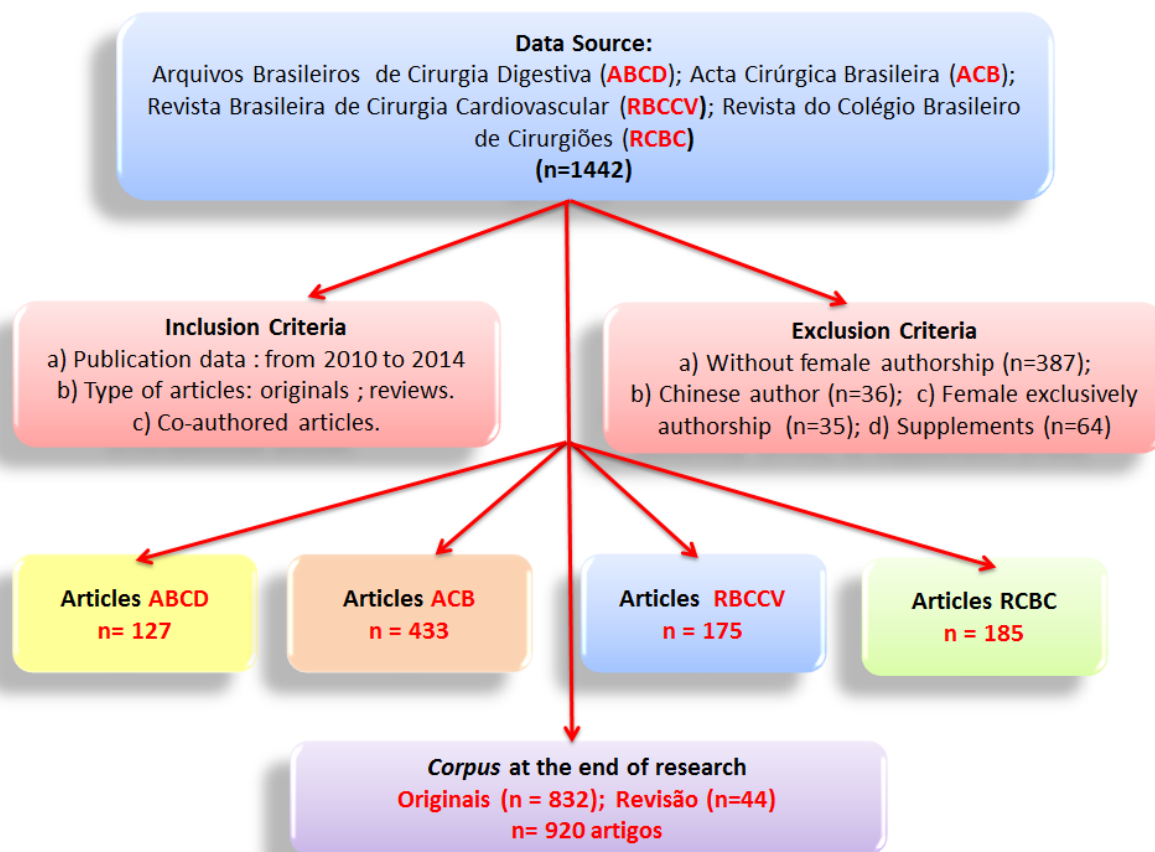


FIGURE 1. Flowchart of selection of the research *corpus*
Source: Authors' elaboration

The research was developed in four steps, as described below:

a) Step 1 – Literature review on female participation in scientific fields, particularly in the area of surgery - in this phase the main journals of the field of metrical studies of science, of feminist studies, and of Medicine were searched, in search of the theoretical reference on the aspects of Gender roles in medicine that affect women's participation in this area.

b) Step 2 - Elaboration of protocols for collecting and recording the data of the articles and editorial bodies of the journals - based on the Hayashi and Hayashi protocol (2011) were elaborated using Excel software, containing the following bibliometric parameters: article profiles: title; full reference; year; type of article (Original or Review); authors: total authors; gender of the authors (first or last) in the signature of the article; editorial board profile: publishers genre; members of the editorial committee, the scientific committee, and the panel of reviewers.

c) Step 3 - Modeling and bibliometric treatment of data - in this phase the collected data were carefully checked, aiming to eliminate inconsistencies (for example, repeated records,

mistakes in the categorization of the articles) and then transported to *VantagePoint*® software for computerized bibliometric analyzes.

d) Step 4 - Analysis and interpretation of the results - based on the theoretical and methodological resources derived from the field of gender studies in science and bibliometric studies, elements were extracted that allowed to understand the asymmetries of gender present in the scientific publications of the field of surgery.

Regarding the ethical aspects of scientific research, the methodological design and the publicly available nature of the data analyzed in the investigation waived its submission to a Research Ethics Committee. The results are presented and discussed below.

4 RESULTS

The 920 analyzed articles (Table 1) were published from 2010 to 2014, in the Journals *Acta Cirúrgica Brasileira* (ACB), *Arquivos Brasileiros de Cirurgia Digestiva* (ABCD), *Revista Brasileira de Cirurgia Cardiovascular* (RBCCV) e *Revista do Colégio Brasileiro de Cirurgiões* (RCBC).

TABLE 1. Annual distribution of the analysis corpus

Journals	Years					Total of articles
	2010	2011	2012	2013	2014	
<i>ABCD</i>	27	27	29	24	20	127
<i>ACB</i>	74	71	112	98	78	433
<i>RBCCV</i>	35	42	40	32	26	175
<i>RCBC</i>	34	48	37	39	27	185
Total	170	188	218	193	151	920

Source: Authors' elaboration

The data in Table 1 show that the *ACB* journal had the highest number of articles (n = 433), representing 47% of the total analyzed in relation to the others. When we investigated the periodicity of this journal it was possible to observe the growth of the total number of editions published annually by the *ACB*. Between 1997 (year in which the collection became available in SCIELO) and 2001 were published four editions per year; from 2002 to 2011, six annual editions were published, and from 2012 onwards the magazine went on to publish twelve annual editions.

On the other hand, the journals *ABCD* and *RBCCV* have four annual editions since they were incorporated into SCIELO (2007 and 1986), while *RCBC* presents six annual editions, and the editions have been available at SCIELO since 1998. In addition to these issues, *ACB* and

ABCD also publish supplemental editions. *ABCD* has published two such issues since 2013, and *ACB* has already published 28 issues of supplements since 2000.

The results of the research also showed that female co-authorship was equal to male co-authorship in only 12.6% (n = 116) among the 920 articles analyzed. In the remaining 88.3% of articles, male co-authorship prevailed in 63.5% (n = 585) of the articles. Female co-authoring was only superior to that of men in 23.8% (n = 219) of the articles.

TABLE 2. Distribution of authorizations in articles, by journal and gender

Journals	Articles			Total
	Women	Men	Women = Men	
<i>ACB</i>	125	257	51	433
<i>ABCD</i>	27	86	14	127
<i>RBCCV</i>	31	126	18	175
<i>RCBC</i>	36	116	33	185
Totais	219	585	116	920

Source: Authors' elaboration

The temporal distribution of the two types of articles analyzed was also investigated. According to the results obtained (Table 3), there was a prevalence (95.2%) of "original" articles (n = 876) on "review" articles, which totaled 4.8% (n = 44).

TABLE 3. Time distribution of review articles (R) and originals (O) by journals

Journals	2014		2013		2012		2011		2010		Subtotal	
	O	R	O	R	O	R	O	R	O	R	O	R
<i>ACB</i>	77	1	96	2	109	3	71	0	74	0	427	6
<i>ABCD</i>	22	5	24	3	23	6	23	1	17	3	109	18
<i>RBCCV</i>	23	3	31	1	38	2	37	5	34	1	163	12
<i>RCBC</i>	26	1	37	2	36	1	45	3	33	1	177	8
Total	148	10	188	8	206	12	176	9	158	5	876	44
TOTAL OF ARTICLES											920	

Source: Authors' elaboration

It is worth realizing in Table 3 that the journal *Acta Cirúrgica Brasileira* (*ACB*) presented the least number of "review articles" (n = 6), because unlike the others it does not have a specific section for this type of article. According to the editorial policy of the *ACB*, expressed in the instructions to the authors, the journal informs that only accepts articles of review, case report or retrospective cases / works, when requested by the Editorial Board. It means that this type of article is included in the "original articles" section. Thus, for the identification of such articles, the respective titles and keywords were read and those that presented the terms "review", "meta-analysis", "systematic review", "literature review", "systematic review of literature" were categorized as "review articles" and included in the analyzed corpus.

Some elements that may serve as possible explanations for the preponderance of the original articles on the review articles can also be found in the editorial policy of the four journals, as explained in the texts in Chart 1.

CHART 1. Mission of the Journals

Journals	Mission
<i>ABCD</i>	Publish articles of clinical and experimental studies that contribute to the development of research, teaching and assistance in the field of surgical, clinical, endoscopic and other correlates.
<i>ACB</i>	Publish original works of basic research and applied in surgery and biomedical sciences, new surgical techniques, reviews related to research in biomedicine, articles on teaching, advances in biomedicine and scientific communication.
<i>RBCCV</i>	The main purpose of the journal is the publication of representative works in cardiovascular surgery, including original texts, pioneers, research , update, case reports and also the experience presented at the National Congress of Cardiac Surgery.
<i>RCBC</i>	The Journal of Colégio Brasileiro de Cirurgiões, the official body of the <i>CBC</i> , is published bimonthly in a single annual volume, and it proposes to disseminate articles of all surgical specialties that contribute to its teaching, development and national integration.

Source: Authors' elaboration

The results also showed that among the 920 articles analyzed, 3.6% (n = 206) of coauthors were referring to review articles, while the original articles collected 96.4% (5,443) of coauthors. However, when the gender of authorship in these two types of articles was investigated, the results (Table 4) showed that female participation is lower than male participation in both types, and in all four journals.

TABLE 4. Distribution of authors by gender in review and originals articles

Journals	Co-authoring in Review Articles		Co-authoring in Original Articles		Total of co-authoring
	Men	Women	Men	Women	
<i>ABCD</i>	53	37	428	225	743
<i>RBCCV</i>	33	27	713	368	1.141
<i>ACB</i>	18	11	1.555	1.139	2.723
<i>RCBC</i>	14	13	614	401	1.042
Subtotal	118(57,2%)	88(42,7%)	3.310(60,8%)	2.133(39,2%)	-
General Total VA/VR	206(3,6%)		5.443 (96,4%)		5.649 (100%)

Source: Authors' elaboration

That is, the data in Table 4 show that of the total coauthors (n = 5,649), only 42.7% (n = 88) of the authors in the review articles are female, whereas in 57.2% (n = 118) The authorships are masculine. This difference is greater in *ABCD*, in which 25.7% (n = 53) of the authors are male and 17.9% (n = 37) female.

These results demonstrate that even in review articles, carried out through bibliographic research - and it is not an applied research in the field of surgery, for example - the female authorship is also inferior to the masculine one. This asymmetry was also observed in the original articles - reports of clinical or experimental studies - published in the four journals, in which there was a higher prevalence (60.8%) of male authorship (n = 3,310)

compared to 39.2% (N = 2113). Among the four journals, *ACB* presented the largest difference (n = 416) of males (n = 1,555) in relation to females (n = 1,139) in the original articles. On the other hand, *RCBC* presented the smallest difference (n = 1) in males (n = 14) compared to females (n = 13).

Regarding co-authorships, the survey results revealed that 920 articles written in co-authorship ranged from two to 23 coauthors.

We can observe in Table 5 that articles with six coauthors were the most frequent (n = 263), followed by those with eight co-authors (n = 128 articles), seven co-authors (n = 131) and five co-authors (n = 155). On the other hand, articles with coauthories from ten were less frequent, ranging the total of articles from one to 12.

TABLE 5. Total articles by journal, co-authorships by article and authors

ABCD	Total of Articles			Subtotal Articles	Total of Co-authors	Total of Authors
	ACB	RBCCV	RCBD			
4	4	4	4	16	2	32
7	14	10	18	49	3	147
14	51	20	17	102	4	408
19	81	20	35	155	5	775
50	117	27	69	263	6	1.578
24	64	19	24	131	7	917
5	50	61	12	128	8	1.024
1	29	8	4	42	9	378
0	9	2	1	12	10	120
1	10	2	0	13	11	143
1	1	0	0	2	12	24
0	2	2	1	5	13	65
0	1	0	0	1	15	15
1	0	0	0	1	23	23
127	433	175	185	920	-	5.649

Source: Authors' elaboration

Another aspect analyzed was the genre in coauthors of the articles. The data in Table 6 show that female co-authorship is lower than male co-authorship in all journals.

TABLE 6. Distribution of co-authoring by gender in journals

Co-authoring	Authors							
	ABCD		ACB		RBCCV		RCBC	
	M	W	M	W	M	W	M	W
2	4	4	4	4	4	4	4	4
3	12	9	21	21	18	12	29	25
4	31	25	110	94	49	31	36	32
5	59	36	225	180	62	38	109	66

6	186	114	440	262	91	71	249	165
7	115	53	269	179	70	63	106	62
8	27	13	224	176	352	136	59	37
9	8	1	131	130	55	17	19	17
10	0	0	59	31	15	5	8	2
11	10	1	65	45	15	7	0	0
12	7	5	7	5	0	0	0	0
13	0	0	11	15	15	11	9	4
15	0	0	7	8	0	0	0	0
23	22	1	0	0	0	0	0	0
Total	481	262	1.573	1.150	746	395	628	414
	5.649							

Source: Authors' elaboration

Some highlights in Table 6 show the gender disparity between men and women in co-authoring. For example, in the ABCD, an article was published with 23 co-authors, 22 of whom are men. This article (MALAFAIA et al, 2012) presents guidelines for the prevention of thromboembolism in cancer surgery of the digestive tract, and as Joliff, Leadley and Coakley (2012) mentioned, the female presence in the field of thoracic surgery is very small. In Brazil, according to data from Franco and Santos (2010, p. 75), the thoracic and cardiac surgeries "have a small contingent of female specialists". Avila (2014: 144) corroborates this view by arguing that "female presence is very limited in predominantly male areas, especially in surgical ones using advanced technology", that is, these are "more prestigious areas, and precisely in them, women are in smaller numbers."

In turn, when articles were signed by two co-authors, gender equality was noted in all journals. We did not find in the scientific literature explanations for this finding, nor even research that had found the same results, and this question remained open to be investigated in more depth, perhaps from a methodological outline that included the consultation of the authors of the articles.

The research also investigated the position of the woman in the list of signatures of the articles and the results obtained can be visualized in Table 7.

TABLE 7. Authors' position by gender in the signature of the articles

Journal	Total of articles	First Author		Last Author	
		Yes	No	Yes	No
ABCD	127	54	73	34	93
RBCCV	175	67	108	43	132
ABC	433	195	238	145	288
RCBC	185	64	121	54	131
Total	920	380	540	276	644

Source: Authors' elaboration

Again, gender asymmetry is present, as women are not the majority as the first or last author in all articles published in the four journals. These findings are corroborated, for example, with those found in the research of Jagsi et al (2006) and Cochran et al (2013). These surveys report that despite the number of women as the first or last author having increased in recent decades in original articles in leading medical journals, female authors continue to be a substantial minority. As Kosmulski (2012) points out, there is no generally accepted method for objectively determining and assessing the contribution of each author to scientific articles, although there is a tendency for senior researchers or leaders to occupy the first or last position.

Female participation was investigated in the editorial boards of four journals and the results can be seen in Table 8.

TABLE 8. Participation of men and women in the editorial board of the journals

Journal	Total of publishers	Women	Men
<i>ABCD</i>	1	1	0
<i>ACB</i>	9	2	7
<i>RBCCV</i>	13	1	12
<i>RCBC</i>	5	0	5
Total	28	4	24

Source: Authors' elaboration

The data in Table 8 show that only in the *ABCD* the female presence is unique and exclusive, whereas in *RCBC* this situation is reversed, that is, there are no women in the editorial staff. In turn, the presence of women is lower in the *CBA* journals (n = 2 females, n = 7 males) and *RBCCV* (n = 1 females for n = 12 males).

In turn, it was observed that in the Scientific Committees and Review Corps of the journals the gender asymmetries are maintained, as indicated in the data of Table 9, below.

TABLE 9. Gender distribution in scientific committees and journals' reviewers

Journal	Scientific Committees		Reviewers Team	
	Women	Men	Women	Men
<i>ABCD</i>	1	59	0	0
<i>ACB</i>	2	35	0	0
<i>RBCCV</i>	0	36	0	0
<i>RCBC</i>	0	25	67	5
Total	3	155	67	5

Source: Authors' elaboration

The data in Table 8 show that only in the *RCBC* - the only journal among the others that presents a list of reviewers separated from the list of members of the Scientific Committee -

the total number of women ($n = 67$) is much higher than the total number of men ($n = 5$). Compared to the data in Table 9, where there is no female presence on the *RCBC* scientific committee, the results suggest that in this journal women are delegated the task of peer review.

The results shown in Tables 8 and 9 corroborate with those obtained by Kennedy, Lin and Dickstein (2001), who found that less than half of the journals studied had parity among the percentages of women in the editorial boards. Ten years later, this scenario seems to have changed for the worse, considering women's participation in editorial, scientific, and review bodies in medical journals. Two studies confirm this assumption. The study of Heckenberg and Druml (2010) concluded that there is still a gender imbalance in articles published between 2001 and 2009 in the magazine *Wiener Klinische Wochenschrift: The Middle European Journal of Medicine*. In turn, the results of the study by Amrein et al (2011), which investigated female underrepresentation in the editorial boards of 60 leading medical journals indexed in the Web of Science, pointed out that only 10 of the editors were female, and less than a fifth of all members of the editorial bodies were women. We therefore agree with these authors that "if more women were appointed to editorial boards this would be a more visible sign of continued progress and would serve as an important model for young women pursuing an academic career in Medicine." (AMREIN et al, 2011, p.378).

In addition to the results obtained in the research, we also agree with Cho et al (2014) that although demographic changes in the academy have reduced some gender disparities over time, scientific journals should be proactively aimed at parity in their editorial boards. Undoubtedly, in the field of surgical medicine this could contribute to the increase of female models, as well as in scientific publication.

5 FINAL CONSIDERATIONS

The results obtained in the research indicated that gender asymmetries persist in terms of authorship, co-authoring, types of articles (original and review), as well as in the editorial staff, scientific committee and reviewers, since in the 920 articles, written by 5,649 authors, there was a higher prevalence (60.8%) of male authorship ($n = 3,310$) than female authorship ($n = 2,133$), which accounted for 39.2%.

It is also suggested that in future studies on authorship and co-authoring with a bibliometric approach, procedures should also be adopted to allow qualitative analysis - such as the scrutiny of the opinion of specialists - men and women - regarding the standards of scientific communication, which may contribute To offer more in-depth explanations regarding the cognitive aspects involved in the process of communication of scientific knowledge. As stated by Costas and Bordon (2011), the combination of bibliometric

indicators with other methodologies is relevant, since it allows a more sociological perspective in the analyzes carried out.

Finally, there are some comments on the difficulties that bibliometricists face when conducting analyzes of scientific production, especially in studies that focus on the issue of the genre of authors and co-authors of articles. This is the case, for example, when citations are analyzed and the list of references presents only the initials of the names or, when the article is multiple authored, only the first author is named and the others are "et al". In addition, in several areas of knowledge there are periodicals that use the names of the abbreviated authors (for example, S. F. Silva) below the title of the article followed by the full name. Thus, it is worth suggesting to the editors of scientific journals attention to these aspects, to avoid gender bias in the analysis of scientific production. Despite the different documentary standards adopted by the journal, a simple measure to be taken in this direction would explain these aspects in the guidelines that aim to submit articles for publication.

Finally, it is worth mentioning that although the results described here can not be generalized, since only four journals from the surgery area were investigated, the research contributes to other research on female authorship and co-authorship beyond the medical field can be developed, Thus broadening the research agenda of the area of Information Science in Brazil.

CO-AUTORÍA Y PARTICIPACIÓN FEMENINA EN REVISTAS BRASILEÑAS DEL CAMPO DE LA CIRURGÍA: ESTUDIO BIBLIOMÉTRICO

RESUMEN

Estudios sobre la co-autoría de las mujeres en la producción científica de varios campos del conocimiento son frecuentes en la literatura científica internacional, pero este objeto de estudio ha sido poco explorado por la investigación brasileña en el campo de las Ciencias Informáticas. Este artículo presenta una contribución a esta área exponiendo los resultados de un estudio que investigó la participación de las mujeres en las co-autorías, y en el cuerpo editorial de revistas científicas brasileñas de la área de la cirugía publicados entre 2010 y 2014. El corpus investigación consistió en 920 artículos publicados en cuatro revistas: Acta Cirúrgica Brasileira (ACB), Arquivos Brasileiros de Cirurgia Digestiva (ABCD), Revista Brasileira de Cirurgia Cardiovascular (RBCCV) y Revista do Colégio Brasileiro de Cirurgiões (RCBC). El enfoque metodológico utilizado fue el análisis bibliométrico y los resultados mostraron que 920 artículos fueron escritos por 5.649 co-autores. Los hombres aparecen como coautores en el 63,5% (n = 585) de los artículos, mientras que las mujeres aparecen como coautores en el 23,8% (n = 219) de todos los artículos. Los resultados también mostraron que la participación de las mujeres en las coautorías es menor en los artículos originales y de revisión. El estudio mostró que persisten las desigualdades de género a respecto de las co-autorías, tipos de artículos (originales y revisiones), y también en el Consejo Editorial, el comité científico y el consejo de los colaboradores.

PALABRAS CLAVE: Co-autoría; Bibliometría; Género en la cirugía; Género en la producción científica.

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