CHAPTER 64

Specialists in interest and collaboration networks, training and dissemination of knowledge in the field of assisted reproduction in Brazil

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ABSTRACT
This text is related to the way knowledge is disseminated in publications co-authored by specialists in assisted reproduction, it analyzes how connections between specialists in clinics and laboratories in Brazil are built. It is the result of research that aimed to identify and analyze collaborative networks in co-authorship between professionals in the area of reproduction linked to the Brazilian Society of Human Reproduction (SBRH). The data are from publications in the journal Produção & Climatério , from 2000 to 2016, and which are updated in other sources of multi-site research , found on the websites of assisted reproduction clinics affiliated to the Latin American Network of Assisted Reproduction. To this end, we chose to work with co-authorship networks that were organized into text files, with the help of software (UCInet and Pajek). This allowed us to visualize how the network is configured, which is made up of 1,064 specialists, who are concentrated in the Southeast region with relevance to the South and Midwest regions. It allowed to perceive the profile of sex and the dynamics that occur with the connections of different specialties in the field of assisted reproduction in the laboratory and what is its relevance for the production of knowledge, considering how it is disseminated and connected with other contexts from different sources, of our research.

Keywords: Co-authorship networks, Assisted Reproduction, Knowledge dissemination.

1 INTRODUÇÃO

Laboratory-assisted reproduction is currently involved with many aspects of intervention in the processes of reproduction of life and the construction of parenting and affiliations, as analyzed by Tarnovski (2017), Thèry and Leroyer (2014). Likewise, in the field, there is a great connection with technosciences, aspects analyzed by Puig de la Bellacasa (2011). These clinical practices concerned with fertility and infertility open different windows to their analysis, they connect both with aspects that bring inequality of access to the solution of reproductive problems (TAIN, 2013) and the dependence on networks of uteruses from other countries. women, as shown by Puleo (2017) and Hochschid (2012). There are still important tensions for the field, from authors who denounce assisted reproduction, inserting their practices as a baby

market, called the baby business as denounces . Spar (2007). But it is also a fact that in recent years the intense circulation of gametes: eggs and sperm opened other discussions (BORGSTRØM; NYGAARD,; DANIELSEN, ET AL. (2019).

These donations and receptions are part of a global bioeconomic market as discussed by Waldby and Cooper (2014), involve connections between secret arrangements and the market (RIVAS, LORES, JOCILES, 2019, and have facilitated homosexual couples to look for their children by articulating in reproductive networks to obtain national and international eggs and uterus, the so-called " *cross-borderreproductivecare* " (OLAVARRÍA, 2018; VITULE, MACHIN, 2015). Different people have been able to count on semen banks for some time (MAMO, 2005) and with more recent international reproductive support networks (MAMO, 2018). Outside the clinical context, home reproduction also marks assisted human reproduction with specific dynamics (FELIPE, TAMANINI, 2021; 2020).

For this chapter we must say that our theme is in this context of the breadth of the subject, however we cut it by choosing the co-authorship networks. Our collaborative networks are a point in an ocean, which allow us to deepen the study of scientific communities and their profiles in laboratory-assisted reproduction in Brazil. In this text we analyze the process of collaboration between specialists, based on the bibliographic production in co-authorship. Our communities are clinical and scientific, therefore, they are linked to treatments and interventions in assisted reproduction, an aspect that also requires from those who look at them openness to interpretation and, therefore, connections with different data and other sources of research that we have already developed.

These networks are part of treatments that focus on the construction of fertility and fecundity, therefore, they are interrelated with protocols of clinical and technological interventions that may have different purposes.

The processes of intervention, decision-making on the bodies of couples, especially women, and, at the same time, on gametes and embryos occupy a place of deep interface with technology, drugs, diagnostics, research and the media, in a situation market and/or women and couples looking for children.

The objective of this research was to identify the collaboration networks formed by professionals specialized in human reproduction, linked to the Brazilian Society of Human Reproduction (SBRH), from articles published in the magazine "Reprodução & Climatério in the period from 2000 to 2016. In addition, the aim is to understand what the configurations of these networks mean in this field and what they demonstrate about the dynamics of knowledge and the insertion of professionals in co-authorship networks as a configuration of the field of assisted reproduction in Brazil in a period of great changes. also technological in the area.

2 METHODOLOGIES

Data collection was carried out from September to December 2016, on the website of the Brazilian Society of Human Reproduction (SBRH), specifically in the "Reprodução & Climatério" Magazine. In this

source, four issues were published annually in 2000 and 2001. In 2002 there was no publication of the journal. From 2003 to 2006, one issue was published per year. Between 2007 and 2010, four editions were published each year. And between 2011 and 2016, three editions were published per year. [1]The choice of this period was intentional, because in this period and, in 2018, we collected from other different sources, data related to the specialists and their connections: their articles, testimonials, images and the constitution of the team on the clinics' websites.

This text, therefore, is also part of different networks from which we look at the field of assisted reproduction. Specifically, in this chapter we work with material from the "Reprodução & Climatério" Magazine, but the interpretation benefits from the body of knowledge that we were producing from the sources of articles found on the websites of Brazilian and Latin American clinics affiliated to the Latin American Reproduction Network. Assisted (REDLARA).

The analysis presented here prioritizes information collected in the Revista "Reprodução & Climatério" and which were sequentially organized into text files; with the help of *software* (UCInet and Pajek), with the aim of building co-authorship networks, which allows us to understand how specialists move and how knowledge circulates.

From this organization it was possible to calculate the indices and parameters of the networks with specific softwares of network theory. We use network theory as a quantitative method to identify and characterize collaborative networks of researchers in bibliographic production.

The magazine "Reprodução & Climatério" was and is an important instrument for the dissemination of knowledge produced by the network of specialists who are part of the Brazilian Society of Human Reproduction (SBRH) for a certain period of time. This temporality is compatible with the great expansion of practices in assisted reproduction and also with great changes in terms of the accumulation of knowledge, access to new technologies and other intervention protocols that also involve gametes and embryos. It published topics from different areas involved with human reproduction in the laboratory, or in gynecology and obstetrics clinics. These are publications related to assisted reproduction, reproductive health, infertility, endometriosis, menopause, sexual and gender violence, adolescence, contraception, fetal medicine, endocrinology and gynecology. It is a relevant source as a marker of a field of interventions because gynecology and obstetrics continue to be fundamental specialties, although never the only ones, among those that we mapped in different temporalities on the websites of clinics affiliated to the Latin American Network of Assisted Reproduction (REDLARA).

As can be seen in the articles in question, this journal has published many topics with interfaces and/or specific interests in assisted reproduction. This fact allows us to compare its contents with other publications collected from the websites of assisted reproduction clinics, affiliated to the Latin American

[1]In 2017 this journal was discontinued, but all editions remain available for evaluation and consultation. Available at:< www.sbrh.org.br .>. Accessed on: 07 Jul. 2022

Network of Assisted Reproduction, and to establish some nexuses that coincide or not, among those we have demarcated for the last 20 years in this field. (TAMANINI, 2022).

It also allows us to perceive how links of meanings and/or indicative of interests and values are established regarding how these collectives, in the Latourian sense , interact and connect contemporaneously with the dynamics of the field of human reproduction, whose practices with technologies, protocols and research have already are widespread and are desired by people seeking membership (TAMANINI, 2021).

Doing this is relevant because intervention in human reproduction today, and has been for a long time, is not a private issue, it has changed a lot since the 80's, when the first babies were born from procedures in clinics. It is necessary to understand how it becomes an increasingly field of intervention by laboratories, clinics and specialists, genetic research, embryos and cells, as well as oncofertility , a field, therefore, of many hybrid *actants* that make up a sociotechnical network. , composed of human and non-human actors (LATOUR, 2000). It is, therefore, limited to many interests and is far from concerns about sexual and reproductive rights, in the sense of the years that the different international women's conferences did; it is not even limited to infertility and the infertile couple category as it was in the past (TAMANINI, 2003).

This dissemination, as Latour (2000, 1997) would say, makes technologies and interventions and does so from their relationship between areas of knowledge, therefore, keeps an interdisciplinary character and produces the circulation of knowledge, according to Foucauldian perspective (2008). , 1995). These knowledges are connected with desires, hormones, ovaries, testes, uterus, pituitary glands, embryos, semen, endometrium, legislation, stress, suffering, depression and pre-implantation diagnoses and beliefs (LATOUR, 2002). They are currently connected and produced in national and international networks to search for gametes and uteruses (TOBER, PAVONE, 2018).

These interventions and these researches have produced conditions for the use of conception technologies, with the purpose of infertility treatment, and for the preservation of fertility for a longer time, above all, they aim to guarantee its guarantee in cases of chemotherapy and radiotherapy treatments, with vitrification of gametes, or from ovarian and/or testicular tissues.

3 DEVELOPMENT

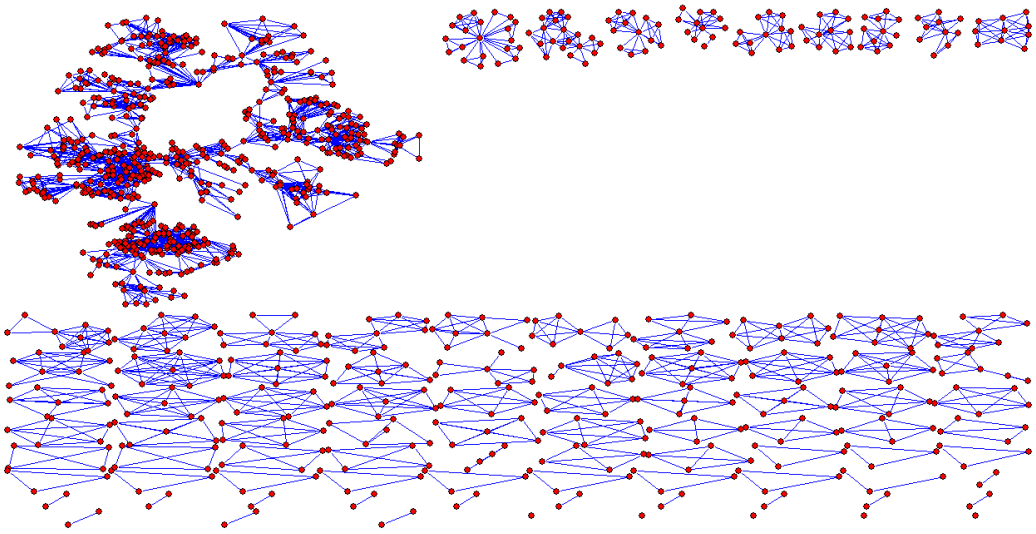
According to Andrade and Tamanini (2016), when we think of co-authorship networks, it is necessary to consider that these co-authors have different backgrounds and different conditions of possibilities for the exercise of intervention in reproductive practices; have different degrees of participation in the connections they establish with each other within their own field and outside it, and this can have significant relationships for the people who seek them, who are also marked by access to treatment and by the regionalized place where the clinic is located.

Part of these networks is made up of specialists who have graduated or are undergoing training within the clinics themselves. Not all are in the great centers; several circulate locally in geographic terms and connect internationally, others circulate nationally and internationally and undergo constant training in international centers. Some circulate less in networks, but have great local and/or regional expression; there are few who are isolated authors, however, all isolated or not, may be involved with human reproduction, with their gynecology and obstetrics clinic and, or others, more specifically with assisted reproduction. They form, therefore, collectives that constitute themselves as co-participants and interested in human reproduction.

Therefore, this network that is presented is marked by all these factors and, regardless of its descriptive aspect; it is associated with the issues of exposing characteristics of a certain population (clinical professionals and researchers) establishing relationships between networks of scientific collaboration and knowledge dissemination.

The total network of the bibliographic production of the journal "Reprodução & Climatério", which was published by SBRH, is shown in Figure 1. The vertices correspond to the specialists and the edges to the articles written in co-authorship between them.

Figure 1**:** Graph of the Bibliographic Production network of the magazine "Reprodução & Climatério" from 2000 to 2016.



Author: MELO, DSC *Scientific Initiation Report* , Salvador, BA, Instituto Federal da Bahia, 2017.

The network has 1064 vertices (experts) which are the components of the network, the lines are the edges and indicate that the researchers wrote articles together, they represent the connections between the vertices. This network is also composed of 88 components (groups), with the largest component (group) having 594 vertices/experts. This is a large component with 56% of the vertices in Figure 1, from which it can be seen that there is an intense dynamic between them, with the circulation of information and knowledge about research and practices in the large area of reproduction. human.

In the manual collection of the names in the published texts, it is possible to observe the regions of origin and the sex of 952 of these specialists. From the analyzes it is seen that 55.77% are from the Southeast region with 531 specialists identified, the South region with 165 specialists, represents 17.33%, the Midwest with 122 specialists, represents 12.81%, Northeast with 58 specialists, represents 6.09% and the North, with 26 specialists, represents 2.73%. There is also an important international network that connects 5.14% of these specialists, as shown in the table below. About the 112 missing to complete the 1064 vertices, it was not possible to know neither sex nor region.

Table 1

	Regions				
Region		**Sex**	%	**Total***	**%**
North	F	18	1.89%	26	2.73%
	M	8	0.84%		
North East	F	26	2.73%	58	6.09%
	M	32	3.31%		
Midwest	F	62	6.51%	122	12.81%
	M	60	6.30%		
South	F	102	10.71%	165	17.33%
	M	63	6.61%		
Southeast	F	259	27.20%	531	55.77%
	M	272	28.57%		
abroad	F	20	2.10%	49	5.14%
	M	29	3.04%		
Unknown Region	F	0	0	1	0.10%
	M	1	0.10%		
Total**		**952**	**100%**	**952**	**100%**

Source: Revista Produção & Climatério da SBRH, authored by Mariana Gonçalves Felipe, at the time in 2018, student of social sciences at UFPR and scientific initiation scholarship.

This network of co-authorships in the journal "Reprodução & Climatério ", denotes a large concentration of specialists in the Southeast region, a configuration that also appeared from the use of data from the REDLARA website, which is followed by the South and Center West regions (ANDRADE, TAMANINI , 2016) and which has practical meanings regarding the regionalization of the countryside, accesses and clinics that play a fundamental role in the provision of human reproduction services.

According to Newman (2010), when the largest component of the network has more than 50% of the vertices it represents the system, in this case it is the largest structuring for the field of human reproduction, as it is for assisted reproduction in terms of co-authorship that is clearly concentrated in the Southeast region.

These groups present direct links between two actors (dyads) and direct or indirect links between three actors (triads) with cases of several vertices connected directly or indirectly through a transmitting center (vertex) where a centralized node receives connections from the other actors. This central position can serve as an intensifier and encourager of distant actors, but it can also interrupt the information between

the extreme points of the network, if the researcher, for some reason, leaves the network. In assisted reproduction, it represents a great connective capacity with publications, but also with the provision of services and access to treatments for individuals and couples.

In this network, most vertices are connected to other vertices through a small number of edges, that is, the path taken for the transfer of information from any individual to the recipient is minimal. It is a network that features highly grouped actors that are at the same time connected to actors outside their groups through a small number of intermediate vertices. This type of configuration according to network theory is less susceptible to fragmentation, allowing greater stability of the network structure, it also demonstrates the stability of the group. It is a type of network that provides elements for the durability of the relationship structures between its components, which is visible in the field of assisted reproduction, whose production and structuring also depend on the ability of clinics to offer services, to update themselves and to create infrastructure. compatible with the requirements of different diagnoses and to respond to people's searches.

Analyzed by measures of centrality, the specialists with the highest centrality are considered relevant in terms of publication. Three measures of centrality commonly applied in Social Network Analysis (SNA) studies were used: degree centrality, proximity centrality and betweenness centrality.[2]

In this way, degree centrality is the measure of the direct influence that a vertex (expert) has in relation to its neighbors; proximity centrality is related to the duration that certain information takes to be propagated by all vertices in the network; and the betweenness centrality of a vertex is related to the possibilities that this vertex is on the shortest path between several other pairs of vertices.

Degree centrality is defined by the number of adjacent ties that a vertex has with others in a network. Degree centrality focuses on the importance of an actor in the simple connections it establishes with neighboring actors, and is quantified by the degree of the vertex. Thus, one vertex in the network is more important than another if it establishes a greater number of links with neighboring vertices.

Proximity centrality is a function of the greater or lesser distance of a vertex in relation to all others in a network. The idea is that a central vertex is the one that has the best conditions to interact quickly with all the others (SCOTT, 2002; FREEMAN, 1979; HANNEMAN; RIDDLE, 2005). An actor's proximity centrality is based on proximity or distance. While degree centrality is measured for actors adjacent to a given actor, proximity centrality shows how close an actor is to all others in the network. Betweenness centrality assesses the dependence of non-adjacent vertices on others that act as a kind of bridge for effective interaction between them (FREEMAN, 1979).

[2]The degree represents the number of vertex connections. The degree being the number of connections of each vertex, the average degree is the average of connections performed by a vertex.

In this case, the greater the degree of centrality, the greater the potential control of a vertex over others that depend on it to execute the interaction. The intermediate vertex is the one that makes the connection between other vertices that do not have direct relations with each other [3].

In Table 1 we present the first 10 highest values obtained for the centralities of degree (CG), proximity (CP) and intermediation (CI) of the researchers who published articles in the journal "Reprodução & Climatério" edited by SBRH, from 2000 to 2000. 2016 . The names of the experts were replaced by codes where the letter P corresponds to researcher and the number corresponds to the order in which the centrality results were obtained using specific software from network theory.

Table 1 - Degree Centrality (Cg), Proximity (Cp) and Intermediation Ci).

Specialist	Sex	CG	Especialista	Sexo	Cp	Especialista	Sexo	Ci
P1048	M	90.0	P928	M	0.224	P928	M	73.658
P928	M	68.0	P702	M	0.224	P124	F	57.798
P460	M	40.0	P377	M	0.224	P285	M	57.557
P831	F	38.0	P919	F	0.224	P266	M	55.283
P78	F	31.0	P831	F	0.224	P919	F	52.012
P278	M	31.0	P78	F	0.224	P1048	M	47.769
P519	M	30.0	P519	M	0.224	P1004	F	45.325
P702	M	29.0	P922	F	0.224	P112	F	40.152
P611	F	27.0	P596	F	0.224	P333	M	39.672
P112	F	26.0	P198	F	0.224	P206	M	39.604

Author: MELO, DSC Scientific Initiation Report, Salvador, BA, Instituto Federal da Bahia, 2017.

The specialists shown in table 1 are from the following Brazilian regions: in the degree centrality there is 1 specialist from the Midwest region, 8 from the Southeast region and 1 from the Northeast. In the proximity centrality there are 9 specialists from the Southeast region and 1 specialist from the Northeast region. For intermediation centrality, there are 6 specialists from the Southeast region, 1 from the Midwest region and 1 from the Northeast. The dynamics related to proximity and intermediation continue to be greater than those found in the Southeast region. However, as can be seen in table 1, the vertex P 928, which is in the southeast, has the second highest degree centrality and the highest proximity and intermediation centralities. He is male and marks a great performance on the network, both in publications and in training for new specialists in the field.

[3]To deepen the studies on network properties, we recommend reading the following authors: Newman (2003), Watts (1999) and Barabási (2016). The word collaboration comes from the Latin *collaborare* and is defined as "cooperation, help, assistance, participation in someone else's work [...] an idea that contributes to the realization of something". (HOUAISS, 2001). For Katz and Martin (1997), two scientists collaborate when they share data, equipment and/or ideas in a project, which usually results in experiments and analysis of research published in an article, that is, scientific collaboration is joint work. of researchers to achieve a common goal of producing new scientific knowledge.

Thus, this expert P928 in this network is an important vertex because it establishes the largest number of links with neighboring vertices and is also the vertex that acts as a bridge, making direct and indirect connections between the other actors; which also denotes its ability to mediate relationships between other actors that are not directly linked to it. Vertices with high betweenness centrality control the flow of information, establishing a relationship of dependence with the other actors in the network, as they serve as bridges through their connection between different groups in the network.

On the other hand, if these vertices are removed, this can affect the network, interrupting the flow of information between the actors, which can cause an important isolation for the field of assisted reproduction, in case other disseminators do not appear.

Vertex P1048 is a relevant vertex, as it has the highest degree centrality, with a large number of connections and published articles. This specialist is from the Midwest region. It's male. It is assumed that it exerts a direct influence on its neighbors, as it establishes a greater number of links with neighboring vertices.

The two researchers (vertices P928 and P1048) have already stood out in the first places of centrality in research with material from clinics affiliated to REDLARA (ANDRADE, TAMANINI, 2016), which gives us peace of mind to show how these dynamics in assisted reproduction are concentrated in certain regions of Brazil.

From the point of view of the sex profile and what this configures for gender equality in publications and knowledge, it is important to note that among the 10 specialists with the greatest prominence for the regions, there are four women in the centrality of the degree. Five in proximity centrality and four in betweenness centrality. In addition to these centralities, in terms of the sex of the 1064 specialists in this network, it is observed that 493 vertices are women, 430 are men; over 140 it was not possible to identify the sex. This data allows us to affirm that the publications in this journal Produção & Climatério, which are known to express concerns, research and activities in gynecology and obstetrics, as a fundamental area of human reproduction, are becoming feminized. This data coincides with the same process observed for assisted reproduction clinics in Brazil in the REDLARA sources, collected in 2017, which is not repeated for all Latin American countries, as we have seen, but which marks an important change in the field with the entry of women into clinics, both as specialists and as clinic owners and administrators, an aspect also observed for Barcelona, in another survey carried out in 2010.

The entry of the areas of embryology, human reproduction and biological sciences has modified the sex profile of the area of assisted reproduction. This area is also becoming feminized in its structure of clinics and laboratories, even if the rigid sexual division of labor seems to be maintained in several Latin American countries and, above all, if it reproduces inequalities in terms of recognition for biologists and techniques of laboratory, for example. In the area of gynecology and obstetrics, in table 2 of the sequence, there are 480 vertices that represent 52.11% of the total of specialists in relation to the set of other areas of knowledge publishing in this medium. It is still predominant, as the number of specialists, marked with

more men 233, they represent 48.54% compared to 208, which represent 43.33% of women. However, the difference is small and it can be observed in different sources that this trend towards the growth of women in the countryside is confirmed.

In the classification of specialties, always based on the self-denomination of the specialists, table 2 shows those that appeared in the co-authored publications. Thus, the medicine category, which can involve many built-in specialties, has 268 specialists and represents 29.9% of the training of specialists who publish in this journal. This category in terms of sex profile is quite feminized and is represented with 53.73% women and 46.26% men.

Among the 172 specialists of the " Reproduction & Climacteric " magazine, representing 18.67% of those who identified themselves as specialists in human reproduction, we have 41.86% women and 58.72% men. As in general, these specialists are also gynecologists and/or obstetricians, this data shows why the difference for more in relation to men prevails, due to the fact that gynecology and obstetrics is still a very masculine area. The 9.22% of biological sciences, 85 specialists, coincide with important cleavages that also appear for the formation of teams and for publications extracted from the websites of assisted reproduction clinics affiliated to REDELARA. They demonstrate the growth of the area in the field. Women are 70.58% of the 85 specialists in biological sciences, who are publishing in this source. This data denotes what we have said before, for other areas, a process of feminization in the biological field.

The area of genetics and embryology has 45 specialists and represents 4.88% of all areas in Table 2, there is also an important cleavage by sex here, 31 people are women, representing 68.88% and 14 are men, representing 31 .11%.

The same happens with the specialists who are psychologists in number of 32 representing 3.47% for the group of professionals, being 28 women, 81.05% therefore for this denomination, 4 are men representing 12.50%. Urology and Andrology, as we have already seen in previous research, are mostly male, in this publication of the Reproduction & Climacterium journal there are 37 specialists, of which 10 representing 27.02% are women. Men are 27 and represent 72.97% in the area.

Table 2

Main Specialties				
Specialty	**Sex**	**%**	**Total***	**%**
Gynecology and Obstetrics	208	43.33%	480	52.11%
	233	48.54%		
Medicine	144	53.73%	268	29.09%
	124	46.26%		
Human Reproduction	72	41.86%	172	18.67%
	101	58.72%		
Genetics and Embryology	31	68.88%	45	4.88%
	14	31.11%		
biological Sciences	60	70.58%	85	9.22%
	52	61.17%		
Psychology	28	81.05%	32	3.47%
	4	12.50%		

	10	27.02%		
Urology/Andrology	27	72.97%	37	4.01%
Total			921	
*Total of men and women in the specialty, without the sum of the variable "unknown"				

Source: Revista Produção & Climatério da SBRH, authored by Mariana Gonçalves Felipe, at the time in 2018, student of social sciences at UFPR and scientific initiation scholarship.

3.1 TOPICS OF INTEREST AND DISSEMINATION OF KNOWLEDGE - TABLE 3

1064 researchers appear in co-authorship networks with collaboration in 447 articles. The articles were grouped by themes, 200 titles among those published in Reproduction & Climacterium, correspond to themes of gynecology and obstetrics in general.

The remaining 247 are in the field of assisted reproduction, with a strong interest in assisted reproduction techniques (15.43%), and in research with cells and hormones, coinciding with the interests of hybrid collectives, also perceived in the publications of affiliated clinics. the REDLARA.

The themes of female infertility (14.09%), ovary (8.72%), diagnosis of infertility for both men and women (8.27%), which added to the themes focusing solely on female infertility (14.09%) and male infertility (5.59%) [4], plus endometriosis representing (4.92%) connect great centrality in the interest in infertility. Texts discussing issues related to hormones also have great co-production, forming a relevant collective in this source that represents (6.04%) of the interests in the articles. Semen that has been material of interest in other sources is also very relevant in this one, with (5.36%) among the published themes. Research (5.59%) and dissemination of its results are again confirmed as being of great interest to specialists involved with assisted reproduction.

The interest in embryos is of high relevance today in publications coming from assisted reproduction websites [5]. This is also the case in this journal and it clearly shows, together with others such as ovum and semen, that the gaze of these specialists is much more dedicated to cells and their interactions, genetic technologies and their possibilities for reproductive improvement than it was in the past. Egg is a relevant category because it connects and collects processes and because it becomes manipulable material, gaining a fundamental status in laboratory procedures and in expert-managed donor networks. In the materials collected from REDLARA sources, it appears as fundamental in the techniques and studies, in which their maturation processes, the donation/reception networks, banks and their maintenance, the ways to obtain them through stimulation and discussions about the conditions to obtain them. Aspect that involves technologies, hormones, exams and tests, age of the woman, the donor and the recipient. As well as

[4]Male infertility has in its composition issues referring to different causes of this problem such as varicocele, emotional and endocrine issues, for example. It refers to the need for professionals in the fields of andrology and urology in this field to answer the numerous questions that infertility still presents. The male infertility category is always associated with the male individual as a whole. Contrary to what is observed when it comes to Female Infertility, a category that appears to be fragmented.

[5]It concerns contents such as differences between fresh and vitrified embryos, studies on the re-vitrification of embryos, different embryonic maturities and different implantation moments, vitrification of embryos with the *slow-freezing technique* , among others.

normative and legal issues, referring to the networks of humans involved in obtaining gametes (MACHIN, 2016).

Table 3

THEMATIC	No	%
interdisciplinary	3	0.67%
drugs	4	0.89%
DGPI	4	0.89%
Obesity	4	0.89%
Psychological Factors	9	2.01%
Uterus	6	1.34%
Scratchs	10	2.23%
oncofertility	13	2.90%
Environmental Factors	12	2.68%
egg	13	2.90%
Embryo	18	4.02%
Infertility	20	4.47%
endometriosis	22	4.92%
male infertility	25	5.59%
Semen	24	5.36%
Search	25	5.59%
hormones	27	6.04%
Infertility diagnoses for both	37	8.27%
Ovary	39	8.72%
female infertility	63	14.09%
technique	69	15.43%
Total	**447**	

Source: Revista Produção & Climatério da SBRH, authored by Mariana Gonçalves Felipe, at the time in 2018, student of social sciences at UFPR and scientific initiation scholarship.

Today, in the field of assisted human reproduction, specialists and solution seekers for the absence of children are constantly linked to different networks, with elements (material and immaterial), whose relationships are forged by the activation of knowledge, technologies and desires and are produced in the construction of an architecture of normality for bodies considered infertile and/or barren; which must, however, reproduce as fertile.

To the extent that all processes that seek clinics are expressed in making decisions, executing protocols and making interventions through specialists, the connection between humans and non-humans,

a Latourian expression , is narrowed in reproductive reorganization and in the construction of fertile bodies. All sorts of arrangements are accelerated, whether recommendations, technologies, regulations, research, medicines, or collaborative desires regarding gametes, embryos and uteruses, as well as advertising and the expansion of clinics for what is considered a greater Good, become babies.

When we talk about the human reproduction laboratory, we also observe several networks formed by hybrids where all the elements of a network collect everyone and collect each other. As they are all collected by all the elements, methodologically speaking, they need to be placed in a symmetrical relationship in the same way that Latour and Woolgar (1997) did when looking at the laboratory. Beliefs, values, the processes of change that he calls translation and the processes of science diffusion are part of this socio-technical network. Collectives are formed that, in the Latourian sense , represent the end of the determinism of one aspect over the other and the end of full freedom, given that needs, the existence of material and immaterial elements decide the interconnections to reach a good term with gametes, embryos and pregnancies. There is only mutual and collaborative collective construction (co-construction idea), therefore, collectives are not free, they suffer influences from each other and from different possible connections with interventions and controversies.

These collectives are a considerable range of specialists in assisted reproduction, and an immense range of research, tests, protocols, with particular relevance to the participation of biologists, geneticists, gynecologists, laboratory technicians, biochemists, embryologists and gametes involved in the formulation of the arrangements. reproductive.

Here, the socio-technical network of couples, women and values regarding family, children and kinship relations are very important. Much of what is collected is due to the way in which this collective works, the complexities of treatment networks offered by clinics, the fact that specialists possess high technology, knowledge and research, and decision-making with more confidence. and more pharmacological aggressiveness, or of convincing protocols and networks to provide gametes, equally of access for those who need the treatments.

Technological and scientific advances and research are part of an interventional technological and scientific body, with genetic technology, less documented by clinical examinations and personal conversations, and more focused on the presentation of in vitro fertilization *techniques* , and their derivation . intracytoplasmic sperm injection and preimplantation diagnosis .

Technological advances in the area also mark asymmetries for many countries, which, even doing these procedures, do not follow all the so-called technological innovations, even if this fact does not eliminate the other, that these technologies are globalized and that, if combined mutually build . If a country does not follow the global dynamics and the commodification and internationalization, it stays in other, less competitive collectives and this does not stop producing problems for women and couples who seek these biomedical, technological, pharmaceutical and value collectives for intervention. in child search processes.

This aspect is present in different Latin American countries whose narrative shows the history, the pioneering spirit, the ability to solve difficult cases, the knowledge that it develops through its research and when it absorbs and buys cutting-edge technology is part of a discourse intense, but not necessarily connected with high technology.

4 FINAL CONSIDERATIONS

Brazilian specialists occupy a prominent position in the sharing and internationalization of technologies, research and training and in the visibility at congresses and in the production and dissemination of knowledge through their publications.

These aspects, at the same time, are different from what happened in the 80s, 90s and in the beginning of the 2000s, when clinical concerns were centered on the female body and its infertility, and, although these actions still appear with relevant visibility, they do not are always in the foreground when comparing different research sources.

In any case, we can say that these relationships are more complex today and quite different from the context of political discussion, particularly feminist, which focused on sexual and reproductive rights, especially considering the medicalization of women's bodies and the risks for babies (TAMANINI, 2006). In this previous context, it was above all a matter of understanding how to form, correct and reform the body, in the current one, this is done on cells, gametes and embryos.

Today, an intense work of imagination and clinical practice is organized on the reproductive organs (uteruses and gametes), on hormones and embryonic cells, which is central to the construction, not only of fertility, but also of contemporary subjectivities related to ways of wanting and making children; the temporality of the decision, the conditions for making it and the external supports for the relationship with the sexual act. These realities are possibilities of a new sociotechnic.

It is evident that there is a hybrid collective collecting humans and non-humans in a socio-technical network as analyzed by Latour (2000). However, for Brazil, there is a great regional geographic imbalance; when it comes to the consideration of the place where the professionals who published the analyzed abstracts are located, at the same time, certain centralities in regions such as the Brazilian southeast, which greatly hinders access to treatments.

This aspect has to do with the notion of temporality related to factors that involve the lives of professionals, such as access to information, the ability to self-finance to attend conferences, the ability to articulate contact networks for publications, the places of their training, the conviction about the qualities of the clinic in the place of origin, or in the region, the geographic distances that interpose geographic barriers and aggravate the economic ones for people, the access and the existence of articulated teams that have technical and formative capacity also, and/or the fact that they are in large centers with high demand.

These dynamics are unbalanced regarding the place of insertion in the process of globalization of knowledge, protocols, research and interventions through high technology, it is also reproduced in the

contents of the videos that we analyzed in January 2018, from sources referring to expert testimonials. Those from Brazil and Barcelona focus on investments linked to highly complex science and technology. They talked about embryos, genetic diagnoses, research, while those from Latin American countries, with less international insertion, talked much more about clinical diagnoses such as endometriosis, polyps, ovarian stimulation, ovarian failures present in women's bodies, whose contents are of a phase in which assisted reproduction offered fewer technological resources for treatments and in which much more was required from the clinical perspective.

When these testimonies are compared with those of specialists who focus on highly complex technologies, on genetic research, on embryo intervention processes, the places of the narrative are arranged at different times. When comparing them, it is as if those who are connected to cutting-edge technologies were temporarily in other dynamics and, in other practices, with few concerns regarding reproductive problems arising from the body, from the relationships with emotional and affective factors, from the ovaries, from the gametes or the uterus and tubes. It is observed from these sources that specialists from clinics with lower technological and research investments, without gamete banks, are much more invested in clinical arguments and in case-by-case follow-ups; based on listening to the reproductive history, counseling about exams, using hormones and timed sex (TAMANINI, 2003). This doing also has consequences for the length of time a woman waits, for her hope and burnout, and for how soon she will or will not get a pregnancy.

It is about the production of knowledge and not just intervention, these are knowledge that are expressed in the use of high technology, of new research with embryos, with human organs, cells and with pharmaceutical products involved in the treatment of infertility, as is the preservation of fertility.

Another dimension to be highlighted concerns gendering by sex, which attributes performance to this hybrid architecture with the participation of important differences between areas and specialties, as well as, in the formation of clinic teams, as many specialists as the technical and administrative.

Even if regarding this aspect, there is a process of increasing feminization in publications, in the patrimony of clinics, in their management, and in areas of knowledge such as biology, which connects many networks in this field, and if, many specialists emphasize in their testimonies the importance of teamwork and interdisciplinarity (TAMANINI, 2014).

The sexual division of labor is quite evident in the way in which traditional interests are still reproduced, such as, for example, the responsibility of women to have children and save the world [6], speaks present in the testimonies of specialists or, in a much greater female presence in embryology and in the biological sciences - specialties that require repetitive work, concentration, care, responsibility, greater delicacy in the laboratory. While other specialties, such as urology, for example, are male-dominated, as

[6]This statement was collected from an interview with a specialist from an assisted reproduction clinic in the south of Brazil, in research in 2015. The same also completed: “What has to happen we already know: women have to agree that they have to make the offspring the priority of their lives”.

well as surgery (considered the most prestigious) is also male-dominated. These hybrid networks, even when they play with nexus of articulation between humans and non-humans, are connectors of gendered inequalities internal to the areas of specialties. Females prevail over males in fields such as social communication, informatics, bacteriology, dermatology, administration, secretariat, coordination, genetics, biotechnology, cytogenetics, cytology; and in other treatments, such as nutrition, acupuncture, massage, occupational health, massage therapy, physiatry, nursing, nursing assistant, clinical embryology, biochemistry, chemistry, pharmaceuticals; in the area of couple support professionals, such as psychologists, psychiatrists, philosophers; in biology, such as reproductive biology, molecular biology, biological sciences, clinical bioanalysis , biostatistics, laboratory reproduction.

Male professionals prevail in specialties such as: infectology and histopathology , rheumatology, radiology and radiotherapy, andrology, oncology and mastology, anatomy and pathology, endocrinology, gynecology, cardiology, cardiovascular surgery, cardiac rehabilitation, phlebology and phleboesthetics , hematology, diagnosis imaging, neurology, neurosurgery, neuropediatrics, neuropsychology, neuroradiology , neumology , urology and uroandrology , urogynecology and nephrology, anesthesiology, pediatrics and education, general medicine, respiratory therapy, traumatology and medical emergencies, clinical assistant and senography , densitometry, reproductive medicine, human reproduction and assisted reproduction, maternal fetal medicine, veterinary, physiatry, sexology, surgery, surgical instrumentation, endovascular , gastroenterology, orthopedics, gynecology and obstetrics; which encompasses techniques and areas such as laparoscopy, hysteroscopy, tocogynecology, gynecological endoscopy, gynecological surgery, climacteric, colposcopy, obstetrics technique [7].

It was observed, in relation to Brazil and Latin America in general, that there were new insertions of specialties in the field in recent years, compared to the first surveys in 2007 and 2009, as well as a greater entry of women or men in certain areas, when compared to previous studies.

However, as much as the number of professionals has increased, it is observed that main categories, such as gynecology and obstetrics, surgery, human reproduction, anesthesiology, urology, andrology have a greater number of male professionals, while specialties related to care, in fine detail, such as nursing, biology, embryology, couples support professionals are mostly female; these professions are recognized and observed as areas that demand greater care and increased attention in the procedures.

These almost descriptive aspects are part of a hybrid architecture because they involve many elements: such as knowledge, its communication, its networks and its publications and that seek to configure the field to show old and new dynamics of interest and the making of a theme that, not it only changes in their relationships with professionals and their choices, but it also changes in relation to what is or is not important within human reproduction, when it is in the laboratory context.

[7]It is important to emphasize that these categories were formed based on the self-description of professionals on the *websites* of the clinics where they work.

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