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The impact of the COVID-19 pandemic on the mental health, performance and productivity of Brazilian female scientists

Marcela Becegato[1,2], Anderson HFF Leão[1], Gustavo José da Silva Pereira[1], Regina H Silva[1,2,3], Soraya Soubhi Smaili[1]

[1]Department of Pharmacology, Escola Paulista de Medicina, Universidade Federal de São Paulo, Brazil; [2]Interdisciplinary Health Sciences Postgraduate Program, Universidade Federal de São Paulo, Brazil; [3]MaternaCiência, Universidade Federal de São Paulo, SP, Brazil

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Summary. Economic and political agencies have reported a worldwide increase in gender inequalities during the COVID-19 pandemic, exposing the frailty of the advances in gender equality in the context of a global crisis. Here, we provide an overview on how the COVID-19 pandemic amplified gender-related vulnerabilities in Brazil, establishing a parallel with the pre-pandemic scenario and evaluating many aspects of the problem, including motherhood and racial issues. At the same time, we also discuss how the abrupt disruption in the labor routine during the COVID-19 pandemic overloaded Brazilian women with household and childcare activities and, more specifically, how women's careers and scientific-academic production were affected. Briefly, the workload and stress imposed on female researchers force them to choose between their professional accomplishments and their families, thus exacerbating gender disparities within the Brazilian academia. Studies and governmental reports reveal that such a burden was even more prominent for mothers with young children and for black scientists. Finally, we describe examples of affirmative actions aimed at counterbalancing gender inequalities within the Brazilian academia, which became crucial to mitigate the effects of the social upheaval during the pandemic.

Keywords. Gender gap, COVID-19, sexual division of labor, academia, Brazil.

Introduction

Since 2006, the World Economic Forum has delivered an annual Global Gender Gap Report based on a methodology integrating statistics from international organizations and a survey among executives. Currently, the Global Gender Gap score stands at 67.7%, corresponding to a 32.3% gap. On average, over the 2006-2020 period the economic gender gap has reduced by 0.16% annually. At this pace, gender inequality is expected to be abolished in 267.6 years, a disappointing estimate. In addition to the slow worldwide progress on narrowing the gender gap, a March 2021 report cited a global -0.6% step back compared to the 2020 report.[1] In other words, the gender gap is the same now as it was four years ago. This scenario exposes the frailty of the advances in gender equality during a global crisis. Indeed, women were disproportionately affected by the social upheaval caused by the COVID-19 pandemic, and the consequences on the already existing gender gap were immediate.

The gender gap is shaped by the patriarchal values embedded in the political, social, and economic systems that structure gender inequality in favor of the male power and authority over women in all domains of society.[2] While the Global Gender Gap Report demonstrates that gender gaps are narrower in the Educational Attainment and Health and Survival subindexes (where only a 5% and 4% gap has to be covered, respectively), they remain extensive in the Economic Participation and Opportunity and Political Empowerment subindexes (where a 42% and 88% gap has to be covered, respectively).[1] In this regard, it is clear that women's access to education and health does not translate into acquiring economic and political power. Moreover, there are societies in which women's access to education is restricted – or even prohibited. Consequently, the Educational Attainment subindex is not homogeneous globally.

A worldwide survey on work from home in the science, technology, engineering, and mathematics (STEM) fields during the COVID-19 pandemic highlighted that 87.9% of women reported being responsible for the household versus 74% of men. When asked about their biggest challenges during the lockdown, the STEM field male professionals reported: shopping for daily necessities, the disruption of their routine and of their access to healthcare, keeping up with the increased workload, difficulty concentrating on work, loneliness and the social isolation, stress, not being able to work from home and being unable to help their partners with childcare and household activities. Conversely, STEM field female professionals reported that their biggest challenges were: childcare, balancing work and home-based schooling, juggling work-children-household duties and losing the boundaries between home and work.[3]

Reports presented by economic and political agencies acknowledge that maternity is followed by various forms of discrimination in the job market, frequently referred to as the "maternal wall". In this regard, the sexual division of labor is pivotal to maintaining the patriarchal structures, in order to naturalize and legitimate the dissociation of productive work from the family's reproductive

space.[4] For example, even in developed nations such as Australia and the United Kingdom, women spent nearly twice as much time as men on activities associated with unpaid work, including domestic chores and childcare, even when they earn more than their male partners.[5,6] Concerning the academic domain, Alessandra Minello highlights that transposing the issue to the academic reality – where research and teaching duties require long periods of thinking, planning and focusing – makes it difficult for women to reconcile with primary childcare.[7]

Thus, the contemporary productive paradigms in research – based on accelerated data acquisition, peer-reviews and publishing – together with the sudden disruption in the labor routine during the COVID-19 pandemic, place academic women, with or without children, in an even more challenging scenario. In this feature article, we provide an overview of how the COVID-19 pandemic impacted the gender gap. We also establish a parallel with the pre-pandemic scenario, while examining the various aspects of this issue and discussing how women in academia – as well as their scientific production – were affected. Finally, we provide examples of initiatives and affirmative actions designed to counterbalance gender inequalities in the Brazilian academia.

Impact of the COVID-19 pandemic on gender inequalities in Brazil

The COVID-19 pandemic dramatically impacted every aspect of life in Brazil. By November 17, 2021, about 611,000 people had died of COVID-19.[8] Many families lost primary and secondary child caregivers, resulting in a surge of suddenly orphaned children requiring care. A modeling study estimated that COVID-19 produced 87,529 paternal orphans, 25,608 maternal orphans, and 13 double orphans in Brazil between March 2020 and April 2021.[9] Moreover, COVID-19 affected men more than women, since men constituted 60% of deaths in the productive age between 20 and 59.[8] This scenario favors the amplification of gender inequalities, as childcare is frequently performed by women – mostly mothers, grandmothers, aunts, or other women in the social support network of orphan children.

Additionally, the COVID-19 sanitary crisis was accompanied by economic, political, and human rights crises, as Brazilian families faced high unemployment, inflation, and food insecurity.[10] The loss of income and the high inflation during the COVID-19 pandemic in Brazil also generated dissatisfaction and frustration in families forced to share the domestic space for long periods. Indeed, the Brazilian population experienced an upsurge in domestic violence complaints and reports.

Violence against women occurs in many forms – i.e., physical, psychological or economic abuse and marital rape. Interestingly, during the first days of the quarantine, most Brazilian states experienced a decline in the filing of complaints that required the victims' presence. However, statistics from the Instituto de Segurança Pública revealed that domestic violence reports in the state of Rio de Janeiro increased by 27% in 2021 over 2020, suggesting an under-notification resulting from the social restriction measures imposed in 2020.[11] São Paulo state police also registered 44.9% more domestic violence calls in March 2020 over the same month in 2019.[12] Furthermore, although the number of homicides diminished during the COVID-19 pandemic, the number of femicide cases increased in states like Mato Grosso, which registered a 400% rise. These unhealthy and unsafe environments threaten women's lives even further, since women enduring domestic violence are frequently unable or forbidden to be employed.

In this regard, a study by the Instituto Brasileiro de Geografia e Estatística (IBGE) in 2018 – before the COVID-19 pandemic – revealed that the Brazilian scenario for gender inequality encompasses several social, racial, economic, and political features. It has been reported that at least 26.5% of the Brazilian population survive under extreme poverty (living on US$1.9 or less a day). Importantly, the gender profile for this portion of the population shows that 56.9% are single mothers with children up to 14 years old, and 64.4% of them are black.[13] The COVID-19 pandemic dramatically impacted these populations, further increasing the Brazilian gender gap, because the main job positions dismissed – household, cleaning, caregivers and outsourced employees[14] – are mostly occupied by women, especially black.[15]

Brazil also experienced extended periods of school shutdown, making it harder for women to balance their professional lives, personal ambitions, childcare, and household duties. These factors led to more unpaid work and a higher mental workload for Brazilian women. In May 2020, during the first wave of COVID-19 in Brazil, 17.9% of working women adopted the home office model versus 10.3% of men, echoing the sexual division of labor in Brazilian culture, and resulting in the overload of domestic duties with remote work imposed on women.[16] These indexes demonstrate that job insecurity, everyday work, and unemployment accompany gender, race, and motherhood in Brazil.

Impact of the COVID-19 pandemic on gender inequalities within the Brazilian academia

As expected, the pandemic's devastating effect on the quest for gender equality also impacted female scientists. Before the COVID-19 pandemic, a 2019 survey revealed that 54% of scientist mothers were the only parent to take care of their child, compared to 34% who shared

childcare with another parent. During the social isolation imposed by the pandemic, Brazilian female researchers with children struggled to work from home. It was reported that 45% of them found it extremely hard to work at home, 20% could perform only simple tasks, 21% worked only after their children's bedtime, and a mere 14% of female scientists were able to work regularly. This data emphasizes that the unequal division of unpaid housework is also a reality for female researchers in Brazil.[17] During the lockdown, a huge challenge for mothers was the balancing of remote work with childcare, particularly because schools were closed and social restriction measures restrained other social support arrangements.[16] A worldwide survey on academic and clinical researchers, including 5.54% of Brazilian scientists, revealed that 47% of women were responsible for childcare during the COVID-19 pandemic, versus 41.5% of men.[3]

According to the Organization for Women in Science for the Developing World, less than 5% of female respondents lost their jobs, while others reported negative impacts on career during the first months of the COVID-19 pandemic. For example, female scientists reported being unable to attend conferences (67%), perform fieldwork or experiments (56%), submit funding proposals (16%) and publications (14%), answer pending publications before deadlines (20%), and delay or suspend ongoing funding (17%).[18] Likewise, a survey answered by 3,345 Brazilian academics revealed that only 49.8% of women submitted articles as planned, compared to 68.7% of men, indicating that men met deadlines more often than women, which could be perceived as if men's productivity was less impacted by the pandemic.[19]

With regard to women with children, this group reported submitting fewer papers, not meeting deadlines, and only 47.4% of them achieved the goals planned.[19] Thus, the COVID-19 pandemic negatively affected women with children more than those without and more than men with children. While the pandemic significantly affected the productivity of female researchers with younger children, the careers of black men and women and their children's lives also suffered. In summary, the COVID-19 pandemic and the parenthood have a greater negative effect on women's careers than men's.[19]

Along with the consequences of the tragic sanitary crisis, the Brazilian government's science and technology funding was severely reduced. The most recent reduction occurred in October 2021, when the federal government announced a 92% cut in the grants offered by the primary public research funding agency in Brazil, the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).[20] This budget cut was particularly alarming, because the large majority of scientific activity in Brazil is conducted in public institutions and universities, and is essentially performed by government employees and graduate students with scholarships. This observation leads to the perception of increased job insecurity, loss of career status, and helplessness.

A cross-sectional study revealed that social isolation was associated with higher depression and anxiety levels among Brazilian and Portuguese populations. Women, in particular, had lower life satisfaction scores and displayed higher anxiety levels than men.[21] Similarly, another cross-sectional study conducted among university students during the COVID-19 pandemic reported female sex as a predictor for psychiatric symptoms such as depression, anxiety, and stress, which were present in more than 50% of the sample.[22] In this sense, Brazilian female researchers face job insecurity and lack of support at the beginning of their careers, which enhance frustration and increase anxiety and depression.

It is important to highlight that from graduate education to postdoctoral fellow researcher position and professorial position, Brazilian researchers accumulate teaching, advisory, research, fund managing, and administrative activities to achieve their production quota. Consequently, the workload is even more onerous for Brazilian female researchers, who are also mentors, mothers, primary caregivers, as well as mainly responsible for household chores. Before the pandemic, many of these obligations and responsibilities were divided among other women or institutions – i.e., family members, employees, nursery and school. Smart working and social distancing accentuated the unpaid work typically done by women, and directly impacted the academic work of female researchers. The enormous workload, increased job insecurity, high peer competition, and unattainable productive goals they all lead to emotional instability and stress, affecting the mental health of Brazilian female scientists.

Taken together, worldwide and national surveys reveal that female scientists have been mainly responsible for household and childcare duties, which directly undermined their careers compared to men. This situation forced women to choose between their job accomplishments and their family, thus increasing gender inequality in the Brazilian academia. Importantly, the more prominent the positions are, the wider the gender gap becomes, since the more prominent positions usually require outstanding productivity and time availability.

Affirmative policies on gender inequality in the Brazilian academia

According to the Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP), despite the fact that women represent 56.4% of the enrolled undergraduate students, in Brazilian universities only 45.5% of teaching positions are filled by women.[23] Accordingly, the Open Box da Ciência initiative calculated that 40% of researchers with PhD degrees in Brazil are women,

accounting for the majority of researchers in language, literature and arts, and health research areas, but only 26% in the engineering areas.[24] More importantly, despite the growing number of female researchers, most productivity fellowships granted by CNPq are awarded to male scientists (63% including all categories; 77% considering only the major awards). This discrepancy occurs even in areas where women outnumber men, such as health sciences.[25] Brazilian researchers apply for this productivity award every three or four years, and it will be interesting to see what happens to this gender gap when productivity during the pandemic period is analyzed.

The aforementioned issues need to be addressed with affirmative policies, in order to reduce gender inequalities in the academia. Recently, to counterbalance inequalities in the Brazilian academia – and after petitions from organized movements of mother scientists – the Brazilian science funding agency CNPq included maternity leave into the curriculum platform used to assess Brazilian researchers' merit and productivity.[26] This modest measure recognizes women as primary caregivers, limiting professional penalties to researchers who experienced a productivity gap during motherhood. Another interesting complementary policy would be to consider the lockdown period as a care leave for researchers with dependent family members attending productivity analyses and other competitions for career promotion. This measure would be helpful to counterbalance the potential productivity disadvantage of caregivers during the pandemic, especially parents with younger children.

The initiatives and collectives engaged in disclosing and discussing gender inequalities in the Brazilian academia, such as the Open Box da Ciência and the Parent in Science Movement, are critical in order to push the political actors towards affirmative policies.[24,27] The Parent in Science Movement was recently awarded the Science Outreach prize by Nature Research Award for Inspiring Women in Science.[27] The Science Outreach category is awarded to initiatives that support girls or young women to engage in, enjoy, and study STEM subjects. Indeed, increasing the retention of women in STEM careers is vital to reducing the gender gap in these academic fields. Parent in Science has started an incentive program to support mothers in grad school, to help them overcome the difficulty of combining their work with childcare, and some Brazilian universities followed this model.

As previously mentioned, race also significantly impacted the productivity of female researchers.[19] In this regard, a study conducted by IBGE in 2018 confirmed the success of a series of affirmative action policies implemented at the turn of the 21st century, as 50.3% of enrolled undergraduate students in Brazilian universities were black.[28] Nevertheless, according to the Open Box da Ciência, race affirmative action policies in the Brazilian academia are still inadequate, since black women represent only 12.7% of the females holding teaching positions.[29] Thus, the successful reduction of the gender gap in the Brazilian academia will need to address race issues, reinforce already implemented policies, and create novel mechanisms to counterbalance race inequalities in academia.

Key messages

- During the COVID-19 pandemic, most Brazilian female scientists struggled to work from home, due to household and/or childcare duties.
- During the pandemic, women submitted fewer papers than originally planned, and struggled with their deadlines.
- The COVID-19 pandemic magnified many social, economic and political issues, intensifying gender inequalities in Brazil.
- Even though Brazilian funding agencies began to include maternity licenses in their curricula, motherhood negatively impacts women's academic careers, since they are typically the primary caregivers.
- More affirmative policies are needed to effectively reduce gender inequalities in the Brazilian academia.

Conclusion

In conclusion, the COVID-19 pandemic magnified a constellation of social, racial, economic, and political issues which intensify gender inequalities in the Brazilian academia and society. Brazilian female researchers also accumulated household and childcare duties upon their academic work. This burden was even more prominent for mothers with young children and for black female scientists. The workload and stress imposed on female researchers force them to choose between their job accomplishments and their family, reinforcing the gender disparities in the Brazilian academia. Finally, gender inequalities in the Brazilian academia should be addressed through democratic affirmative action policies, in continuous exchange with social representatives of women, such as the initiatives and collectives mentioned above.

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Correspondence to:
Soraya S. Smaili
Rua Três de Maio 100
04044-020, São Paulo
SP, Brazil
email: ssmaili@unifesp.br