

The pandemic is increasing gender inequalities and minority disparities

Universities must take the lead

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Abstract

International student mobility has always represented an advantage in terms of globalization, sharing of ideas, collaboration, innovation and cultural exchange. However, the Covid-19 pandemic outbreak severely limited international travels, thus making it impossible to carry out Erasmus traineeships and summer internships abroad. Although mobility and exchanges are slowly recovering, the impact that the lack of internationalization has determined on undergraduates is still uncertain. Moreover, increased disparities between men and women as well as between researchers from richer and poorer countries are also a rising concern among global health experts. Here we briefly present a case study as a starting point for a more general discussion on the consequences that the Covid-19 pandemic can have for students' future, women's career and under-represented groups' success, with particular focus on the biological field.

1. Introduction

In December 2019, TZ, a biology student enrolled at the University of Pavia, Italy, was accepted for a summer internship at the Icahn School of Medicine at Mount Sinai, New York, USA. "After a brief interview, my dream came true, I was so ex-

cited! I was finally able to seize a great opportunity for my future, and forge important partnerships for postgraduate", said TZ. However, in March 2020 the situation in Italy suddenly changed, and the lockdown was imposed by the authorities. At first, no one thought that the mobility block would have lasted long but, shortly

after, the pandemic took over, and international travel, as well as intranational travel, was banned. Even worse, travel between the United States and Europe was deemed to be at high risk, and every and all flights were canceled, with few exceptions. Unsurprisingly, in May 2020 came the decision from the Mount Sinai to reject

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any foreign students previously accepted for internships, due to safety concerns. “When I read the rejection email, the world fell on me for a moment. The commitment and the tenacity with which I had obtained that internship had been thwarted in one shot. I had no idea on how to replace this internship, and I started writing random emails all over Italy and Europe, hoping to find a PI who had a free place in his/her lab”. However, all answers were negative, and the effort of TZ was useless. The need to keep social distancing and the work shifts obligation made accepting new students impossible even for PhD candidates, let alone undergraduates. “I cannot predict the damage that losing an internship in the US has done on my future career, but the pandemic certainly left its mark”. In the biological field, having substantial practical experience before graduation is an essential prerequisite for applying to a PhD position, and students like TZ lost an important opportunity to improve their research expertise. Moreover, travelling and living in the United States is expensive, and the scholarships won for 2020 will hardly be reassigned for future years,

leaving a gap in the career of early scientists. “After a period of discouragement due to all those rejections, I began to concentrate on improving my soft skills. There were a lot of public speaking free online courses on the web, so I decided to fill my summer like this. After all, the important thing is looking for new stimuli”. Thanks to these webinars, TZ can now ask questions at conferences without fear, but the question remains whether the soft and hard skills acquired in the US could have been many more.

2. Results

2.1. *The effect of the pandemic psychological distress*

TZ is not the only student who lived this experience. Stories like the one reported here have impaired many bright and willing students to achieve their dream^{1,2}. When, in July 2020, the president of the United States Donald Trump imposed Visa restrictions for foreign students whose institutions offered online teaching only, enrolment in US graduate programs was forbidden to many international applicants, similarly to what happened to TZ³. Given this situation, it is

understandable that feelings of uncertainty and desolation pervaded students around the world who aspired to build a brilliant career in North America⁴.

The Covid-19 pandemic has also exacerbated cognitive symptoms among college youth. Although in the biological field anxiety, stress and depression have been reported due to the constant pressure of the “publish or perish” culture, they have grown at even higher extent during the pandemic⁵. The results of a survey involving 30,000 undergraduates and more than 15,000 graduate students, conducted by a collaboration between the University of Minnesota and the University of California, report that anxiety increased by 50% in 2020 compared to 2019 (Woolston, 2020b). Signs of depression followed the same rising trend, as noted by another survey involving 19,000 students in the US⁶. When Universities were forced to close, and lab work was restricted to few exceptions, isolation and loneliness were also reported by other students⁵. In addition, those who already presented mental health disorders often experience an increase in drug abuse and alcohol consumption⁷. In

this respect, a study conducted in Ohio demonstrated that the average number of drinks per week among students passed from 3,5 before the pandemic to more than 5 after the lockdown⁸. Given these data, the idea of a psychological support offered by the Universities, already applied in the USA, could prove beneficial in reducing stress and anxiety among young students and researchers, thus helping to get them out from the mental impact of the pandemic.

2.2. Minorities and under-represented groups pay the price

Several students belonging to minorities have come to meet the same challenges of TZ, but the fear that the under-represented groups will pay the highest price is great. “Skipping a summer internship for a Black student or a White student is not the same” warns Giovanni Ricevuti, coordinator of the Erasmus program at the University of Pavia, Italy. “We often forget that students living in richer countries have countless other possibilities to enrich their CVs that students from under-represented groups just don’t have. For African students, for example, losing the chance of going to

the US or Europe to carry out high-impact research is often detrimental for their career, and no one will give them back this opportunity”.

An increasing number of accounts is dramatically reporting that several Universities all over the world are not ready yet to ensure fairness and inclusion in the application process, as many are shifting their focus from promoting diversity towards developing measures that allow students and workers to attend safely again their Universities (Nwora *et al.*, 2021; Woolston, 2020a). But safe does not mean equal: “It’s like we are going back 30 years”, said Raísa Vieira, a Brazilian ecologist at the Federal University of Goiás in Goiânia, when interviewed from Nature Journal⁹. As online teaching and smart working are deemed necessary to allow the continuation of daily activities, it has to be acknowledged that not everyone has access to the same opportunities. Indeed, despite the great adaptation effort of some Universities to run all courses from remote¹⁰, students belonging to minorities in some cases had no Internet access, thus being unable to work from home, as the case of the Indian

PhD student Ganguly⁵. Hope remains, that lagging Universities and funding Institutions will follow the path traced by the prompt response of others in order to promote inclusion in the application procedure: “proposing a balanced selection has always been our priority and will continue to be so even when the pandemic is over”, reassured Giovanni Ricevuti.

The impact of the pandemic on under-represented groups goes even beyond the lack of strategic support and equal opportunities during application processes. Indeed, ethnic minorities are reported to be more likely affected by the economic consequences of the pandemic, and financial disparities are predicted to rise among Black scientists, thus increasing inequalities⁹. “Many had to decide between their family in one country and their students and projects in another country”, warns Bea Maas, ecologist at the University of Vienna, who witnessed several fellow researchers leaving their workplace to fly back to their hometowns to take care of their families⁹. While pre-pandemic data already showed that poverty rates in the US are two-to-three times higher for ethnic minorities

compared to Whites¹², the impact of the novel coronavirus seems to have exacerbated the inequality or at least the perception of it. Indeed, a survey conducted by sociologists from the Indiana University (US) reported that – during the Covid-19 pandemic – Whites experienced significantly less financial, housing and food insecurity than ethnic minorities such as Black, Latino and others¹³. Furthermore, in the same study, a similar trend has been observed between individuals bearing a different degree of education, with less educated ones most hardly hit by the consequences of the pandemic (Perry *et al.*, 2021).

Worsening the scenario, the current economic crisis turned out to be associated also with a higher prevalence of infection. African Americans, lowest income groups and women have been shown to be at higher risk of contracting Covid-19 infection compared to the rest of the population, according to data collected in Michigan, US¹⁴.

The fact that the novel coronavirus represented anything but an event flattening pre-existing discrepancies among different social subgroups is well documented by the not alike risks of pandemic-related death

and hospitalization among ethnic groups¹⁵. Once more, data collected in the US show that minorities, in particular Black and Latino persons, have faced significant higher rate of hospitalization or Covid-related death compared to Whites, and often in higher proportions than one would estimate based on the number of infected persons per ethnic group¹⁵. Multiple causes seem to be at the root of these recurring inequalities: differential access to the health systems and to higher education, pre-existing comorbidities and discrepancies in financial and work-related situations, among them^{15,16}. Hence, it appears as a priority to invest time and energies at different societal levels, Universities first, in order to plan global health and economic strategies to flatten unfair differences among individuals and to reverse the negative trend that the Covid-19 pandemic has fostered about pre-existing issues such as diversity and inclusion⁹.

2.3. *Increased gender inequality in the pandemic era*

Enhanced gender inequality as a result of Covid-19 lockdown is also of concern. Disproportions in employment because of the pandemic have been reported

across different countries¹⁷. Results from a longitudinal study conducted in the UK reports that White men had a lower probability to be dismissed from work between March and May 2020, while women and ethnic minorities were more likely to experience economic hardship¹⁸. Similar data were also obtained in the US, where the penalty of being mothers emerged as a consequence of unequal layoffs in the Covid-19 pandemic¹⁹. In India, where women have always been subject to the gender hierarchy, Covid-19 pandemic has drastically worsened their conditions. Socioeconomic precariousness, job loss and economic uncertainty all contributed to increasing the gap of inequality²⁰. Although it is often difficult to quantify the impact of the pandemic on women, results from a six-country survey calculate that women have a 24% higher probability of being fired compared to their male counterparts. At the same time, a decrease in women's income of more than 50% compared to men's one is also expected, with a strong impact on expenditures and savings²¹. In this respect, interventions aimed at supporting women should be considered. For example,

economic benefits in favor of unemployed women should be introduced by governments, with a particular attention to mothers and pregnant women²².

With reference to the scientific field, the fact that young women are reported to be one of the categories most affected by the pandemic²³ is of particular concern for their career. The results of a survey involving 3,345 Brazilian academics show that while 77% of White men without children managed to publish by the planned deadline during the pandemic, only 47% of women with children were able to do the same²⁴. When mothers or single parents need to look after their children during homeschooling, do cleaning and cooking, it becomes difficult to concentrate on analyzing data and writing papers, with a strong impact on their mental health^{25,26}. Moreover, reduced physical exercise among women compared to men because of the aforementioned household chores should also be accounted as a sign of inequality²⁷. Given these conditions, symptoms like psychological distress are common. Unsurprisingly, Xue and McMunn report that lone mothers are at higher risk of experiencing excessive stress and decreased mental health,

with serious consequences on labor activity²⁸. “When your PI asks you to be productive and to quickly conclude your manuscript while you need to accomplish an infinite number of tasks at the same time, a rise in pressure is understandable”, says professor Ricevuti. Often, working at nights remains the only solution to be able to do everything in 24 hours, but that’s not always enough. According to a paper published in 2020 in the *BJM Glob Health Journal*, women account for only a third of the authors who published manuscripts in the Covid-19 field, with a high prevalence of men in the first and last positions²⁹. Andre-son and colleagues point out how this reduction could be particularly relevant for early-career women, thus making them start at a disadvantaged level compared to their male counterparts³⁰. In biology, not publishing means not accessing grants, and the difference in productivity between males and females will be detrimental to access research funds. In Denmark, one of the European countries with the highest gender gaps, the situation could get very serious, and the effects of the pandemic on productivity might slow down any attempt

to flatten the differences³¹. Extended deadlines, enhanced inclusion, policy revision and funding distribution considering the gender consequences of the pandemic should be considered in granting assignments, PhD/postdoc’s candidate evaluation and mobility fellowship selection. “Different circumstances cannot be simply compared but must be analyzed and understood singularly. I hope the evaluation committee will take this into account”, advises professor Ricevuti.

3. Discussion

Experiences like that of TZ are only an example of how the pandemic is affecting the entire research world, from undergraduates to postdocs and group leaders. In addition to those who could not leave for a summer internship, there are those who were unable to publish or that lost important funding, therefore exacerbating the already reported signs of stress, anxiety and depression among people involved in the academia field. Financial distress, unemployment and economic hardship have been reported to be higher among ethnic minorities and women, thus suggesting that already disadvantaged

groups are the mostly affected by the pandemic consequences¹³. Since under-represented groups and women are paying the highest price of both the lockdown and the economic crisis, their disparities must be considered by the research community. The aim of our paper is to shed light on the challenges that minority groups and women are facing because of the pandemic. To avoid the increase in inequality, Universities, Institutions and Commit-

tees must revise their relevant policy quickly, implementing a flexible and balanced grading system when awarding research grants, mobility fellowships/ internships and job promotion. We strongly call for a revision of the currently used evaluation parameters, and we hope that this action can have positive results in limiting disparities and in reducing the gender gap.

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AV, LR and VF wrote and

revised the manuscript. GR supervised the work and revised the manuscript. All authors read and approved the final manuscript.

Conflict of interest

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Notes

1. Gould J. The career costs of Covid-19: how post-docs and PhD students are paying the price. *Nature* (2020) available at <https://www.nature.com/articles/d41586-020-03108-4> Accessed on 28/11/2021
2. Reardon S. More international students were coming to US universities - then Covid hit. *Nature*. 2020 Nov 9. doi: 10.1038/d41586-020-03168-6.
3. Kumar S. How to manage the uncertainty of a remote PhD. *Nature*. 2021 Jul 20. doi: 10.1038/d41586-021-02001-y.
4. Arnold C, Woolston C. Uncertainty plagues junior researchers from underprivileged backgrounds amid pandemic. *Nature*. 2020 Dec;588(7837):355-357. doi: 10.1038/d41586-020-03465-0.
5. Forrester N. Mental health of graduate students sorely overlooked. *Nature*. 2021 Jul;595(7865):135-137. doi: 10.1038/d41586-021-01751-z.
6. Woolston C. Signs of depression and anxiety soar among US graduate students during pandemic. *Nature* (2020) 585:147-148; doi: 10.1038/d41586-020-02439-6.
7. Lechner W v., Laurene KR, Patel S, Anderson M, Grega C, Kenne DR. Changes in alcohol use as a function of psychological distress and social support following Covid-19 related University closings. *Addictive Behaviors* (2020) 110:106527 doi:10.1016/j.addbeh.2020.106527

8. Woolston C. 'The problem is greater than it's ever been': US universities urged to invest in mental-health resources. *Nature* (2021) 590:171-172. doi: 10.1038/d41586-021-00229-2
9. Woolston C. 'It's like we're going back 30 years': how the coronavirus is gutting diversity in science. *Nature* (2020), doi: 10.1038/d41586-020-02288-3
10. Nwora C, Allred DB, Verduzco-Gutierrez M. Mitigating Bias in Virtual Interviews for Applicants Who are Underrepresented in Medicine. *Journal of the National Medical Association* (2021) 113:74-76, doi:10.1016/j.jnma.2020.07.011
11. Padma T. How Covid changed schools outreach. *Nature* (2021) 594:289-291. doi: 10.1038/d41586-021-01517-7
12. Tai DBG, Shah A, Doubeni CA, Sia IG, Wieland ML. The Disproportionate Impact of Covid-19 on Racial and Ethnic Minorities in the United States. *Clinical Infectious Diseases* (2021) 72:703-706, doi:10.1093/cid/ciaa815
13. Perry BL, Aronson B, Pescosolido BA. Pandemic precarity: Covid-19 is exposing and exacerbating inequalities in the American heartland. *Proceedings of the National Academy of Sciences* (2021) 118:e2020685118, doi:10.1073/pnas.2020685118

14. Wu K-HH, Hornsby WE, Klunder B, Krause A, Driscoll A, Kulka J, Bickett-Hickok R, Fellows A, Graham S, Kaleba EO, et al. Exposure and risk factors for Covid-19 and the impact of staying home on Michigan residents. *PLOS ONE* (2021) 16:e0246447, doi:10.1371/journal.pone.0246447
15. Center for Disease Control and Prevention. <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html>. (2021)
16. Razai MS, Kankam HKN, Majeed A, Esmail A, Williams DR. Mitigating ethnic disparities in covid-19 and beyond. *BMJ* (2021) 372:m4921, doi:10.1136/bmj.m4921
17. Landivar LC, Ruppanner L, Scarborough WJ, Collins C. Early Signs Indicate That Covid-19 Is Exacerbating Gender Inequality in the Labor Force. *Socius: Sociological Research for a Dynamic World* (2020) 6:2378023120947997, doi:10.1177/2378023120947997
18. Witteveen D. Sociodemographic inequality in exposure to Covid-19-induced economic hardship in the United Kingdom. *Research in Social Stratification and Mobility* (2020) 69:100551 doi:10.1016/j.rssm.2020.100551
19. Dias FA, Chance J, Buchanan A. The motherhood penalty and The fatherhood premium in employment during covid-19: evidence from The united states. *Research in Social Stratification and Mobility* (2020) 69:100542 doi:10.1016/j.rssm.2020.100542
20. Chakraborty D. The “living dead” within “death-worlds”: Gender crisis and Covid-19 in India. *Gender, Work & Organization* (2021) 10.1111/gwao.12585, doi:10.1111/gwao.12585
21. Dang H-AH, Viet Nguyen C. Gender inequality during the Covid-19 pandemic: Income, expenditure, savings, and job loss. *World Development* (2021) 140:105296, doi:10.1016/j.worlddev.2020.105296
22. Steinert JI, Alacevich C, Steele B, Hennegan J, Yakubovich AR. Response strategies for promoting gender equality in public health emergencies: a rapid scoping review. *BMJ Open* (2021) 11:e048292, doi:10.1136/bmjopen-2020-048292
23. Davillas A, Jones AM. The first wave of the Covid-19 pandemic and its impact on socioeconomic inequality in psychological distress in the UK. *Health Economics* (2021) 30:1668-1683, doi:10.1002/hec.4275
24. Staniscuaski F, Kmetzsch L, Soletti RC, Reichert F, Zandonà E, Ludwig ZMC, Lima EF, Neumann A, Schwartz IVD, Mello-Carpes PB, et al. Gender, Race and Parenthood Impact Academic Productivity During the Covid-19 Pandemic: From Survey to Action. *Frontiers in Psychology* (2021) 12:663252, doi:10.3389/fpsyg.2021.663252
25. Staniscuaski F, Reichert F, Werneck FP, de Oliveira L, Mello-Carpes PB, Soletti RC, Almeida CI, Zandona E, Ricachenevsky FK, Neumann A, et al. Impact of Covid-19 on academic mothers. *Science* (2020) 368:6492, doi:10.1126/science.abc2740
26. Reardon S. Pandemic measures disproportionately harm women’s careers. *Nature* (2021), doi: 10.1038/d41586-021-00854-x
27. Sher C, Wu C. Who Stays Physically Active during Covid-19? Inequality and Exercise Patterns in the United States. *Socius: Sociological Research for a Dynamic World* (2021) 7:2378023120987710, doi:10.1177/2378023120987710
28. Xue B, McMunn A. Gender differences in unpaid care work and psychological distress in the UK Covid-19 lockdown. *PLOS ONE* (2021) 16:e0247959, doi:10.1371/journal.pone.0247959
29. Pinho-Gomes A-C, Peters S, Thompson K, Hockham C, Ripullone K, Woodward M, Carcel C. Where are the women? Gender inequalities in Covid-19 research authorship. *BMJ Global Health* (2020) 5:e002922, doi:10.1136/bmjgh-2020-002922
30. Andersen JP, Nielsen MW, Simone NL, Lewiss RE, Jagsi R. Covid-19 medical papers have fewer women first authors than expected. *eLife* (2020) 9:e58807, doi:10.7554/eLife.58807
31. Bendixen M, Hall VJ. How the pandemic could choke gender equity for female researchers in Denmark. *Nature*. 2020 Sep 9. doi: 10.1038/d41586-020-02527-7.