COMMENTARY

Impact of COVID-19 pandemic on the mental health of scientists

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MENTAL HEALTH DURING COVID-19

The COVID-19 pandemic has had a substantial impact on mental health not only in the general population but also in specific groups such as university students.[1,2] For example, the prevalence of depression and anxiety increased, and sleep quality and quality of life worsened compared with prepandemic levels. Additionally, the pandemic has disrupted work schedules and affected working time among scientists.[3] Moreover, the pandemic has had a greater impact on females and younger individuals.[3] Despite the known effects on these groups, the impact of the pandemic on the mental health of scientists and researchers has received less attention. Scientists working in a competitive environment often experienced pressure even prior to the outbreak of the pandemic. Furthermore, both scientists engaged in COVID-19 research and those working on other topics have been impacted by the pandemic, such as experiencing pressure to develop vaccines or having their research work hindered by the lockdown. As a result, it is imperative to assess the mental health status of this population. We conducted a short survey to examine the mental health of scientists and identify factors related to mental health in this population. The survey aimed to provide insight into the challenges faced by scientists and researchers during the pandemic and to inform the development of interventions and support for this population.

DESCRIPTION OF SAMPLE

Our survey was conducted using a convenience sample of scientists recruited through social media and email invitations. We invited followers of *The Innovation* on Twitter and emailed corresponding authors of Nature Index journals to participate in the survey. A total of 1,039 participants completed the survey from November 21 to December 20, 2022. The sample characteristics can be found in Table 1. Generally, the sample was relatively diverse; participants were from different regions (3.4% from Africa, 56.1% from Asia, 23.9% from Europe, 10.5% from North America, 1.7% from Oceania, and 4.4% from South America) and reported a range of economic conditions, with 13.9%, 50.4%, and 35.6% reporting bad, fair, and good economic conditions, respectively. A majority of participants were male (65.2%), 72.2% held a doctoral degree, and the mean age was 42.67 years.

GENERAL MENTAL HEALTH STATUS

Mental health was evaluated using the well-validated Patient Health Questionnaire-2 (PHQ-2) and Generalized Anxiety Disorder Screener (GAD2) instruments to evaluate depression and anxiety, respectively. The results showed that a substantial proportion of the sample experienced mental health issues. Specifically, the mean PHQ-2 score was 1.28 (full score was 6), and 15% of participants had a score indicating probable depression (cutoff of 3). Additionally, the mean GAD2 score was 1.33 (full score was 6), and 15.8% of participants had a score indicating probable anxiety (cutoff of 3). Furthermore, 23.2% of participants reported experiencing some problems with sleep (see Table 1). These findings indicated that a substantial proportion of scientists experienced depression, anxiety, and sleeping problems, highlighting the importance of addressing mental health in this population, particularly during the ongoing pandemic.

Regarding overall stress during the pandemic compared with before the pandemic, 54% of participants reported increased overall stress, 36.6% reported that their overall stress remained the same, and 9.3% reported that their overall stress had decreased. In terms of coping with the current situation, 64.8% of participants reported that they could cope adequately, 26.1% reported that they could possibly cope, and 8% indicated that they could not cope with the stress. The most commonly used coping methods were self-regulation (70.9%) and support from community, family, and friends (40%). Additionally, the survey results indicated that there were several barriers to accessing mental health care for scientists, including a lack of information about available resources (49.6%), limited access to services (47%), financial concerns (46.2%), and social stigma (39.4%).

CORRELATES OF MENTAL HEALTH

We conducted regression analyses using multiple factors to predict depression or anxiety scores. The results showed that factors such as age, economic condition, region, and self-isolation status were associated with depression, while age, economic conditions, and COVID-19 status were associated with anxiety. Logistic regression analysis using depression or anxiety status (if the score was above the cutoff) as the outcome produced similar results.

DISCUSSION

Our study found that the prevalence rates of depression and anxiety among scientists were 15% and 15.8%, respectively. Moreover, factors such as younger age, worse economic conditions, self-isolation, and long COVID status were associated with higher rates of depression and anxiety.

The prevalence of depression and anxiety was lower than that in previous studies, such as a meta-analysis that reported rates of 33.7% for depression and 31.9% for anxiety in the general population.[4] This discrepancy may be due to differences in the stage of the pandemic at which the participants were surveyed. In the earlier stage of the pandemic, there was more uncertainty and social isolation, which likely contributed to higher rates of depression and anxiety. However, by the end of 2022, many countries had lifted restrictions related to COVID-19, and life had generally returned to normal, which may have led to decreased rates of depression and anxiety compared with the early stages of the pandemic. This is supported by a longitudinal study that reported decreased levels of depression and anxiety in the general population.[5] Additionally, the discrepancy in findings may be due to the use of different tools or versions of tools or the population studied. Our study focused on scientists, who may have better self-regulation skills than other groups, such as students.

Our study found that factors related to mental health were different from those related to working time among scientists. Myers et al.[3] found that female scientists, those in the "bench sciences," and those with young children had an obvious decline in working time, whereas we found that younger age, worse economic conditions, self-isolation, and long COVID were associated with mental health problems. These findings suggest that different factors should be considered when addressing mental health compared with those for working. Age was negatively associated with both depression and anxiety, which is consistent with previous studies showing that younger people were particularly affected during the pandemic,[2] which may be due to their immature coping ability, lack of peer interaction, and uncertainty. Economic status was another factor that affected both depression and anxiety. It is possible that economic conditions affected both participants' living conditions and access to psychological services, as 46.2% of participants reported financial concerns as barriers to mental health care. Our study found that self-isolation and the region in which participants were physically located were associated with depression. This may be related to different antivirus policies in different countries or regions. Participants in regions with strict policies were more likely to experience self-isolation, which can lead to social deprivation and depression. As some participants noted, many of the troubles caused by COVID were not due to the virus itself but the quarantine. An additional possibility is that the differences in mental health between regions

Table 1. Demographic variables and mental health status of participants

Item	Result
Sex (%)	
Female	33.2
Male	65.2
Not reported	1.6
Age	
Range: 17–97	mean (SD) = 42.67 (13.91)
Educational degree (%)	
Doctoral	72.2
Master's	16.1
Undergraduate	10.1
None	1.6
Economic condition (%)	
Bad	13.9
Fair	50.4
Good	35.6
Number of dependents (%)	
0	26.9
1	23.3
2	23.2
3 or more	26.5
Age group of dependents (%)	
0–2	12.6
3–5	12.6
6–11	19.6
12–18	16.4
18–65	39.7
Over 65	24.2
Living situation (%)	
Partner or spouse	64.8
Friends	6.1
Alone	20.7
Other	8.4
Occupation (%)	
Nonbiomedical related	53.2
Biomedical related	46.7
Physical location (%)	
Africa	3.4
Asia	56.1
Europe	23.9
North America	10.5
Oceania	1.7
South America	4.4
COVID-19 (%)	
Never	54.5
Most likely	8.8
Had but recovered	29
Long COVID	5.3
Unsure	2.5
Self-isolated/quarantined (%)	
Yes	64.8
No	35
Depression	
Range: 0–6	mean (SD) = 1.28 (1.47)
Depression proportion (cutoff of 3)	15
Anxiety	
Range: 0–6	mean (SD) = 1.33 (1.51)
Anxiety proportion (cutoff of 3)	15.8
Sleep quality (%)	
Very bad	6
Slightly bad	17.2
Fair	34.7
Slightly good	21.8
Very good	20.2
Overall stress during the pandemic (%)	
Increased	54
Decreased	9.3
Remained the same	36.6
Able to cope with current situation (%)	
Yes	64.8
No	8
Maybe	26.1

may not be solely related to COVID-19, as these differences may have existed prior to the pandemic. COVID-19 status was associated with anxiety; specifically, those with long COVID-19 had higher levels of anxiety than other participants. Participants who had COVID-19 but recovered did not differ in anxiety levels from those who never had COVID-19. This may be because those who never had COVID-19 were worried about contracting it, while those who had it and recovered were no longer worried about it.

This study has several limitations. First, the sample size was limited and may not have been representative of the entire population of scientists. Second, the age range of participants was broad, and a more focused examination of the effects of age on mental health outcomes would be useful. Additionally, the specific research disciplines of participants were not assessed, which may limit the generalizability of the results. Furthermore, only simple measures of mental health were used, and other factors, such as resilience and social support, were not evaluated. Finally, this was a cross-sectional study, which precluded an examination of longitudinal changes in mental health among scientists.

Despite the approaching end of the COVID-19 pandemic, its impact remains palpable. Some participants commented on difficulties in finding employment equivalent to their prepandemic positions and noted that while the virus may be gone, other problems persist. These findings suggest that COVID-19 may have long-term effects and call for further longitudinal studies to better understand its impact.

Given the finding that age was negatively associated with both depression and anxiety among scientists, it is imperative to implement strategies to support young scientists and researchers, particularly during the later stages of the pandemic or during the challenging postpandemic period. Potential strategies could include the provision of targeted mental health resources and support, such as counseling services, peer support groups, and financial assistance for those facing economic challenges. Additionally, flexible working arrangements, such as remote internships or part-time options, can help to mitigate the impact of unemployment and allow young scientists to maintain a sense of stability and continuity in their work.

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DECLARATION OF INTERESTS

The authors declare no competing interests.