



Research Letter | Equity, Diversity, and Inclusion

Evaluation of Professional Setbacks and Resilience in Biomedical Scientists During the COVID-19 Pandemic

Nicole C. Weitowich, PhD; Anthony C. Waddimba, MD, DSc; Chen Yeh, MS; Lutfiyya N. Muhammad, PhD; Ann Marie Warren, PhD; Christine V. Wood, PhD

Introduction

Biomedical scientists faced unprecedented challenges during the COVID-19 pandemic, analogous in many ways to their clinician colleagues.¹ Nevertheless, insufficient attention has been paid to adverse psychological consequences of the pandemic for scientists. We investigated whether resilience was associated with scientists' professional and career setbacks during the pandemic.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

Methods

In this survey study, we sampled recipients of National Institutes of Health funding and members of the National Postdoctoral Association. Data were collected from October 1 to November 30, 2020. Participants self-reported demographic information including gender, race, and ethnicity. Respondents answered yes or no or unsure to the question, "Have you experienced career or professional setbacks as a result of the COVID-19 pandemic?" They also completed the 10-item Connor-Davidson Resilience Scale (CD-RISC-10).² This study followed the [AAPOR](#) reporting guideline and disclosure standards.³ The Northwestern University institutional review board approved this study, and participants provided electronic informed consent. The dependent variable was whether respondents experienced a professional setback during the pandemic. Logistic regression models of the outcome were fitted on CD-RISC-10 score, gender, additional child and/or elder care work, and professional career stage. Analyses were conducted using GraphPad Prism, version 9. Two-sided $P < .05$ was considered significant. The eMethods in [Supplement 1](#) provides additional details.

Results

Of 31 647 invitations, 635 individuals met the inclusion criteria and completed the survey (response rate, 2%) (**Table**). A total 390 respondents (61%) experienced a career or professional setback during the pandemic. The median CD-RISC-10 score was 29 (IQR, 29-32).

In an unadjusted model, CD-RISC-10 score was positively associated with experiencing a setback (odds ratio [OR], 1.04; 95% CI, 1.01-1.07; $P = .008$). In a multivariable model, CD-RISC-10 score (OR, 1.04; 95% CI, 1.01-1.07; $P = .02$), gender (OR, 2.50; 95% CI, 1.80-3.51; $P < .001$), and additional family care responsibilities (OR, 1.84; 1.32-2.59; $P < .001$) were associated with experiencing a setback but career stage was not (OR, 1.04; 95% CI, 0.74-1.47; $P = .80$) (**Figure**).

Discussion

Biomedical scientists engaged in synergistic efforts to address the COVID-19 pandemic alongside health care professionals. Scientists were expected to persevere in achieving professional goals, expectations, and milestones despite facing disparate professional and personal challenges.⁴ Our data highlight the differential consequences of the pandemic for women scientists of all career stages, who experienced greater household responsibilities while facing social pressure to advance their careers.

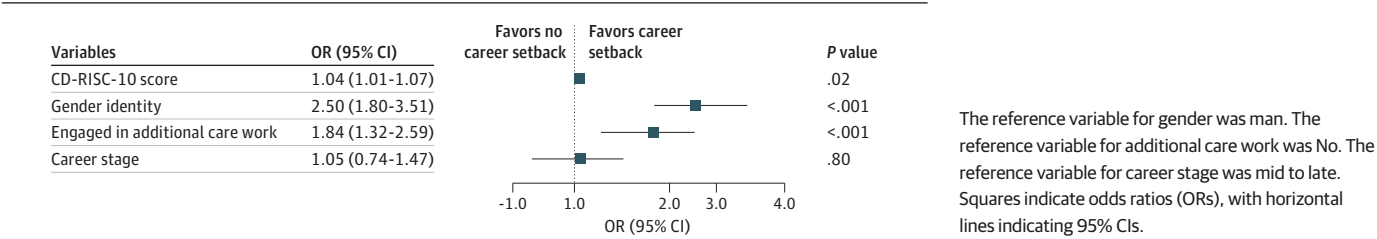
Open Access. This is an open access article distributed under the terms of the CC-BY License.

Resilience may play an important role in how scientists experienced the pandemic. This aligns with the concept of resilience as a protective psychological factor in response to stressful experiences.⁵ These data surprisingly suggest that resilience was associated with experiencing

Table. Respondent Demographics

Characteristic	Respondents, No. (%) (N = 635)
Gender identity	
Female	369 (58)
Male	257 (40)
Prefer to self-describe or not say	9 (1)
Age, y	
18-24	1 (<1)
25-34	109 (17)
35-44	231 (36)
45-54	145 (23)
55-64	91 (14)
65-74	49 (8)
≥75 or prefer not to say	9 (1)
Race	
American Indian or Alaska Native	1 (<1)
Asian or Pacific Islander	58 (9)
Black or African American	10 (2)
White	528 (83)
Multiracial	17 (3)
Prefer to self-describe or not say	21 (3)
Ethnicity	
Hispanic or Latino/a/x	51 (8)
Not Hispanic or Latino/a/x	584 (92)
Highest degree obtained	
PhD	503 (79)
MD	62 (10)
MD and PhD	62 (10)
Other	8 (1)
Experienced a professional setback	
Yes	390 (61)
No or unsure	245 (39)
Took on additional care work	
Yes	305 (48)
No or unsure	330 (52)
Career stage	
Early	102 (16)
Mid to late	533 (84)

Figure. Odds of Experiencing a Professional Setback From the Logistic Regression Analysis



setbacks during the pandemic. Although individual resilience is a complex and nonstatic phenomenon, it is unlikely to be a causal factor. Sociocultural factors such as a gender and/or additional family care responsibilities were also associated with professional setbacks among scientists during the pandemic.

This is one of the first studies to evaluate scientists' resilience using the CD-RISC-10. Overall, scientists' scores ranked below the national prepandemic average but were comparable to other postpandemic reports.⁶

Study limitations include a small-sized sample that was predominately White. Experiences of racial and ethnic minority scientists may be underrepresented. Additionally, acquiescence response or social desirability bias cannot be ruled out. Data were collected within 60 days, providing only a brief snapshot of scientists' pandemic era experiences. Most importantly, causality could not be determined due to the cross-sectional study design.

The promotion of resiliency building may support beneficial coping skills but might not sufficiently counteract sociocultural and contextual pressures arising from gender disparities within the biomedical workforce. Focused strategies to support the professional advancement of women and gender-minority scientists, particularly in the wake of the pandemic, are warranted.

ARTICLE INFORMATION

Accepted for Publication: June 29, 2023.

Published: August 9, 2023. doi:[10.1001/jamanetworkopen.2023.28027](https://doi.org/10.1001/jamanetworkopen.2023.28027)

Open Access: This is an open access article distributed under the terms of the [CC-BY License](https://creativecommons.org/licenses/by/4.0/). © 2023 Woitowich NC et al. *JAMA Network Open*.

Corresponding Author: Nicole C. Woitowich, PhD, Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, 633 N St Clair St, Ste 1900, Chicago, IL 60611 (nicole.woitowich@northwestern.edu).

Author Affiliations: Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, Chicago, Illinois (Woitowich, Wood); Division of Surgical Research, Department of Surgery, Baylor University Medical Center, Dallas, Texas (Waddimba); Division of Biostatistics, Department of Preventive Medicine, Feinberg School of Medicine, Northwestern University, Chicago, Illinois (Yeh, Muhammad); Division of Trauma, Acute Care, and Critical Care Surgery, Baylor University Medical Center, Dallas, Texas (Warren).

Author Contributions: Dr Woitowich had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Woitowich, Waddimba, Warren, Wood.

Acquisition, analysis, or interpretation of data: Woitowich, Yeh, Muhammad, Wood.

Drafting of the manuscript: Woitowich, Waddimba, Yeh, Muhammad, Wood.

Critical review of the manuscript for important intellectual content: All authors.

Statistical analysis: Woitowich, Yeh, Muhammad, Wood.

Obtained funding: Woitowich, Wood.

Administrative, technical, or material support: Woitowich.

Supervision: Woitowich.

Conflict of Interest Disclosures: Dr Wood reported receiving grants from the National Science Foundation during the conduct of the study. No other disclosures were reported.

Funding/Support: This work was supported by award 2035112 from the National Science Foundation (Drs Woitowich and Wood).

Role of the Funder/Sponsor: The National Science Foundation had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Data Sharing Statement: See [Supplement 2](#).

REFERENCES

1. Myers KR, Tham WY, Yin Y, et al. Unequal effects of the COVID-19 pandemic on scientists. *Nat Hum Behav*. 2020;4(9):880-883. doi:10.1038/s41562-020-0921-y
2. Campbell-Sills L, Stein MB. Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): validation of a 10-item measure of resilience. *J Trauma Stress*. 2007;20(6):1019-1028. doi:10.1002/jts.20271
3. AAPOR. Disclosure standards. Published November 8, 2022. Accessed June 14, 2023. <https://aapor.org/standards-and-ethics/disclosure-standards/>
4. Lufler RS, McNulty MA. The glass ceiling thickens: the impact of COVID-19 on academic medicine faculty in the United States. *Med Educ Online*. 2022;27(1):2058314.
5. Troy AS, Mauss IB. Resilience in the face of stress: emotion regulation as a protective factor. In: Litz BT, Charney D, Friedman MJ, Southwick SM, eds. *Resilience and Mental Health: Challenges Across the Lifespan*. Cambridge University Press; 2011:30-44. doi:10.1017/CBO9780511994791.004
6. Waddimba AC, Baker BM, Pogue JR, et al. Psychometric validity and reliability of the 10- and 2-item Connor-Davidson resilience scales among a national sample of Americans responding to the Covid-19 pandemic: an item response theory analysis. *Qual Life Res*. 2022;31(9):2819-2836. doi:10.1007/s11136-022-03125-y

SUPPLEMENT 1.

eMethods.

SUPPLEMENT 2.

Data Sharing Statement