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| Tips and Tools

Fostering community discussions and building a toolkit for mental health and wellness in STEM

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ABSTRACT Mental health interventions can help mitigate the unique challenges that individuals in Science, Technology, Engineering, and Mathematics (STEM) face as they navigate these disciplines. We developed the "Mental Health and Wellness: Our Community and our Identity in STEM" workshop, which emphasizes leveraging our STEM community and promoting self-compassion, to foster a conversation among members of the STEM community on how to support mental health and wellness. This interactive workshop begins with a short lecture to define mental health and wellness and introduce evidence-based methods to increase self-compassion. Participants, who are often from diverse backgrounds and various career stages, then explore case studies that highlight experiences related to mental health across STEM career stages. Pre- and post-assessments of workshop participants suggest that participants had positive shifts in their ability to show compassion toward themselves as well as an increased comfort in discussing mental health within their STEM community. This workshop not only provided participants with practical tools and insights but also cultivated a supportive environment, underscoring the importance of mental health awareness and collective well-being within STEM fields. In this paper, we share tips on how this workshop was executed and lessons we have learned from our years of sharing similar workshops in the broader STEM community. We hope this paper serves as a valuable guide for potential facilitators to initiate conversations about mental health and wellness in their respective STEM spaces.

KEYWORDS workshop, mindfulness, self-compassion, identity, diversity

The mental health and wellness of individuals pursuing Science, Technology, Engineering, and Mathematics (STEM) fields have garnered increased attention (1–3). The cultural landscape of STEM is often described as competitive and characterized by hierarchical power dynamics (4–6), which can profoundly influence individuals' mental health and wellness (7), especially for scholars who are historically and presently excluded in STEM (8–10). Mental health interventions, such as the professional empowerment of graduate students and gratitude interventions in college biology courses, can have positive effects on students (11–13). Thus, there is a growing need for interventions targeted for science trainees who empower individuals to proactively engage in attending to their mental health and wellness by providing resources, encouraging preventive measures, and fostering an environment where the significance of mental well-being is acknowledged and prioritized.

To destigmatize discussions on mental health and wellness and increase accessibility of evidence-based tools to increase well-being in STEM, we created a workshop: "Mental Health and Wellness: Our Community and our Identity in STEM." This workshop is the fusion of two workshops that the authors have conducted in a multitude of STEM settings ranging from national conferences [e.g., Society for the Advancement of Chicanos/Hispanics and Native Americans in Science, and Annual Biomedical Research

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Conference for Minoritized Scientists (ABRCMS)], university department meetings, training program workshops, and smaller seminar settings. Audiences have ranged from small (<10 participants) to large audiences (>200 participants) of undergraduate and graduate students, postdocs, staff, and faculty both in-person and virtually. Thus, the workshop can be adapted for a variety of contexts and audiences to facilitate meaningful conversations about mental health and wellness in STEM. Below, we discuss the workshop that was presented at ABRCMS in 2023 and describe its structure, content, and design, and present results on the impacts this workshop had on participants.

PROCEDURE

This workshop aims to facilitate and inspire conversation surrounding mental health and wellness among STEM students, trainees, faculty, and staff. We started the workshop with a disclaimer that we are members of the STEM research community rather than mental health practitioners, but that the workshop was developed in collaboration with mental health experts. The workshop began with a short lecture to ground participants in common terminology (e.g., wellness, brave space, transformative space, and identity) and to share evidence-based practices in stress reduction. Facilitators then encouraged group discussion on how community support, positionality, and compassion all influence mental health and wellness in the STEM research community. Participants spent much of the workshop time discussing ideas and reflecting on provided case studies (Table 1) that may be salient to some of their experiences related to mental health and wellness as they have navigated careers in STEM. We used pre- and post-assessment surveys with participants to evaluate shifts as a result of their participation in the workshop.

The major goals of the workshop are to: (i) identify the individuals in our broader STEM community who support our mental health and recognize how we as individuals can support the mental health of those within our community and (ii) increase self- and interpersonal awareness through accessibility to empirically tested methods in compassion and self-compassion (14–16).

The beginning of the workshop includes a short introduction on compassion, self-compassion, and identity as defined by Drs. Kristin Neff and Kimberlé Crenshaw, respectively (17, 18). Facilitators discuss the challenges one might encounter practicing compassion and self-compassion that are unique to an academic research setting. We also discuss that building a strong support network inside and outside of the STEM research community can contribute to resilience and perseverance in STEM. In both small- and large-group discussions, participants review mental health case studies exploring the diverse points of view anchored in the positionality of individuals in an academic setting. The case studies are intentionally open ended, allowing participants to develop their interpretations and solutions based on the provided scenario. To foster rich discussions among participants, group discussions are facilitated by guiding questions (see Supplemental Materials). Upon completion of the case studies discussion, the workshop details compassionate phrases to use toward yourself and between STEM community members (see Supplemental Materials).

Survey questions were selected from evidenced-based methods for stress reduction and increased well-being pertaining to the individual. Pre- and post-data collected via QR code are self-reported, and Likert scale questions were used to quantify changes pre- and post-workshop through matched participant data.

CONCLUSION

The "Mental Health and Wellness: Our Community and our Identity in STEM" workshop was offered as a session during ABRCMS in 2023. A wide range of participants across academic career stages participated in this workshop (Fig. 1A). Participants showed an increase in their ability to show compassion for others and themselves and an increase in their comfort level to discuss mental health with colleagues in their STEM community and their own communities after the workshop (Fig. 1B; n = 40 matched-paired

TABLE 1 Case studies used in mental health and wellness workshop

Case study	Career stage	Description presented for small-group and large-group discussions

Crista[a]	New undergrad researcher	• Second year undergraduate majoring in microbiology.
		• Crista has just entered her lab for the first time this semester and hopes to find a passion in research.
		• Crista has some worries about getting started in the lab.
		  ○ Crista is intimidated by the graduate students.
		  ○ Crista feels like she does not have anything interesting to bring to the lab despite her PI's assurance that she is naturally talented.
		• Crista has yet to start a project given to her after a month and a half in the lab.
		• Crista's instructors have noticed her grades are slipping.
		• With friends, Crista is more distant than usual, very tired, and passive.

Angel[a]	Senior undergraduate applying to graduate school	• Fourth year undergraduate double majoring in biology and chemistry. • Angel is graduating this semester and applying to graduate school. • Angel's undergraduate experience was affected by the pandemic. "Hands-on experience" was difficult to gain remotely. • Angel gave their first in-person lab presentation recently but feels like it did not go well. • Angel has recently missed meetings with their PI and labmates. • Angel's instructors have noticed assignments are missing. • With friends, Angel has mentioned being tired and sleeping a lot more than normal, not being hungry, and having difficulty concentrating on schoolwork.
Dr. Taylor[a]	Postdoctoral research fellow	• New postdoctoral researcher in a biology lab of a new PI. • Lately, experiments have not been successful, and their PI is frustrated at the lack of data; they need data to publish for tenure. • Dr. T's PI tells them that they should expect to work nights and some weekends if they expect to be successful and publish in high-impact journals. • Graduate students and techs in the lab notice that Taylor is overtired and no longer excited when conducting experiments in the lab. • Taylor stops going rock climbing with his friends in the evenings because he "needs to get useful data."
Dr. Jordan[a]	New primary investigator	• Newer PI in the biochemistry department. • Started their lab in January 2021, right in the middle of COVID lockdown. • Well prepared for a challenging first couple of years, Dr. J has now been in the department for nearly 2 years but feels very behind. • While students are in the lab and excited to get started, some critical pieces of equipment are delayed, and Dr. J is navigating the department and campus. • Plans to have lab outings and start lab traditions have been slow due to the challenges of planning and hosting group events—the lab feels disconnected. • Dr. Jordan is more frequently canceling dinner plans with family to try to catch up with what feels like months of lost time, and they have not been attending the book club they started with some friends from ABCRMS.

[a]Case studies include pseudonyms, and while fictional, are at least in part representative experiences of several members of our STEM community.

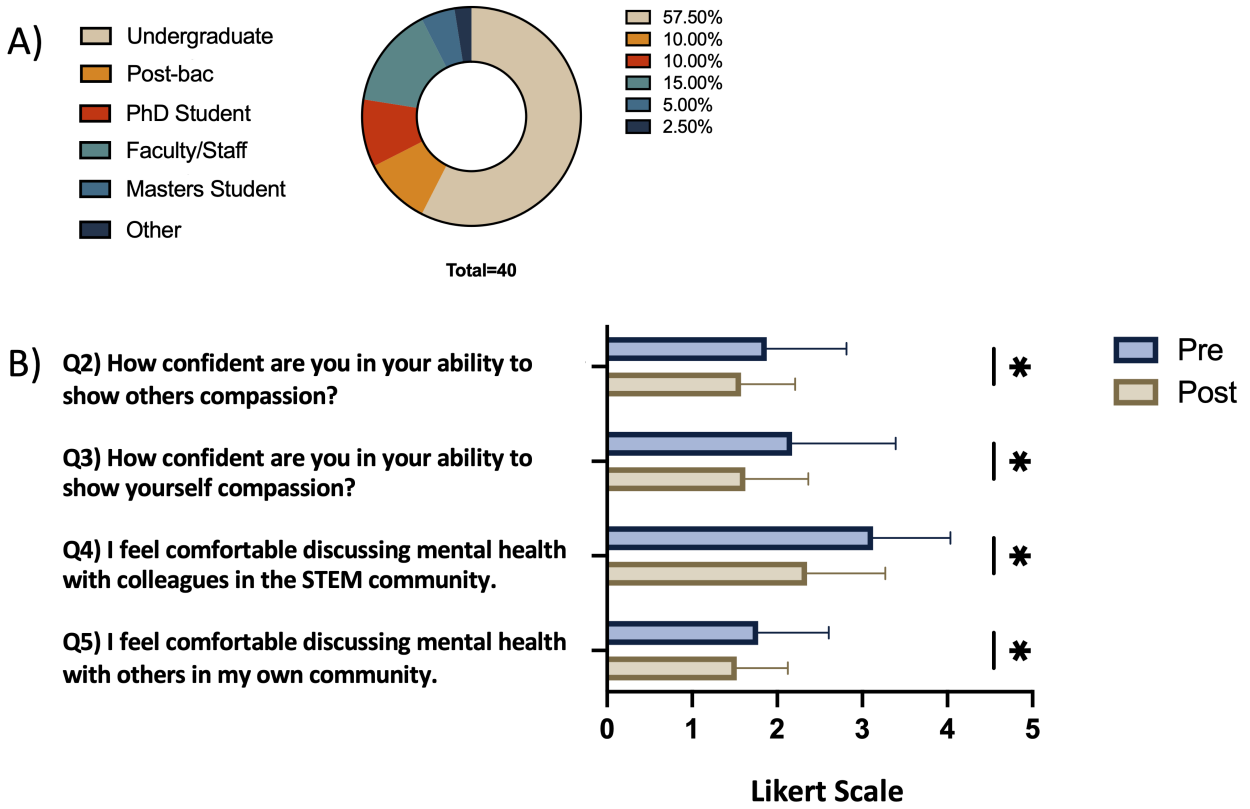

FIG 1 Forty participants' matched-paired pre- and post-survey data who attended the "Mental Health and Wellness: Our Community and our Identity in STEM" workshop. (A) Demographics of workshop participants. (B) Match-paired pre- and post-workshop scores on a Likert scale to measure the efficacy of concepts reviewed in the workshop (Q2 and Q3, 1 = extremely confident and 5 = not at all confident; Q4 and Q5, 1 = strongly agree and 5 = strongly disagree. Significance is denoted with * for $P < 0.05$. Paired sample *t*-test ($n = 40$); Q2, $P = 0.006$; Q3, $P = 0.000$; Q4, $P = 0.000$; Q5, $P = 0.012$.

participants). Despite the small sample size and brevity of the workshop (45 minutes), we observed significant shifts in participants' responses after their engagement in the workshop. Given that we have facilitated longer 90-minute workshops that provide more time for small- and large-group discussions, we anticipate that the recorded effects may be even stronger in longer versions of the workshop.

This workshop is one example of an intervention designed to impart practical tools and foster meaningful dialog about mental health and wellness within the STEM community. By sharing tips and tools to execute this workshop, we hope that our colleagues will replicate and host similar workshops within their respective STEM spaces to amplify its impact and extend this conversation to peers and trainees. It is imperative that we prioritize mental health in STEM throughout an individual's STEM academic career as it contributes to their success as a scientist at every stage.

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ETHICS APPROVAL

Data collection was reviewed and approved for Danielle Williams by the University of North Carolina, Chapel Hill, Institutional Review Board (UNC-CH IRB #23-1571).

ADDITIONAL FILES

The following material is available online.

Supplemental Material

Workshop Presentation Slides (jmbe00089-24-s0001.pdf). Slides presented at the 2023 ABRCMS Mental Health and Wellness Workshop (all data presented in the paper are from this presentation).

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