CASE STUDY

E-Mentoring Female Underrepresented Public Health Student Researchers: Supporting a More Diverse Postpandemic Workforce

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Within higher education, underrepresented students continue to face inequalities and discrimination, with unique challenges surfacing during the COVID-19 pandemic. Mentoring through formal or informal channels is one way to offer assistance to such students. During COVID-19 lockdowns, as classes and work moved online, mentoring also transitioned online. Electronic mentoring, or e-mentoring, was implemented formally by some universities and informally by independent researchers. This article describes the informal mentoring experiences of the lead author with 8 female student researchers, 6 of whom were mentored online. The students represented different racial and ethnic backgrounds, offering a collection of e-mentoring case studies during the pandemic. These independent field reports should not be assumed to represent any of the students' 6 universities, but they are a sample of what can be achieved by invested e-mentors. By sharing these anecdotal experiences, the authors call on all researchers of underrepresented groups to consider e-mentoring to support underrepresented student researchers and diversify the public health research field.

Keywords: COVID-19, Mentoring, Public health preparedness/response, Pandemic, Female researchers, Underrepresentation

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INTRODUCTION

WITHIN HIGHER EDUCATION, underrepresented students continue to face inequalities and discrimination,[1] with unique challenges surfacing during the COVID-19 pandemic. Mentoring through formal or informal counseling or coaching is one way to offer assistance to these students.[2] As classes and work moved online during the COVID-19 lockdowns, mentoring also transitioned online. Electronic mentoring, or e-mentoring, was implemented formally and informally by some universities[3] and independent research institutions.

A mentor with good listening skills can motivate a student to explore their interests and curiosities and further guide the student to develop a specialty in a topic they would be proud and passionate to pursue. A successful public health mentor offers instruction, counsel, and guidance and facilitates a student's development professionally, academically, and emotionally. Effective mentoring benefits the public health field through the retention of strong and committed students who become community leaders who may, in turn, mentor others in the future.[4] Pairing students and mentors with similar backgrounds is especially important for supporting first-generation college students who are interested in pursuing professional and academic opportunities in public health,[5] as cultural factors and language barriers can inhibit trust.[6] Mentorship gives students the opportunity to hone their skills to become credible voices for the underrepresented groups they identify with. Dr. Joan Reede, Dean of Diversity and Community Partnership at Harvard Medical School, stated, "Role models are critically important," and explained that they provide a visual example of people who have accomplished the same or similar goals as the student and who understand the unique challenges the student will be presented with. Mentorship not only develops the individual but also "helps [organizations] better serve underrepresented communities."[7]

The need for and importance of female researchers of color supporting other female researchers of color cannot be emphasized enough. For example, although the number of female doctoral students has increased in research and clinical work in the field of psychology, in 2017, considerable inequalities still existed between men and women, especially with regard to postgraduate pay.[8] On average, women in academia remain underrepresented and take longer than men to attain tenure.[9] In recent years, research on representation has caused many departments to rethink how the identities of staff and faculty members influence the experiences of their students.[10] Having a shared identity with a mentor can increase psychosocial and professional support, educational resources, and future job satisfaction.[11] Female mentors of underrepresented ethnic, racial, and religious backgrounds can help students cultivate essential skills that their training fails to teach them, such as navigating institutional barriers and negotiating pay.[12]

Gaining practical experience outside the classroom enables underrepresented individuals to be more competitive candidates for opportunities at large organizations and prestigious institutions, such as the World Health Organization, US Centers for Disease Control and Prevention, or the US National Institutes of Health.[13] The status associated with working in such organizations or attending certain universities, while not necessarily important, may further cement the reputability of the public health field in the eyes of immigrant parents. Additionally, mentors who serve a particular underrepresented group further promote the possibility that children of immigrants can use a public health career to serve underrepresented groups both in the United States and abroad.

THE E-MENTORING PROCESS

As research scholars at the Ronin Institute for Independent Scholarship, the scholars described in this article volunteer as mentors, providing supplemental support to student research interns from traditional academic settings. The students were recruited via notices sent to associations, such as American Muslim Health Professionals, and a professor teaching a health, policy, and management field experience internship course. The lead author screened and interviewed all potential mentees, including those the professor recommended as good possible matches. The mentors teach their students to conduct research according to Ronin's values of truth and empathy.[14] Ronin's "pay it forward" principle aligns with the authors' religious, moral, and ethical beliefs in the importance of service.[15]

The mentors strive to encourage and support their students using a range of communication methods, including email, phone, text messaging, Zoom video conferences, and other chat apps, providing flexibility to meet students where they are the most comfortable and have the best access. The mentors and students collaborated by sharing data via Microsoft Office and Google Workspace. By empowering their students with options, choices, and openness to offer professional critiques in a nonjudgmental environment, the mentors aimed to treat their students as colleagues. This approach created an ideal, albeit remote, research setting that enabled their students to flourish as junior scholars.

STUDENT PROFILES

This article describes the informal e-mentoring experiences of volunteer mentors at the Ronin Institute, both female independent researchers of color. The lead author

mentored 8 female research students, 2 in person and 6 online. The students were from different racial and ethnic backgrounds, offering a range of e-mentoring case studies during the pandemic. These independent profiles should not be assumed to represent any of the students' 6 universities, but they are a sample of what can be achieved by invested e-mentors. By sharing these anecdotal experiences, the authors call on all researchers of underrepresented groups to consider e-mentoring to support underrepresented student researchers and diversify the public health research field.

Multiethnic, Muslim American Doctoral Student in Houston

In addition to working with her doctoral advisor, a multiethnic, multilingual Muslim American woman attending a postgraduate program in Houston, a city that celebrates and encourages diversity,[16] sought out the opportunity to work with 2 female mentors of different backgrounds. Her mentors offered personal anecdotes about their experiences in higher education and the workforce, provided opportunities for publishing, and supported her on various projects during the pandemic. As an early career researcher, the student's experience having female mentors was invaluable.[17]

First-Generation Mexican American Undergraduate Student

A Mexican American young woman witnessed firsthand the lack of trust her parents held toward public health officials. Faced with indifference from monolingual health officials and administration, her Spanish-speaking immigrant parents relied on themselves and their children to attain health services in Rhode Island. The role of children helping to access health services is common among immigrant families.[18] Language barriers can prevent non-English-speaking immigrants from accessing crucial public health messages, particularly about COVID-19.[19]

Seeing how health disparities affect racially marginalized populations fueled the student's desire to obtain a global health research opportunity.[20] This student pursued the mentorship opportunity to gain global health research experience as part of a mandatory 3-credit course at her home institution. Her mentor served as an example of how someone the student could relate to can provide the most impactful guidance.

Black Medical Student in the South

A Black woman, originally from the Northwest and living in the South, entered the research field while preparing for medical school. Working in an affluent hospital with poverty-stricken satellite sites, she encountered patient populations on both ends of the socioeconomic spectrum. During her tenure, she witnessed interactions with patients and various medical professionals and noticed the differences in patient care due to health insurance plans and patients' racial backgrounds. Such experiences motivated the student to make an impact on the health of underserved populations.

This medical student pursued a research internship to help bring accountability and trust to the research and the medical profession through ethical practices. She is proud to be learning and applying open science principles from her mentor, as they align with her desire to create more trustworthy, transparent, and accountable research projects. This student is motivated to be a voice of change and justice while completing school, rather than waiting or aspiring to do so in the future. Her mentor provided the tools, guidance, and even publication opportunities to fuel her passions immediately.

Muslim American Medical Student

A multiracial Muslim American woman wanted to become a doctor at a young age. She was further encouraged to enter medicine in later years due to the shortage of female Muslim doctors. The opportunity to study medicine in a Muslim country enabled her to work on her Arabic fluency and study with Muslims and give back whenever she could.

This medical student sought a research internship during the lockdown. She knew that low representation of Muslims in data or research can be detrimental and can lead to erroneous overgeneralizations.[21] Fortunate to have impactful female mentors, she wishes to mentor others and contribute to the promotion of future mentoring.[4]

The student plans to implement a near-peer mentoring program like those in the United States, in which clinical medical students mentor students in the basic sciences. Near-peer mentoring has proven social, professional, and emotional benefits primarily in the "improvement in problem-solving skills, responsibility, and communication skills."[22] With her research knowledge on the health disparities of marginalized populations, she hopes to impart on her peers the importance of treating patients with empathy. She sees the profession of medicine as a service and believes if doctors work with the concept of service in mind, patient trust is inevitable. She also hopes to colead a public health open data science project for fellow female medical students.

First-Generation Bangladeshi Muslim Public Health Student

A first-generation Bangladeshi Muslim woman admits that having a mentor earlier would have enabled her to focus on public health more confidently earlier in her career. She split her time studying public health and biology, working as a medical scribe, and even applying to medical schools, rather than focusing her talents and energy on pursuing public health internships. She did so to appease her parents, who did not feel that public health careers were as prestigious as those in the medical field.

Unfortunately, public health has long been an underrepresented field of study in the South Asian diaspora.[23] This lack of interest in public health has proved detrimental to public health projects in many South Asian countries, which have been unable to produce and keep a substantial workforce to support much-needed public health infrastructure.

Mentorship is one way to increase interest and boost respect in the field of public health. When this student's parents saw a successful peer of their own age, background, and financial standing advising their daughter on public health degrees, they could visualize their child's future in a field they were otherwise unfamiliar with. Her mentor was able to show the student's immigrant parents that a career based on serving a larger population through the public health field is just as worthy as helping individuals in a clinical setting. This student and her family are grateful to her mentor for helping to normalize her career choice.

American-Born, Nigerian-Raised, Muslim Graduate Student

An American-born, Nigerian-raised, Muslim woman pursuing her second master's degree full time wanted an e-mentoring opportunity to pursue her interest in Muslim health and grant writing. For this student, the remote relationship with a mentor abroad was challenging and frustrating, but it also provided some opportunities. In addition to being in lockdown, the difficulties of acclimating to shared documents and new technology, scheduling across time zones, and adhering to strict deadlines were stressful for this student who is also a mother of 4 children. Having a mentor with similar interests who offered her motivation, kindness, and guidance, gave her the support she needed to pursue her interest in and commitment to researching Muslim health. Mentors who are transparent about the difficulties of balancing work and motherhood, especially during lockdown, can provide students with examples of how to manage the challenges. Although the student wanted to give up at times, she continued because she felt encouraged by her mentor's support.

Schedule and Structure

For the mentor of these students, working with 5 active students and 2 inactive students (not currently working on new projects) required approximately 22 hours a month for individual student meetings, which did not include additional time for exchanging emails and texts or for reviewing the students' work. While it may seem like a considerable time investment, the mentor gained inspiration with each student interaction. She regularly advised her students to update their resumes with each new skill acquired or accomplishment achieved. For example, 1 student submitted a preprint to her university for a competition and won a cash prize.[24,25] Every meeting included time for the student's own agenda items. Communication is critical for a rewarding e-mentoring relationship, and a systematic method can assure that e-mentoring increases a researcher's capacity rather than create a burden.

During the active semesters of e-mentoring, 3 students worked on average 8 to 12 hours a week, and 3 students worked on average 3 to 7 hours a week. All students met with their mentor for an hour-long weekly meeting via phone, Zoom, or text. While they also had access to the mentor via text and email, the preferred method of communication was in-line comments within Google Docs. While trying to meet deadlines, students could request an additional 15- to 60-minute phone call, which rarely happened. Additional time was scheduled for the student to meet the mentor in Google Docs to work online simultaneously. During the inactive semester, the 2 students not working on new projects met with the mentor 1 hour per month and communicated via email and text for progress updates on outstanding papers or grants.

The e-mentoring schedule and structure were more effective, efficient, and mutually beneficial for the research completed by students working for credit. The lead author established additional e-mentoring policies to ensure all research projects continued according to their projected timelines while protecting the confidentiality of her projects.[26]

Measurable Student Outcomes

During the 2021 spring semester, 6 of the student authors working with the lead author were volunteers and 2 worked for school credit. One student withdrew during the semester, and the remaining 6 confirmed their continuation into the following 2 semesters. By the end of the internship, 3 students will have their second research paper published as a preprint and submitted to a peer-reviewed journal, and all 6 will have been acknowledged in 1 to 3 additional papers for their technical editing or research assistance—skills acquired through this research internship. One student worked exclusively on a $230,000 grant application, the result of which is currently pending.

Two students exceeded their mentor's expectations. The student working for credit will have coauthored 3 papers. She also spent 6 weeks assisting the mentor submit 3 grant applications, ranging in amounts from $20,000 to $230,000 (all currently pending), and helped research and write 7 grant proposals, pitches, or presentations. Another student is cofounder and colead to most of the lead author's research projects and programs. By the end of the semester, she will have coauthored 10 papers, 1 of which she is the primary author and 1 of which she is the only coauthor alongside the mentor. She was also acknowledged for technical editing on 3 papers; working on or submitting 14 grant applications, proposals, pitches, or presentations; and being involved with multiple side projects such as developing multiple open data publications and project websites.

During the spring 2021 semester, 3 additional students joined the lead mentor's research team. Within the first month, 2 withdrew; the third was another undergraduate student who received credit for participating, making a total of 8 students. Mid-semester, 1 student withdrew. Two students will continue working with the research team for credit, and 5 will volunteer in the summer and fall semesters. If grants become funded, the mentor intends to hire the students.

A lesson learned during this past year is that student researchers who work for credit will be prioritized over noncredit students because they had 100% weekly meeting compliance and more accountability to the agreed upon semester learning objectives, goals, and timeline. This success has led to an internal policy change for the lead author. From this point forward, student researchers who work for credit will be prioritized over noncredit students.

Public Health E-Mentoring Beyond the Pandemic

E-mentoring offers numerous benefits such as cost-effectiveness and appropriate matching because mentors are not limited by geographical location.[27,28] Some of the challenges to e-mentoring, however, include the loss of nonverbal communication cues that may affect relationship building, internet connectivity problems, and scheduling conflicts across different time zones. However, online doctoral students at the dissertation stage who were mentored remotely during the pandemic were able to meet all of their goals and reported a high level of satisfaction and positive experiences.[29] Adaptability by both parties proved essential.

Mentoring training materials have increased effectiveness and may be beneficial for those new to e-mentoring or mentoring in general.[30,31] The lead mentor drew from her experience e-mentoring students for over 15 years. However, because this was the first year of e-mentoring student researchers, her research team is currently documenting and evaluating best practices. A follow-up article, currently under review in a peer-reviewed journal,[26] describes how to design a semester-long research plan with learning objectives, timelines, and milestones and how to best use Google Workspace for an effective e-mentoring experience. The article also shares tips for potential mentors and mentees. Additional documents being drafted by the research team include guidance on conducting a multiauthor literature review, applying for grants as an independent researcher, acknowledgment and authorship, and recruiting students for school credit.

The goal of these research mentoring relationships was to train students as capable research colleagues and coauthors, regardless of their degree level (bachelor's, master's, doctorate, or medical). Acknowledgment or authorship was not guaranteed to any student in any project, as their efforts, time, and intellectual contribution to a manuscript must be justified. Students anticipate gaining new professional skills when signing their initial internship agreement forms. This case study demonstrates that an e-mentoring research experience can be rewarding. As a group, these authors added to the diversity of the public health workforce, which they are committed to expanding.

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