Title
Preparing Health Professions Students to Address Medical Misinformation and Vaccine Hesitancy

Budget
UB Clinical Competency (Simulation) Center ($4,000)

Name, title, and institution of project leader and other key personnel

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Research Narrative

Section I. What is your research question?

Vaccine hesitancy was identified as a top 10 threat to public health by the WHO in 2019.[1] It is driven by popular myths/misconceptions, often relating to the safety/efficacy of vaccination and the seriousness of the diseases they prevent.[2-6] In today's information age, both valid and misleading information about vaccines are readily available on the internet. Social networks can influence perspectives on vaccination,[7] and some misplace trust in non-healthcare professionals, those estranged from their medical profession, and non-vetted sources of information.[8]

Achieving high vaccination rates is contingent on vaccine acceptance, which is contingent on how a person and society perceive the risks and benefits of vaccination.[9] Healthcare professionals will encounter individuals who are vaccine hesitant. A trusting relationship, strong communication skills, and an understanding of how to address concerns, are keys to improving vaccine acceptance. There is limited evidence supporting any one strategy for working with those who are vaccine hesitant.[10] However, because patients place high levels of trust in healthcare professionals, the message they send influences the decision to vaccinate.[5,8,11] An interprofessional approach to addressing vaccine hesitancy not only provides patients with multiple perspectives but also increases the number of times the healthcare system touches on this issue.

Health professions students can take an active role in addressing vaccine hesitancy and misinformation through community outreach and clinical experiences. To equip students to influence change, they must understand the prevalence of medical misinformation, theories to understand the current stage of change,[12] and strategies to communicate health information and dispel misinformation.

Our research question is: can an interprofessional, instructional design strategy prepare students of various health professions programs to effectively address medical misinformation and vaccine hesitancy? Student competence will be measured during live simulations using standardized actors. Students will complete simulations in pairs with a partner from a different health professions program. Our idea is innovative in that it combines live simulation to assess competency attainment along with asynchronous, online learning and virtual simulation as an instructional model to prepare for said simulation. Students will have an opportunity to learn about, with, and from students of other health professions programs during this activity, which is critical to interprofessional education. During the preparation for live simulation and during the interprofessional debriefing, students will have an opportunity to explore how they can provide quality patient care using an interprofessional, team-based approach.

Our long-term goal is to develop a curricular resource that we can share across the academy to assist with preparing students to effectively address medical misinformation and vaccine hesitancy. Accordingly, the objective of this proposal is to determine if our educational program prepares students to meet a minimal level of competency in addressing medical misinformation and vaccine hesitancy. Secondarily, we seek to determine if our educational program improves student's confidence (i.e., self-efficacy) in addressing these issues. The central hypothesis of this proposal is that our educational program will prepare a high percentage (>80%) of students to meet a minimal level of competence in addressing medical misinformation and vaccine hesitancy. We will test this hypothesis through the following two specific aims:

1. Determine the frequency of students achieving competency, using a standardized rubric, during simulation
2. Compare changes in student's self-assessed abilities and confidence in addressing medical misinformation and vaccine hesitancy as a measure of self-efficacy

Section II. How will you test your idea?

Our hybrid instructional design strategy includes: (1) asynchronous online modules; (2) virtual simulation; and (3) in-person simulation. The asynchronous online learning consists of short, pre-recorded modules summarizing: (1) the "infodemic" and misinformation surrounding the COVID-19 pandemic and vaccination; (2) vaccine hesitancy; (3) the value of an interprofessional approach to combating medical misinformation; and (4) evidence-based communication practices informed by the Transtheoretical Model, e.g., motivational interviewing. Two virtual simulation scenarios will allow participants to apply knowledge and practice communication strategies introduced in asynchronous online learning. Participants will receive feedback in real time and complete guided self-reflection questions. Last, students will complete three in-person, simulation scenarios with standardized actors portraying individuals with different levels of willingness to engage in education about vaccines. The simulation scenarios allow students to implement communication strategies introduced in the asynchronous online learning and reinforced during the virtual simulations. Participants will work in pairs with an individual from a different health professions program than their own (e.g., nursing, pharmacy, or physician assistant) and complete all three scenarios, followed by a structured, interprofessional debriefing session. Students will be assessed objectively on their performance during the in-person simulations using a standardized rubric. Students will also complete a pre/post-experience survey and a post-program evaluation.

A pilot program, supported through a grant from the Association of American Medical Colleges (AAMC), was launched during the fall 2022 semester and enrolled 51 students across four health professions schools (medicine, nursing, pharmacy, and public health). Participants reported an increase in self-assessed abilities from pre-to-post, from 2.7 (fair-to-good) to 4 (very good) (**Table 1**). Participants "agreed" (mean=4.3) that the programmatic components (i.e., asynchronous online modules, virtual simulations, and in-person simulations) advanced their foundational knowledge and skills. The overall program evaluation revealed that participants "agreed" (mean=4.4) that the program was effective and important (**Table 2**). Our pilot data are reassuring that the program met the needs of a diverse group of health profession students. The funding from this proposal will allow us to investigate the effectiveness of our educational program in a larger cohort of students, which will also include a rigorous, objective assessment of competency attainment.

The requested funding ($4,000) will offset the expense with using our university's simulation center. Participating programs are charged a fee based on the amount of resources (e.g., time, standardized actors, etc.) used. Our goal is to recruit 240 students (~120 pharmacy students) to participate in the program. Students enrolled in the activity will gain access to the asynchronous, online modules and virtual simulations during the Fall 2023 semester. The in-person simulations will occur during either the Fall 2023 or Spring 2024 semester, based on simulation center availability.

Data generated from this study will include those data required to evaluate the specific aims, including frequency of student competency attainment, self-efficacy, and standard programmatic evaluation data (i.e., how the students rated the overall program). Assuming the project is successful, next steps will include disseminating our findings along with the

educational materials (modules, virtual simulations, in-person simulation scenarios, rubric, pre/post surveys) through a creative commons license.

With successful completion of the project, we will inform the academy and beyond on whether this interprofessional, instructional design strategy was effective in preparing students to address medical misinformation and vaccine hesitancy. These data will be helpful to not only Schools/Colleges of Pharmacy but across various health professions programs interested in implementing effective teaching/learning approaches surrounding this topic. Additionally, involving multiple health professions (including student prescribers) will expand interprofessional education.

References

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Appendix

Table 1. Comparison of Retrospective Pre- and Post-Experience Self-Assessed Skills by Student Participants (N=51)

Item	Pre M (SD)[a]	Post M (SD)[a]	Diff M (SD)[b]	p	Cohen's d	Magnitude of Effect[c]
Before/after participating in this experience, my ability to do the following skill was:						
Ask an individual permission to discuss vaccines	2.7 (1.0)	4.0 (0.8)	1.4 (0.9)	<.001	0.9	Large
Ask an individual to share their concerns related to vaccines	3.0 (0.9)	4.2 (0.7)	1.2 (1.0)	<.001	1	Large
Express empathy in relation to an individual's concerns about vaccination	3.0 (1.0)	4.2 (0.7)	1.2 (0.9)	<.001	0.9	Large
Assess an individual's level of resistance to vaccination	2.8 (1.0)	3.9 (0.8)	1.1 (0.9)	<.001	0.9	Large
Respond applicably to an individual's level of resistance to vaccination	2.3 (0.8)	3.8 (0.8)	1.5 (0.9)	<.001	0.9	Large
Incorporate social norms into a conversation about vaccination	2.6 (1.0)	3.9 (0.8)	1.2 (1.0)	<.001	1	Large
Engage in shared decision making with an individual	2.8 (1.0)	3.9 (0.8)	1.1 (0.8)	<.001	0.8	Medium
Affirm an individual's decision about vaccination	2.7 (1.0)	3.9 (0.7)	1.2 (0.9)	<.001	0.9	Large
Total Scale Score (pre α=0.90, post α=0.92)	2.7 (0.7)	4.0 (0.6)	1.2 (0.7)	<.001	0.7	Medium

[a] The scale scores are based on a five-point rating system and are the mean of the responses to the items; 1=poor, 2=fair, 3=good, 4=very good, 5=excellent

[b] Paired sample t-test was used to determine significance, defined as $p<.05$ between pre and post results.

[c] $d<0.2$ is considered a very small effect size; d between 0.2 and 0.5 is considered small, d between 0.5 and 0.8 is considered medium, and $d>0.8$ is considered large

Table 2. Comparison of Ratings of Individual Components and Overall Educational Experience Between Professions (N=51)

Item	Total M (SD)[a]	Medicine M (SD)[a,b]	Nursing M (SD)[a,b]	Pharmacy M (SD)[a,b]	Public Health M (SD)[a,b]	p[c]
The asynchronous, online modules:						
Advanced my foundational knowledge related to this topic	4.2 (0.6)	4.2 (0.7)	4.1 (0.3)	4.1 (0.8)	4.4 (0.5)	.39
Prepared me for the virtual simulations	4.2 (0.6)	4.0 (0.7)	4.1 (0.5)	4.1 (0.6)	4.5 (0.5)	.15
Prepared me for the in-person simulation	4.2 (0.7)	4.1 (0.8)	4.2 (0.6)	4.0 (0.9)	4.4 (0.5)	.31
The virtual simulations:						
Advanced my foundational knowledge related to this topic	4.2 (0.7)	3.8 (0.6)	4.2 (0.6)	4.0 (0.8)	4.6 (0.5)	.007
Advanced my skills related to this topic	4.2 (0.7)	3.9 (0.7)	4.2 (0.9)	4.1 (0.6)	4.7 (0.5)	.03
Prepared me for the in-person simulation	4.1 (0.8)	3.9 (0.7)	4.3 (0.6)	3.8 (0.8)	4.5 (0.9)	.10
The in-person simulation:						
Advanced my skills related to this topic	4.6 (0.6)	4.6 (0.7)	4.6 (0.5)	4.5 (0.5)	4.7 (0.6)	.87
Prepared me to apply learned knowledge and skills to patient care	4.7 (0.6)	4.7 (0.7)	4.6 (0.5)	4.5 (0.7)	4.9 (0.4)	.46
Large group debriefing helped me further develop my ability to use the skills	4.5 (0.7)	4.3 (0.8)	4.5 (0.7)	4.5 (0.7)	4.8 (0.6)	.25
Through participation in the program in its entirety:						
I gained new knowledge and insights about medical misinformation	4.6 (0.6)	4.3 (0.9)	4.4 (0.5)	4.5 (0.5)	4.9 (0.4)	.13
I gained new knowledge and insights about vaccine hesitancy	4.6 (0.6)	4.3 (0.9)	4.4 (0.5)	4.5 (0.5)	4.9 (0.4)	.13
Total Scale Score (α=0.90)	4.3 (0.5)	4.2 (0.5)	4.3 (0.4)	4.2 (0.5)	4.7 (0.3)	.03
This program:						
Was an effective learning experience	4.5 (0.6)	4.3 (0.9)	4.5 (0.5)	4.5 (0.5)	4.9 (0.4)	.07
Was important to my professional development	4.5 (0.7)	4.3 (0.9)	4.4 (0.7)	4.5 (0.5)	4.6 (0.6)	.81
Was relevant to my profession	4.6 (0.6)	4.6 (0.9)	4.5 (0.5)	4.5 (0.5)	4.6 (0.5)	.94
Was well organized	4.7 (0.5)	4.7 (0.5)	4.7 (0.5)	4.5 (0.5)	4.7 (0.5)	.82
Should be required for the degree program in which I am enrolled	4.1 (1.0)	4.2 (1.2)	4.1 (1.0)	3.9 (1.2)	4.2 (0.7)	.81
Should be required for all health professions students	4.1 (1.1)	4.1 (1.2)	4.1 (1.2)	3.6 (1.2)	4.5 (0.7)	.21
Total Scale Score (α=0.89)	4.4 (0.6)	4.3 (0.9)	4.4 (0.6)	4.3 (0.6)	4.6 (0.6)	.58

[a] The scale scores are based on a five-point rating system and are the mean of the responses to the items; 1=strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; 5=strongly agree

[b] For cohort, n=12 for Medicine; n=12 for Nursing; n=13 for Pharmacy; n=14 for Public Health

[c] One-way analysis of variance was used to determine significance, defined as $p<.05$ between professions.