EDUCATIONAL CASE REPORT

The Impact of the Transition to Virtual Environments on Medical Students Mentoring At-Risk Youth

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Youth who are mentored experience improved social, emotional, behavioral, and academic development [1]. Youth who are considered "at-risk" or raised in at-risk environments specifically benefit from pro-social role models [2]. Benefits are not restricted to the mentee; mentors themselves gain insight and develop skills through their involvement in such programs [3]. Furthermore, mentoring has been incorporated into medical training to enhance skill development in physicians [3, 4].

The Advocacy Mentorship Initiative (AMI) is a unique health advocacy training program for undergraduate medical students at the University of Toronto. AMI aims to provide medical students with the opportunity to develop skills associated with various CanMEDS roles—a framework which outlines core competencies deemed essential to the practice of medicine—by utilizing an innovative cascading mentorship model, with medical students providing mentorship to at-risk youth, while in turn being mentored by psychiatry residents [3].

With the onset of COVID-19, various mentorship programs were required to transition to virtual environments [5–8]. AMI also transitioned to include virtual mentoring, which involved the use of digital platforms, inclusive of text-based exchanges, audio or video calls, or a combination of these. There is a paucity of research examining the impacts of virtual mentorship upon medical student mentors. Here we aim to examine (1) the impact of virtual mentoring on medical student mentors in AMI; and (2) whether AMI continued to meet educational objectives despite the utilization of virtual mentoring.

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Program Description

The AMI program was developed at the University of Toronto in 2014 by the primary author as a means to provide pre-clerkship medical students with advanced training in child development and advocacy-related skills. Medical students register as volunteers with Youth Assisting Youth, a community-based, non-denominational, and non-profit organization, which matches them with youth aged 6–15 deemed at-risk (e.g., experiencing social, behavioral, or emotional challenges). Medical students serve as mentors to their mentees for approximately 1 year and can remain mentors after completion of the program. Utilizing a cascading mentorship approach [3], the medical students are divided into groups with four to five medical students receiving teaching and supervision from a pair of psychiatry residents, with whom they meet monthly to discuss progress in the relationship with their assigned youth. The entire cohort of medical student mentors and residents meet on a monthly basis for large group supervision and teaching on topics related to child development and health advocacy, overseen by the primary author, a dually qualified Child and Adolescent and Forensic Psychiatrist.

From 2014 to 2020, all components of the program were conducted in-person. Due to the COVID-19 pandemic, the program was transitioned to include virtual environments in 2020. The monthly large group teaching sessions were transitioned to a virtual teaching environment (VTE) utilizing online video teleconferencing (Zoom™). Medical students and their resident mentors were also encouraged to schedule smaller group sessions virtually in order to adhere to social distancing guidelines.

Participants

Ethics approval was obtained from the University of Toronto Research Ethics Board. Medical students were recruited to the program in January 2021 during their

first year of undergraduate medical education (of a 4-year degree program) at the University of Toronto and were enrolled in the study in March 2021. The match process between medical student mentors and youth, as facilitated by Youth Assisting Youth, a non-profit community organization, commenced in April 2021. All recruitment and match processes occurred virtually. Structured teaching and group sessions occurred on a monthly basis during the students' second year of medical training (from September 2021 to May 2022). To be included in the study, participants needed to provide informed written consent.

Data Collection

An administrative assistant assigned a unique and anonymous identification code to each participant, to which the study investigators remained blinded. Electronic questionnaires were administered to participants before they were matched to their mentees (pre-exposure) and upon completion of the program (post-exposure). The questionnaires were composed of a combination of quantitative and qualitative items and solicited information on participant demographics, as well as self-rated knowledge regarding various topics (rated on a 5-point Likert scale). The pre-exposure questionnaire included open-ended short answer questions regarding participants' learning objectives and goals for participation in the program, while the post-exposure questionnaire included open-ended questions regarding perceived benefits of participation in the program, the impact of participation on future career trajectories, and the use of virtual environments.

Data Analysis

Likert scale items on the questionnaires were scored from 1 to 5 (1 = poor, 5 = excellent). Paired *t*-tests were used to compare the mean differences between pre- and post-exposure data. Thematic content analysis was used for qualitative data obtained through open-ended questionnaire responses. Following the approach described by Taylor-Powell and Renner given its focus on program evaluation [9], the data were organized into emergent categories to develop a coding scheme by the authors MP and NS. Categories were constructed until no new themes or subcategories emerged; the responses were then reviewed again with the completed coding scheme and data were sorted into themes relevant to the focus of the study using the identified codes by MP and NS. Comparisons between results previously published from cohorts participating in AMI between 2017 and 2020 were also completed [3].

Outcomes

Twenty-six mentors were enrolled in the program during the 2021–2022 cycle and 24 mentors participated in the study by completing at least one questionnaire (pre- or post-exposure), resulting in a response rate of 92.3%. Twenty-two (91.7%), 14 (58.3%), and 12 (50.0%) mentors of the 24 mentor participants completed the pre-exposure, post-exposure, and both questionnaires, respectively. Eighteen of the 24 participants were female (75.0%). The mean age of mentors was 25.12 years (SD 1.99) and the mean age of mentees was 12.46 years (SD 3.23). The mean duration of the matches was 7.93 months (SD 2.40). The mean number of mentor–mentee meetings per month was 3.14 (SD 0.95).

Communication Methods

Of the 14 mentors who completed the post-exposure questionnaire, 13 (92.9%) reported having interacted with their mentees primarily via virtual platforms with some in-person meetings. One (7.1%) reported meeting with their mentee in-person only and none reported having connected with their mentee exclusively via virtual means. The 13 mentors who interacted with their mentees primarily by virtual means reported the utilization of a variety of digital communication forms (see Fig. 1), with the most common being video conferencing (92.3%) followed by online chat (38.5%) and telephone/audio calls (15.4%). Five (38.5%) reported the use of more than one method of virtual communication. Regarding meetings with their resident mentors, 10 (71.4%) participants reported having interacted exclusively via virtual means, while the remainder indicated a hybrid approach.

Self-reported Knowledge

Participants' self-rated level of understanding across five domains was compared between pre- and post-exposure questionnaires. Among the 12 respondents who completed both pre- and post-exposure questionnaires, paired *t*-tests determined significant large increases in four of the five domains: child development from 2.3 (SD 0.8) to 3.2 (SD 0.7) ($p = 0.005$, $d = 1.02$); attachment theory from 2.4 (SD 1.0) to 3.3 (SD 0.8) ($p = 0.010$, $d = 0.89$); chronic illness in youth from 1.6 (SD 0.7) to 2.8 (SD 0.9) ($p = 0.001$, $d = 1.24$); and autism and other developmental disabilities from 2.4 (SD 1.2) to 3.3 (SD 1.1) ($p = 0.010$, $d = 0.89$). A medium non-significant increase was noted in the social determinants of health from 3.3 (SD 0.9) to 3.9 (SD 0.3) ($p = 0.067$, $d = 0.62$).
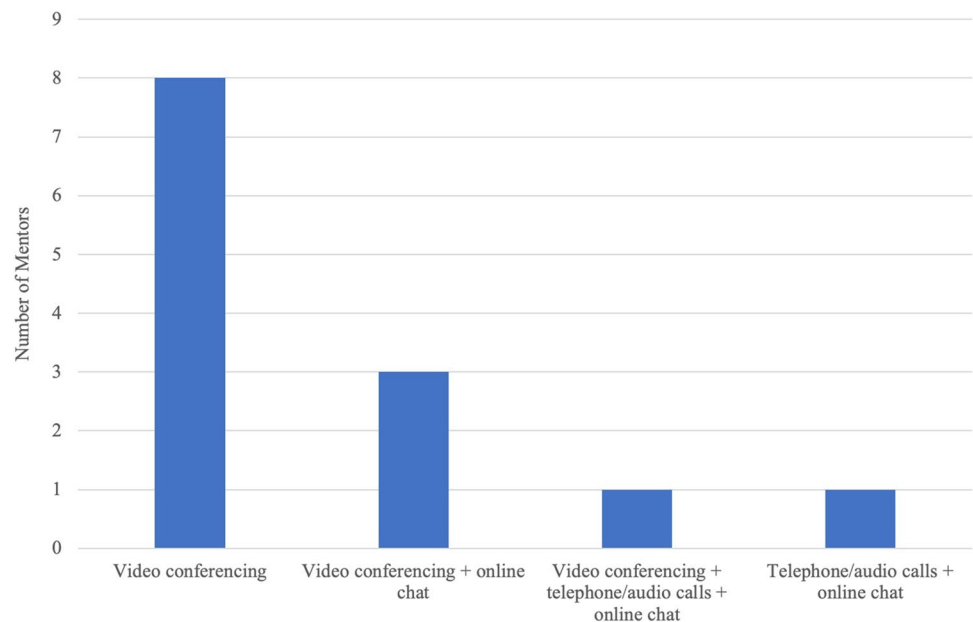
Perceived Skill Development

When asked whether they had gained new skills through participation in the program, 11 of 14 (78.6%) participants responded affirmatively while the remaining 3 (21.0%) reported they were unsure. Four themes emerged and are summarized in Table 1. Skills relating to communication with youth were most commonly identified; other themes involved building rapport with youth, creating safe and supporting spaces for youth, and relating to youth perspectives.

Benefits of Participation

In the post-exposure questionnaire, 12 of 14 (85.7%) participants listed benefits related to their involvement in the program. Four themes emerged, with the main benefit identified being building a relationship with the mentee. Other themes that emerged included connecting with resident mentors; learning about child development, child psychiatry, and communicating with youth; and exploring career interests.

Twelve of 14 (85.7%) participants also listed benefits from engaging with their resident mentors. From these responses, three themes were identified. The most common was receiving general advice, support, and feedback from residents on interactions with mentees. Other themes included receiving career mentorship and advice, as well as advice on handling difficult situations (see Table 1).

Eight of 14 (57.1%) participants indicated that they believed their experience as a mentor in the AMI program would influence their career trajectory or future practice.

When asked to elaborate, two themes emerged from the textual responses provided. The most common theme was an increased interest in working with youth, followed by an increased interest in psychiatry (see Table 1).

Impact of the Transition to Virtual Environments

Eleven of 14 (78.6%) respondents described their perceived impact of COVID-19 and the associated transition to virtual environments upon their participation in the program. From these responses, five themes emerged, which were categorized as either beneficial or challenging. The most common challenge identified by medical student mentors was difficulty establishing rapport with their mentees when meeting virtually. Several also noted decreased engagement on the part of their mentees, which they attributed to virtual meeting fatigue as mentees also completed schooling over online platforms during the pandemic. Less common challenges described were delays in the matching process and mentees experiencing difficulties with virtual technologies. The increased convenience of being able to meet with mentees virtually in terms of scheduling and reducing travel burden was identified as a benefit. Table 1 lists these themes and representative quotations.

Post-program Engagement

Twelve (85.7%) of the mentors reported an intention to stay in touch with their mentees beyond their completion of AMI. Among these participants, 5 (41.7%) planned to employ a hybrid approach, 4 (33.3%) to continue meeting in-person only, and 3 (25.0%) to continue communicating

Table 1 Perceived skill development, benefits, influence on future career plans, and impact of the COVID-19 pandemic associated with participation in the Advocacy Mentorship Initiative program as described by medical student mentors

Key themes	Number	Representative quotations
Perceived skill development	$n = 10$	
Communicating with youth	7 (70.0%)	"how to converse with children to open more dialogue from their end"
Building rapport with youth	4 (40.0%)	"building rapport with youth (through exploring their interests together and having multiple visits to get familiar)"
Creating safe and supportive spaces for youth	3 (30.0%)	"How to foster a comfortable, safe environment for the youth mentee"
Relating to youth perspectives	2 (20.0%)	"ability to relate to children and understanding what concerns an elementary student may have"
Benefits of participation	$n = 12$	
Building a relationship with mentee	8 (66.7%)	"Developing a relationship with my mentee"
Connecting with resident mentors	3 (25.0%)	"Building a relationship with my supervising resident"
Learning about child development, child psychiatry, and communicating with youth	3 (25.0%)	"the opportunity to learn important skills and lessons about child development and communicating with youth"
Exploring career interests	1 (8.3%)	"Getting more exposure to psychiatry as a specialty and regularly interacting current residents was very beneficial in exploring my career interests"
Benefits of resident mentors	$n = 12$	
General advice, support, and feedback about interactions with mentee	9 (75.0%)	"consistently provided me with helpful advice and feedback that I was able to use to enhance my relationship with my mentee"
Career mentorship and advice	4 (33.3%)	"providing advice about clerkship and residency"
Advice on handling difficult situations	3 (25.0%)	"our discussions about handling difficult situations/conversations with our mentees were very valuable"
Influence on future career plans	$n = 6$	
Increased interest in working with youth	5 (83.3%)	"This program solidified my interest in working with youth in my future practice. I thoroughly enjoyed all the lessons that were taught throughout the AMI program from the resident mentors, as well as the opportunity to form a strong connection with youth. I developed a strong passion for helping and empowering youth to overcome challenges, and I would like to carry this passion into my future practice."
Increased interest in psychiatry	2 (33.3%)	"Increased my interest in psychiatry as a specialty, or considering ways to incorporate psychiatry into my future practice."
Impact of the COVID-19 pandemic	$n = 11$	
Difficulty establishing rapport when meeting virtually	8 (72.7%)	"it was challenging because my mentee would not open up while we spoke virtually"
Decreased engagement due to virtual meeting fatigue	5 (45.5%)	"Virtual lectures compounded from school and outside were tiring"
Convenience of being able to meet virtually	4 (36.4%)	"Ability to play games online together was beneficial for scheduling during busy weeks"
Delays in matching process	2 (18.2%)	"I was not matched until December and then was not officially able to meet the mentee until January"
Difficulty with technology	1 (9.1%)	"She was very young and struggled with technology, as did her guardian"

exclusively via virtual means. The most commonly selected form of ongoing virtual communication (among the 8 participants planning to continue connecting in this manner) was text messaging (66.6%), followed by Facebook™ or other social media (16.6%), video conferencing (16.6%), and telephone/audio calls (8.3%).

Discussion

Mentoring between medical students and youth raised in at-risk environments was achievable with the use of virtual technologies. Mentors reported that it was possible to build a relationship with a mentee utilizing virtual

technologies, while also benefiting from mentoring and teaching that was completed utilizing VTEs. A specific benefit of using virtual technologies was the ease of contact made between mentor and mentee due to an absence of travel time required to connect in person. Mentoring programs for youth may thus be expanded to include populations that are geographically difficult to reach through such technologies. Furthermore, cascading mentorship models [3] may also potentially be expanded by the use of VTEs.

Overall, medical students enrolled in this mentoring initiative did not report substantial differences in perceived knowledge acquisition when compared to self-reported changes in knowledge among participants who completed AMI prior to the pandemic [3]. Both studies have indicated increased scores on self-reported knowledge levels pertaining to all domains (child development, attachment theory, chronic illness in youth, autism and other developmental disabilities, and the social determinants of health); please refer to Patel et al. [3] for specific pre-pandemic results.

Experiences associated with "Zoom™ fatigue" in the mentees and difficulties building rapport were noted; however, medical students also reported similar beneficial outcomes from the program as per previous iterations that were conducted in-person [3]. Improving communication skills was consistently one of the most common goals, and participants continued to identify communication and relationship-building with youth as the top skills gained. Medical students also continued to report an increased interest in pursuing psychiatry as a career despite connecting virtually with residents. As such, expansion of programs such as AMI to other medical schools may increase interest in the pursuit of careers in psychiatry further, particularly in underserviced areas or in schools where there is a paucity of such opportunities.

Many mentors planned to remain in contact with their mentees following completion of the program, the majority of which intended to continue to use virtual technologies. The implications of the use of various forms of social media in mentoring relations should continue to be explored, particularly given the legal implications of social media use by youth.

Various limitations were associated with this study: although the overall response rate was high, fewer than half the medical student mentors completed both the pre- and post-exposure questionnaires resulting in a relatively small sample size and uncertain internal validity. External validity is also uncertain given it was conducted within one institution. Furthermore, there is a risk of self-selection bias affecting the reporting of outcomes, with those who had positive experiences in the program potentially being more likely to have responded. Although questionnaire responses were anonymous, results may also have been impacted by fear of providing negative feedback.

In conclusion, our study suggests the use of virtual technologies did not inhibit the development of skills and knowledge among medical student mentors enrolled in AMI and may thus represent a viable modality for education, especially in the context of increasing shifts toward VTEs. However, although AMI continued to meet its objectives, further research is needed and more in-depth exploration of mentors' experiences (i.e., through focus groups) may help inform improvements for future iterations of the program.

Declarations

References

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