Rethinking genetic counseling clinical skills training in the time of COVID-19

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Abstract
The COVID-19 pandemic has had a significant impact on clinical training programs, including genetic counseling graduate programs. The University of Arizona Genetic Counseling Graduate Program responded to limited clinical training opportunities by designing a virtual Clinical Skills Workshop for incoming genetic counseling students. During the workshop, students were introduced to psychosocial and clinical genetics skills through virtual lectures, role-play, and practice sessions, as well as assignments. Program evaluation of the Clinical Skills Workshop demonstrated better preparation of key clinical skills prior to starting clinical rotations and highlighted areas for improvement in future iterations. Although this workshop was developed in response to clinical restrictions due to COVID-19, this approach to providing incoming students with basic clinical skills has been a valuable addition to the UAGCGP curriculum.

Keywords
COVID-19, education, genetic counseling, program evaluation

1 | INTRODUCTION

The Coronavirus disease 2019 (COVID-19) pandemic has disrupted systems worldwide, including those systems that support health care, medical education, and training. On March 17, 2020, the Association of American Medical Colleges published guidelines recommending that in-person clinical rotations be put on pause for medical students (Prescott, 2020). Many health systems around the United States limited or suspended in-person clinical activity for students throughout the health professions. Programs that train healthcare providers, including genetic counseling graduate programs, were forced to quickly adapt and find methods to support students’ learning despite the barriers from COVID-19 (Rose, 2020; Sharma & Bhaskar, 2020).

The University of Arizona Genetic Counseling Graduate Program (UAGCGP) was not exempt from the disruptions and challenges presented not only by the pandemic, but the local, state, and national response to this unprecedented health crisis. At the University of Arizona (UArizona), all in-person classes and clinical rotations for students in the healthcare professions transitioned to virtual learning in March 2020. While not seamless, online education is not new (Choules, 2007) and faculty adapted didactic courses to virtual spaces. The more concerning challenge to the UAGCGP was finding and facilitating appropriate opportunities for the acquisition and application of clinical skills.

Limited clinical training sites impact enrollment throughout healthcare education programs in the United States (Recruiting and Maintaining U.S. Clinical Training Sites, 2013), including genetic counseling training programs (Hoskovec et al., 2018; Pan et al., 2016). The Genetic Counselor Workforce Working Group Curriculum Subcommittee recently reviewed strategies that clinical training programs use to expand fieldwork experiences for their students, such as extra-disciplinary placements, increased student to supervisor ratios, and patient simulations (Berninger et al., 2021). At the start of the COVID-19 pandemic, genetics-focused training programs experienced limitations on fieldwork opportunities and needed to adapt to this new training environment with new and established strategies (Berninger et al., 2021; Regier et al., 2020). Two genetic
counseling training programs partnered to develop in-depth standardized patient encounters teaching core clinical and psychosocial skills through the spring and summer terms of 2020 (Redlinger-Grosse et al., 2021). Another training program worked with a genetic testing laboratory to develop a virtual laboratory genetic counseling laboratory course in lieu of an in-person laboratory rotation (Redlinger-Grosse et al., 2021). Other genetics training programs developed bootcamps for clinical skills development (Bellacross et al., 2020).

The UAGCGP is a new genetic counseling graduate program at the University of Arizona, opening for the first class in 2019. In the 2019–2020 academic year, students in the UAGCGP were taught clinical skills through both in-person instruction in a formal class setting and hands-on fieldwork experiences that began the first week of class. Both methods taught students concepts such as medical record review, case preparation, constructing family history, contracting, agenda setting, and active listening throughout the first semester of the program.

Feedback from our clinical supervisors suggested that our students would benefit from additional training prior to starting in clinic, such as more familiarity with contracting, family histories, and health literacy. Based on this feedback and examples from other genetic counseling graduate programs (Bellacross et al., 2020; Redlinger-Grosse et al., 2021), we designed and implemented a clinical skills workshop (CSW) for our first-year students. The CSW was held over the initial five weeks of the fall 2020 semester for our five first-year students. Intended to facilitate students’ advancement of their clinical knowledge, the CSW was a virtual educational program focused on core genetic counseling clinical skills. We used several teaching strategies in the CSW, including readings and assignments, lectures, role playing, in-class practice, and use of standardized patients. While these instructional methods are not novel, combining them into an introductory clinical skills workshop which was entirely virtual has not yet been demonstrated in the genetic counseling educational literature.

2 METHODS

2.1 CSW implementation

The CSW took place over 5 weeks in late August and early September 2020. All class activities took place virtually using the video-conference platform Zoom. Class materials, schedules, and other communications with students were hosted on the online learning software Desire2Learn.

2.2 Survey development and distribution

We developed two surveys to obtain feedback on the CSW: one for students and another for clinical supervisors. Both surveys were developed and distributed in Qualtrics (Qualtrics, Provo, UT). The student survey was based on the standard UA[Arizona course evaluation form, with additional questions added that were specific to the CSW. Briefly, we asked students to rank how well they felt the CSW expanded their knowledge and connected concepts and skills to future patient interactions. Students were also asked to evaluate specific lectures and activities in the CSW. Students ranked each response on a five-point Likert scale. All responses to the survey were voluntary and anonymous. A link to the survey was distributed via email to all students who participated in the CSW. Four out of five students completed the survey.

The feedback form for the clinical supervisors asked them to assess how well they felt the program prepared students for their clinical rotations by comparing the overall preparation of students before and after the implementation of the CSW. Supervisors were asked to rank student proficiency in core clinical skills, such as agenda setting, contracting, and family history construction, on a five-point Likert scale. Supervisors were also asked to evaluate whether they felt that the CSW better prepared students for clinical rotations. All responses to the survey were voluntary and anonymous. A link to the survey was distributed via email to all supervisors who supervised first-year UAGCGP students in both the 2019–2020 (pre-CSW) and 2020–2021 (post-CSW) academic years. All four supervisors completed the survey.

2.3 Institutional review board

On January 6, 2021, the University of Arizona Institutional Review Board determined that this project is not considered research as per 45 CFR 46.102(1) and therefore a human subjects review was not required. Protocol #2012293024.

3 RESULTS

3.1 CSW development and delivery

In the Spring of 2020 when the COVID-19 pandemic limited clinical rotation opportunities for UAGCGP students, the program
administration decided to revise the methods that we used to introduce core clinical skills by developing the CSW. The goals of the CSW were to (a) take advantage of excess time due to limited clinical opportunities and (b) re-organize and provide more extensive clinical preparation for our first-year students prior to the start of their clinical placements. We scheduled the CSW to take place during the first five weeks of the semester, when our students would have previously started observing in their clinical rotations.

To identify specific skill sets where our students could benefit from additional instruction prior to starting rotations, we reviewed formal supervisor and student evaluations from our first cohort of students and unofficial feedback that we received directly from clinical supervisors. We worked with faculty and instructors inside the University as well as the network of genetic counselors in Arizona who volunteered to lecture and participate in role-play scenarios with our students.

Due to limitations on in-person gatherings, the CSW used a video conferencing platform (Zoom) and online learning software (Desire2Learn) to deliver all instructional content. We used genetic counseling scenarios to engage in virtual role playing among students, instructors, and genetic counselor volunteers. The topics, educational formats, and corresponding Accreditation Council for Genetic Counseling (ACGC) Practice-Based Competencies (Accreditation Council for Genetic Counseling, 2019) in the CSW are shown in Table 1. Students were evaluated in the CSW by class participation, assignments, and evaluations of their performance with role-playing and standardized patients.

At the end of the workshop, we worked with staff from the University of Arizona's Health Sciences Interprofessional Clinical Skills Center Standardized Patient Program to act as genetic counseling patients. All standardized patient encounters took place over Zoom, and audio and video recordings were obtained by the program. This culminating experience gave our students the opportunity to practice the skills learned during the CSW in a real-world scenario. Following the standardized patient encounters, program faculty reviewed the recorded sessions and provided the students with individualized feedback over Zoom.

3.2 | CSW feedback

Students’ perception of the workshop was overall positive. All four responses to the student feedback survey indicated that they strongly or somewhat agreed with statements asking whether the workshop expanded their knowledge in agenda setting, contracting, constructing a family history, and eliciting relevant information from a patient to develop a family history. One student indicated that they neither agreed nor disagreed with the statement that the workshop expanded their knowledge in active listening, while the other three either strongly or somewhat agreed with the statement. Most students preferred lectures and activities with an interactive component, and the students were eager to practice as they learned. Suggestions for improvement included keeping lessons short and simple and more extensive development of role-playing activities, in addition to better overall planning and implementation.

Following the CSW, clinical supervisors noted improved preparation of UAGCGP students in most skills, with the largest improvements observed in the areas of contracting and analyzing medical history and medical record information (Figure 1). No improvement was noted in the student’s ability to elicit information relevant to developing an appropriate family history chart, suggesting this is an area of the CSW could be examined and developed further.

From the UAGCGP administration’s perspective, the CSW was effective. While condensing these topics into a five-week experience was intensive for both students and instructors, the students gained valuable skills that helped them actively participate in clinical rotations during their first semester. Although the uncertainty of COVID restrictions on clinical placements limited our ability to plan and organize the CSW, the strong community of instructors, genetic counselors, trained standardized patients, and dedicated staff enabled us to develop the CSW virtually on short notice.

4 | DISCUSSION

Prior to the CSW, the UAGCGP taught introductory clinical skills using a combination of in-person lectures, role-playing activities, and hands-on experience in clinical rotations spread throughout the fall semester of the first year. In contrast, the CSW was a focused experience, condensing many of these topics into a five-week period prior to the start of clinical rotations. We included a virtual standardized patient experience in the CSW, which had not previously been used by the UAGCGP, and taught all concepts on a virtual platform.

The concepts that we taught in the CSW are based on the ACGC Practice-Based Competencies (Accreditation Council for Genetic Counseling, 2019: Table 1) and are not unique to our program. In addition, the methods that we used to teach these concepts, such as lectures, role-playing activities, and standardized patients, are commonly used techniques to teach clinical skills (Berninger et al., 2021). However, to our knowledge, this is the first demonstration of a virtual program used to teach clinical skills to genetic counseling students. This was an effective technique to teach our students core clinical skills, despite the limitations imposed by the COVID-19 pandemic.

Several of our supervisors felt that the CSW better prepared our students for their clinical rotations compared with our previous methods. Our students enjoyed the content and thought it prepared them well for their clinical rotations. A major theme in feedback we received from students was to improve organization of the CSW. We experienced significant time limitations when preparing the schedule and content for the virtual CSW and occasionally scheduled lectures or activities in the same week. In the future, we plan to have a fully developed, detailed schedule of topics and instructors well in advance of the CSW start date for student planning.

Importantly, these analyses are limited by the small sample sizes in both of our surveys; we received four responses each for the student and supervisor surveys. Furthermore, the environment of the
students’ initial instruction and rotations (virtual vs. in-person) was different between the two cohorts, further complicating the interpretation of the survey results. Future assessment of the CSW will provide additional clarity regarding the effectiveness of using this approach to teach genetic counseling clinical skills.

Although we developed the CSW to address experiential training gaps created by the pandemic for our first-year class of five students, we have found this to be a valuable experience. The CSW not only reorganized the way our program taught key clinical skills, it did so in an entirely virtual environment. We will continue to integrate the CSW into the curriculum of the UAGCGP for future students, replacing the first five weeks of clinical rotations with the CSW. In the future, other portions of the curriculum that were originally designed to introduce these skills will be used to reinforce and expand the concepts taught in the CSW.

We plan to incorporate additional technologies and teaching methods to help facilitate more meaningful student engagement in future versions of the CSW. These could include hybrid classes that incorporate online and in-person instruction, exploring team-based learning (Haidet et al., 2012), video platforms for self-paced learning that are also interactive, and the ‘flipped classroom’ model (Flipped Learning Network, 2019) where students receive the material

### TABLE 1 Clinical skills workshop overview

| Topic area                                      | Educational Formats                                      | ACGC practice-based competencies                                                                 |
|------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Introductory counseling skills                 |                                                         |                                                                                                 |
| Agenda setting                                 | Live lecture                                            | Establish a mutually agreed upon genetic counseling agenda with the client.                      |
| Active listening                               | Live lecture                                            | Employ active listening and interviewing skills to identify, assess, and empathically respond to stated and emerging concerns. |
| Introduction to researching genetic conditions and testing options | Live lecture                                            | Demonstrate and utilize a depth and breadth of understanding and knowledge of genetics and genomics core concepts and principles. |
| Family and medical history                     |                                                         |                                    |
| Constructing and eliciting family histories    | Live lecture                                            | Construct relevant, targeted and comprehensive personal and family histories and pedigrees.       |
| Reviewing and using medical records and histories | Live lecture                                            | Assess individuals’ and their relatives’ probability of conditions with a genetic component or carrier status based on their pedigree, test result(s), and other pertinent information. |
| Introductory psychosocial skills               |                                                         |                                                                                                 |
| Self-care                                      | Live lecture                                            | Demonstrate a self-reflective, evidenced-based, and current approach to genetic counseling practice. |
| Multicultural inclusion                        | Live lecture                                            | Apply genetic counseling skills in a culturally responsive and respectful manner to all clients.   |
| Person-first language                          | Live lecture                                            | Apply genetic counseling skills in a culturally responsive and respectful manner to all clients.   |
| Patient coping mechanisms                      | Live lecture                                            | Use a range of genetic counseling skills and models to facilitate informed decision making and adaptation to genetic risks or conditions. |
| Health literacy                                | Live lecture                                            | Effectively educate clients about a wide range of genetics and genomics information based on their needs, their characteristics, and the circumstances of the encounter. |
| Additional concepts and practice               |                                                         |                                                                                                 |
| Introduction to telemedicine                   | Live lecture                                            | Understand how to adapt genetic counseling skills for varied service delivery models.             |
| Comprehensive practice of all skills developed during the workshop | Standardized patients                                   | All above                                                                                         |

Note: Topics and educational formats discussed during the CSW along with the associated ACGC Practice-Based Competencies (Counseling, 2019).
beforehand and use their questions and feedback to guide instruction. In the future, we will likely use a hybrid approach for the CSW, with a combination of virtual and in-person instructional content.

We also identified several topics that we would like to expand upon and new topics that we would like to include in this workshop moving forward. For example, we would like to spend more time at the beginning of the workshop discussing case preparation and review before any patient-related scenarios. In addition, we will add content on diversity (race, ethnicity, and gender identity), historical considerations regarding medical mistrust (local and national), and inclusivity into the workshop, to better prepare our students to provide equitable counseling to all patients. We also plan to incorporate sessions on basics of professional behavior and work on practicing transitions from one part of a counseling session to another. Plans for the topics we will cover in future version of the CSW are shown in Table 2. We will assess future versions of the CSW by surveying both students and clinical supervisors to continue to improve the CSW as an integral part of the UAGCGP.

**TABLE 2  Future plans for clinical skills workshop**

| Week | Major theme                                      | Topics                                                                 |
|------|-------------------------------------------------|------------------------------------------------------------------------|
| 1    | Case preparation                                | Reviewing and using medical histories                                   |
|      |                                                 | Researching genetic conditions and testing options                      |
|      |                                                 | Professionalism in clinics                                              |
| 2    | Family and medical history                      | Constructing family histories                                           |
|      |                                                 | Eliciting family history information                                   |
| 3    | Introductory counseling and psychosocial skills | Contracting                                                             |
|      |                                                 | Active listening                                                       |
|      |                                                 | Self-care                                                               |
|      |                                                 | Patient coping mechanisms                                               |
|      |                                                 | Managing transitions in a genetic counseling session                    |
| 4    | Diversity, equity and inclusion in genetic counseling | Health literacy                                             |
|      |                                                 | Unconscious bias in health care                                         |
|      |                                                 | LGBTQ issues in genetic counseling                                     |
|      |                                                 | Person-first language                                                  |
|      |                                                 | Multicultural inclusion in genetic counseling                          |
| 5    | Cumulative practice with standardized patient   | Apply skills learned during CSW in standardized patient session        |
|      |                                                 | Faculty review and feedback                                             |

**FIGURE 1** Average observed proficiency by clinical supervisors. Four clinical supervisors who worked with UAGCGP students assessed the degree to which the program prepared students in several clinical skill areas. Higher scores indicate higher level of perceived preparation and proficiency at the start of clinical rotations. Gray bars show average scores for students prior to instituting the CSW, and white bars show the same in students who have taken the CSW. The error bars represent the standard deviation.

**AUTHOR CONTRIBUTIONS**

Chris Stallman was involved in conception, design, instruction and evaluation of the CSW, and drafting and revising the manuscript. Shannon Kieran was involved in the design and instruction of the CSW and revising the manuscript. Dorothy Quinn was involved in the design and instruction of the CSW and revising the manuscript. Valerie Schaibley was involved in conception, design, and evaluation.
of the CSW and drafting and revising the manuscript. Chris Stallman and Valerie Schaibley had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. All authors gave final approval of this version to be published and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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COMPLIANCE WITH ETHICAL STANDARDS

CONFLICT OF INTEREST
Chris Stallman, Shannon Kieran, Dorothy Quinn, and Valerie Schaibley are employed by the Genetic Counseling Graduate Program, University of Arizona Health Sciences, Tucson, Arizona.

HUMAN STUDIES AND INFORMED CONSENT
The University of Arizona Institutional Review Board determined that this project is not considered research as per 45 CFR 46.102(1), and therefore, a human subjects review was not required. Protocol #2012293024.

ANIMAL STUDIES
No animal studies were carried out by the authors for this article.

DATA SHARING AND DATA ACCESSIBILITY
Data for this study are available upon request from the corresponding author. All data obtained during this study that are relevant to the major research questions are reported in the published article, tables, and supplemental material.

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