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Efficacy of an Online Communication Skill Training Intervention on Genetic Counseling Students' Performance During Standardized Patient Sessions

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Abstract

Objective: To examine the efficacy of a brief, online intervention designed to enhance genetic counseling students' patient-centered communication.

Methods: Genetic counseling students and recent graduates were randomized to two groups following a baseline standardized patient (SP) session: (1) immediate intervention exposure, which consisted of five modules that taught patient-centered communication skills followed by a second SP session, or (2) delayed intervention exposure following completion of the second session. Sessions were coded using the Roter Interaction Analysis System. Short-term efficacy was assessed by comparing communication during the second session between the delayed

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and immediate intervention exposure groups. Longer-term efficacy was assessed by comparing communication during a third session approximately five weeks later.

Results: During the second session, students in the immediate intervention exposure group (n=18) used more emotionally responsive statements and were more likely to use teach-back than those in the delayed intervention exposure group (n=23). Students' emotionally responsive statements decreased among the immediate intervention exposure group during the third session.

Conclusion: Exposure to the intervention was associated with multiple, positive changes to students' patient-centered communication behavior.

Practice implications: These time- and resource-efficient modules may be beneficial as an introduction to communication skills training or a supplement to existing training.

Keywords

Genetic counseling; education; communication; RIAS; Patient-provider communication; Patient simulation

1. Introduction

Graduate education is a critical stage of genetic counselors' development of patient-centered communication skills. Patient-centered communication entails recognition of each patient's specific preferences, needs, and values [1] and has been positively associated with patient satisfaction [2], learning [3,4], and adherence to medical recommendations [5,6]. While the professional norms of genetic counseling align with principles of patient-centered and psychosocially-oriented care [7,8], empirical studies of genetic counseling consistently describe a predominant focus on biomedical rather than emotional and social aspects of conveyed information [9,10]. Moreover, while genetic counseling students are expected to master interpersonal and counseling competencies prior to certification [8,11], teaching and assessing these skills pose logistical challenges for programs, students, and clinical supervisors.

In a 2016 survey study, 97% of responding genetic counseling program directors reported that limited clinical sites and experiences were barriers to expanding their training programs [12]. To supplement traditional clinical fieldwork rotations, some training programs have turned to communication training methods that include the use of simulated or standardized patients (SPs). SPs are trained to play the role of a patient during interactions with a health care provider or trainee and are widely used to train and assess students in clinical professions such as medicine [13] and nursing [14] as well as genetic counseling [15]. SP sessions can be useful practice and assessment tools, in part because they require students to integrate complex communication skills in a manner similar to clinical scenarios. While it is unclear if SPs are superior to other active learning strategies such as peer role-play [16,17], SPs are widely accepted as a valuable method of teaching communication skills [13]. Notably, the 2019 revision to the Accreditation Council for Genetic Counseling (ACGC) Standards of Accreditation now allows up to 10 SP cases to count toward the required 50 participatory cases [11].

Yet, the complexity of integrating multiple skills during SP sessions may also pose challenges – specifically for students who are in the early stages of their training and those who are learning to use new skills. There may be benefits to taking a "scaffolding" approach [18], in which students can learn and practice new skills in a low-stakes setting before being asked to apply and integrate them during a SP or actual case. The present study was designed to pilot test a flexible platform aimed at meeting genetic counseling program and student needs. We designed an intervention that incorporates active learning strategies using an interactive, self-administered platform in an asynchronous, online format that allows convenient student access to skill-building modules. Structured self-assessments help students to engage in self-reflective practice, while reducing time demands on faculty and supervisors. The modules include demonstration, practice exercises, and self-assessment questions that are conceptually linked to the evaluation instruments.

To evaluate the efficacy of the intervention on genetic counseling student communication, we conducted a randomized crossover trial. We hypothesized that exposure to the online training intervention would result in increased use of the targeted communication skills and improvements in session-level indicators of patient-centered communication during SP sessions. While future papers will address acceptability of the intervention and other novel assessments of student communication, here we present findings regarding the intervention's effects on students' communication behavior.

2. Methods

2.1 Participants

Students and recent graduates were eligible to participate in this study if they were enrolled in an ACGC-accredited U.S. or Canadian program, or if they had graduated within the past four months and had not yet passed the ABGC or CBGC certification exam. Students were ineligible for the study if they were under the age of 18 or if they were enrolled in the Johns Hopkins University/National Institutes of Health program due to previous exposure to the intervention materials. We used the following recruitment methods: 1) E-mail: e-mails were sent to the Association of Genetic Counseling Program Directors listserv, program directors and clinical/fieldwork coordinators at accredited programs, and the National Society of Genetic Counselors (NSGC) Student/New Graduate Special Interest Group, 2) Social media: posts were listed on student Facebook groups, Twitter, student Discord groups, and the Minority Genetics Professional Network Slack group, and 3) Other recruitment resources included: use of the 2021 NSGC Annual Conference message boards and chats, encouraging study participants to share the study with their peers, and giving brief presentations about the study to genetic counseling classes across multiple training programs. Students were offered study incentives of up to $100 for their participation in the study. The study protocol was reviewed, approved by the Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health (IRB# 00012812), and a waiver of written consent was granted.

2.2 Procedures

Intervention development and design.—We developed a communication training intervention based on the Listen, Educate, Assess, Partner, Support (LEAPS) framework

for effective clinical communication [19], with adaptations to tailor the content to genetic counseling. This framework is shown in Table 1. Five modules – each addressing one domain of the LEAPS framework – were created in Qualtrics. Each module defined and demonstrated a set of related skills as brief video clips (approximately 20 seconds in length) within the context of a genetic counseling case scenario. The skill examples were drawn from transcripts of SP sessions from the Genetic Counseling Video Project, a database that includes recordings of over 150 genetic counselors conducting a simulated cancer or prenatal session [9]. The examples were re-recorded for the training modules using actors to portray the genetic counselors and patient. After viewing the skill examples, students viewed a video clip of a SP asking a question or expressing a concern and were prompted to respond **in writing or** verbally to the SP as they would to an actual patient. This method has been used previously in studies assessing communication performance of genetic counselors and certified nursing assistants [20–22] and received high ratings of face-validity and relevance to communication tasks in both studies. Students and faculty of the Johns Hopkins University/ National Institutes of Health Genetic Counseling Training Program pre-tested and provided feedback on the modules, which were revised based on this feedback. An open-access version of the communication training tool is available at https://bit.ly/jemf-leaps.

Standardized patient recruitment and training.—Four SPs were recruited to portray the clients in three genetic counseling client scenarios. The SPs included one professional actor and three graduate students at Johns Hopkins University. The three non-professional SPs were recruited through a university-wide job posting and school-wide emails. None of the SPs had prior training related to genetic counseling. The SPs were selected based on their performance during an audition and on their similarity to the scripted patients' characteristics. The SPs identified as female and appeared to be in their late 20s or early 30s to match the characteristics of the scripted scenarios and to facilitate cross-training so that analyses could separately assess any possible differences in the communication patterns among the individual SPs and the clinical scenarios. Two of the SPs identified their race and ethnicity as Black and non-Hispanic/Latinx, and two identified as White and non-Hispanic/Latinx. SP training followed procedures established in the Genetic Counseling Video Project [23] and techniques suggested by Nestel and colleagues [24] including partial and full session roleplays. All four SPs were cross-trained on three clinical scenarios: 1) a breast/ovarian cancer case (positive results for a familial *BRCA1* variant), 2) a prenatal case (non-invasive screening result indicating an increased risk for Down syndrome), and 3) a colorectal cancer case (variant of uncertain significance in the *MSH2* gene, with a family history of colon cancer). Prenatal and cancer scenarios were selected because these represent two of the most common clinical specialties among practicing genetic counselors who work in direct patient care [25]. To ensure the scenarios' realism and clarity, each scenario was reviewed by two or more genetic counselors with at least a year of clinical experience, including at least one genetic counselor with two or more years of clinical experience in the relevant specialty.

Study design.—This study used a randomized crossover design that included assessments of student communication at baseline and during two follow-up SP sessions. Randomization

was intended to ensure that participants' baseline characteristics, including clinical experience and demographic characteristics, were similar between the study groups. The SPs were not aware of the intervention group to which the students were assigned. In this crossover design, all students who completed the study were exposed to the intervention, but at different time points depending on their study group. Analytically, this design provided a control group to be able to isolate the intervention's effects from those of students' ongoing training. Due to the repeated measures for each participant, this design also allowed for an analysis of longer-term intervention effects and exploratory within-participant comparisons. The intervention period was set as approximately five weeks, as we expected that students could reasonably complete one module per week. Figure 1 depicts participant flow through the study.

Study procedures.—Students who were interested in participating completed an online eligibility screener. If they were eligible and consented to participate, students then completed an online baseline questionnaire that that included sociodemographic and educational characteristics, including prior the number of prior participatory cases the students had completed overall and in prenatal and cancer settings. After questionnaire completion, students were randomly assigned to a clinical scenario and SP. They were then prompted to schedule a time slot for a videoconference SP session. Students were sent a summary of the SP's medical and family history to prepare for the session. After completing the session, students and SPs completed an online questionnaire about session communication. Students were then randomly assigned via the Qualtrics randomizer to one of two study arms: (1) immediate intervention exposure group, which received access to the intervention immediately and were asked to complete it over a five-week period leading up to a second SP session or (2) delayed intervention exposure group, which were informed that they would receive a link to the online modules after conducting the second SP session. The delayed intervention exposure group was used as a control group to assess the effects of the intervention during the second SP session.

Students were prompted to schedule and conduct the second SP session approximately five weeks after completing the baseline session, following the same scheduling and preparation procedures as for the baseline SP session. An adaptive randomization scheme was used to prevent students from repeating the same clinical scenario. After completing the second SP session, students who had been assigned to the Delayed group were provided with a link to the online modules and instructed to complete them within approximately five weeks. Students assigned to the Immediate group did not receive any additional intervention between the second and third session. They were allowed but not required to review the modules before the third session. All students were instructed to schedule and conduct a third SP session approximately five weeks after the second session. The third SP session was conducted to assess the duration of the intervention effects among the immediate intervention exposure group and to assess within-student intervention effects among the delayed intervention exposure group.

2.2 Instrumentation

SP-reported skill use.—After each session, SPs reported on the student's skill use as part of an online questionnaire. The SP-reported student skill use measure was adapted from a previously-used measure [19] and each item reflected one of the 22 LEAPS skills. SPs rated each skill as "used", "not used", or "could not remember". While prior studies indicate that SPs' ratings can be biased– particularly for subjective measures such as satisfaction [26,27] – we found no clear evidence of clustering effects between the four SPs in the SP-reported skill use ratings [27].

Roter Interaction Analysis System. Sessions were recorded and coded using the Roter Interaction Analysis System (RIAS), a widely used quantitative communication coding system for medical interaction [28]. In addition to the standard RIAS coding categories, three specific skills were coded as present or absent: eliciting all of the SP's concerns, summarizing key points of the session, and using teach-back.

2.4 Data Analyses

RIAS codes were combined to create meaningful categories that included percent of personally-framed clinical information, percent of open-ended questions, facilitative statements, emotionally responsive statements, patient-centered**ness** summary score, verbal dominance (the ratio of all student statements to all SP statements made during the session), and session duration. For the measure of SP-reported student skill use, we calculated a sum of the total skills used in each of the LEAPS skill domains. The communication outcomes are described with examples in Table 2. Two-sample t-tests compared the immediate and Delayed group students' communication during the second SP session for continuous outcomes. Chi-square tests compared the study groups for categorical outcomes. Post-hoc power calculations indicated 80% power to detect a large effect size (d=.9) for two-sample t-tests, assuming a significance level of .05.

We further explored whether intervention effects persisted by conducting paired t-tests that compared communication outcomes during the second and third SP sessions among the intervention group. Finally, we explored the intervention's individual-level effects. Using paired t-tests, we pooled data from both study groups to compare outcomes during the session they conducted immediately before accessing the intervention (i.e., the first session for the Immediate group and the second session for the Delayed group) to the session that they completed just after the intervention (i.e., the second session for the Immediate group and the third session for the Delayed group).

3. Results

Study participation and baseline characteristics.

Shown in Figure 1, 60 students completed baseline measures and were randomized. Shown in Supplementary Table 1, there were no statistically significant differences in students' demographic characteristics, number of prior participatory cases completed, RIAS-coded communication behavior, or SP-reported skill use between the two study groups during the baseline session. Short-term intervention efficacy analysis was based on the 18 students

from the Immediate group and 23 from the Delayed group who completed the second SP session. Longer-term efficacy was based on the 17 participants from the Immediate group who completed the third SP session. Pooled analyses were based on 37 participants (18 from the Immediate group and 19 from the Delayed group) who completed at least one SP session after completing the intervention. Two students withdrew and 22 were lost to follow-up after multiple reminders to schedule a follow-up session. One student from the Delayed group completed all three SP sessions but not the LEAPS modules. This student was included in analyses, following the intention-to-treat principle.

Intervention effects during the second session.

Table 3 describes and compares (under "P-value: Immed. vs. Delayed") student communication during the second SP session between the Immediate group (which had been instructed to complete the intervention) and the Delayed group (which had not yet received the intervention). During the second SP session, emotionally responsive statements accounted for a higher proportion of all student statements among students in the Immediate group (7.27%, s.d.=2.36%) compared to the Delayed group (5.29%, sd=2.99%). Seven out of 18 (39%) students in the Immediate group used teach back, while one student out of 23 (4%) in the Delayed group used this skill. There were also trends toward higher patient-centeredness summary scores (p=.061) and use of more of the LISTEN communication skills (p=.067) by students in the Immediate group. There was no statistically significant difference in session length.

Persistence of intervention effects in the Immediate group.

Shown in Table 3, student use of communication skills did not change significantly from Session 2 to Session 3 among students in the Immediate group for any of the measures except emotionally responsive statements. On average, these students' emotionally responsive statements during the third session accounted for 6.0% of all statements, compared to 7.3% in the second session (p=.049).

Within-participant intervention effects in the pooled analysis.

Supplementary Table 1 shows paired comparisons of pre- and post-intervention communication. The pre-intervention data combines session communication from the Immediate group during the first SP session and the Delayed group during the second SP session. The post-intervention data combines communication data from the Immediate group during the second SP session and from the Delayed group during the third SP session. At the individual level, students used more of the LISTEN communication skills after completing the intervention than before (p=.01). There were trends toward a higher proportion of emotionally responsive statements (p=.07), higher patient-centeredness ratios (p=.06), higher total SP-reported skill use (p=.09), and use of more of the ASSESS skills (p=.05).

4. Discussion and Conclusion

4.1. Discussion

Our objective was to assess whether exposure to an online, self-paced communication training intervention was associated with changes in GC student performance of targeted

patient-centered communication behavior. Despite evaluating this intervention with a small sample that had substantial variation in their levels of clinical and educational experiences, we found that intervention exposure was significantly associated with increases in a variety of patient-centered communication behaviors. Yet, intervention exposure was not associated with longer sessions, in support of arguments that use of patient-centered communication skills do not necessarily take more time [29].

During the second session, approximately one-third of students in the Immediate group used teach-back compared to only one student (4%) in the Delayed group. Teach-back is a clinical communication skill in which a health care provider checks and addresses a patient's understanding of a new concept by asking them to explain the concept in their own words [30]. Use of teach-back has been associated with positive patient outcomes, including increased adherence to recommendations, improved self-management of chronic diseases, increased disease-specific knowledge, and self-efficacy, as well as decreased hospitalization and readmission rates [31]. Teach-back may be especially beneficial for patients with low health literacy [31,32]. Despite these benefits, we are unaware of published studies that address how often it is typically taught or used in genetic counseling sessions, and teach-back is not currently considered an element of "usual care" in genetic counseling [33,34]. In a previous study, several genetic counselors who had completed a pilot intervention were able to use teach-back appropriately during sessions with real patients [35]. Like the present study, these findings are encouraging about the potential for wider adoption of teach-back. However, some genetic counselors in this prior study reported hesitation to using teach-back consistently, citing reasons such as: 1) feeling that it was unnecessary to use during session with patients who had higher health literacy 2) being concerned that patients may feel challenged, or 3) worrying that use of teach-back would harm rapport [35]. Future studies should continue to identify strategies to promote consistent use of this skill, such as raising awareness of the value of teach-back, increasing motivation to use teach-back, providing opportunities to practice teach-back, and addressing hesitation to using this important skill.

Students in the Immediate group used more emotionally responsive statements in the second SP session than at baseline. Emotionally responsive communication was emphasized throughout the LEAPS modules and particularly in the final module, SUPPORT. The importance of patients' emotions is also a tenet of the Reciprocal Engagement Model [7]. Moreover, genetic counselors' use of emotionally responsive communication has been linked to patients engaging in verbal communication indicating more emotional [36,37] and cognitive [36] processing during genetic counseling sessions. While our exploratory analysis of the long-term effects of the intervention showed persistence in most outcomes, emotionally responsive communication among the Immediate group participants decreased slightly during the second post-intervention session. This may suggest that students need additional reinforcement to maintain these skills due to their complexity.

There was also a trend toward a higher patient-centeredness ratio after intervention exposure. The higher patient-centeredness ratio reflects an increase in emotionally responsive communication as well as other possible differences in the student and SP communication behaviors reflected in the ratio. These behaviors may have been individually too infrequent to affect session outcomes reported here, but they may have contributed to a

cumulative effect when combined with other infrequent codes to reflect a patient-centered style. This opens the possibility of encouraging learner-centered student experiences and assessments by allowing students to choose from and use a variety of patient-centered behaviors rather than requiring or expecting them to perform a narrower set of skills. SPs also reported that students in the Immediate group used more of the LISTEN communication skills. These skills focus on eliciting the patient's questions and concerns. In another analysis of the same parent study, increased use of the LISTEN skills was strongly associated with higher SP satisfaction with the session [38]. This suggests that these skills may be foundational for ensuring that patients' needs are elicited, heard, and understood.

A primary limitation to external validity of this study relates to the study sample. We used a variety of recruitment methods that relied on students self-selecting to join the study. The sample may therefore overrepresent students who were motivated to learn about communication skills, interested in gaining simulated practice opportunities, and engaged with the platforms and e-mail lists that advertised the study. We therefore cannot easily assess the rate of study uptake from each of these recruitment methods, and we cannot assume that these results would generalize to all genetic counseling students.

There was also loss to follow-up during the study, with 24 (40%) of students not completing the study. Therefore, the results may overrepresent students who were most interested in the intervention and other study components. As most of the participants who did not complete the study stopped responding to email contact with the study team, their reasons for not continuing in the study are unknown. Moreover, due to the small sample size and limited racial and ethnic diversity of study participants, it was challenging to perform robust comparisons of these characteristics between students who did and did not complete the study. Related to the large number of participants who were lost to follow-up, statistical power to detect differences between the delayed and Immediate groups was limited. We only had sufficient power to detect large effect sizes. Therefore, our results likely underestimate any potential true effects of the training.

Due to the importance of cross-training the SPs to portray multiple scenarios, all three of the scripted scenarios featured a female patient in her late twenties to early thirties. Therefore, our study provides limited insight into the extent to which the intervention effects may generalize to interactions with patients of other genders, ages, or other social characteristics; interactions with multiple genetic counseling clients such as couples or families; and clinical specialties other than cancer and prenatal. While the SPs in our study did have varying racial backgrounds, future studies should assess the extent to which patients' or SPs' sociodemographic characteristics (including other races and ethnicities) may influence students' development and use of communication skills.

Students' communication during the SP sessions may have also differed from their communication during actual patient sessions or under different circumstances. The participants were aware that they were participating in recorded sessions, and they became aware of some of the outcome measures when they completed post-session surveys in which they were asked to self-report their use of the LEAPS skills. Since they were aware that they were being observed and, in the second and third SP sessions, were familiar with the

behavioral outcomes under study, it is possible that the students altered their behavior from their typical communication [39]. In addition, students may interact differently with actual patients and under different supervision conditions and settings. Yet, while SP encounters are an imperfect reflection of their performance in actual clinical cases, we believe that they are a valid assessment of students' developing ability to use new communication skills.

4.2 Conclusion

Intervention exposure was associated with increased student use of teach-back and emotionally responsive statements, as well as trends toward higher overall patient-centeredness and higher SP-reported use of skills related to elicitation of the patient perspective. Our study suggests that these modules may be a time- and resource-efficient approach to building communication skills and may be beneficial as an introduction to communication training or a supplement to existing training methods.

4.3 Practice Implications

We designed the modules with genetic counseling training programs' need for flexible and resource-efficient teaching methods in mind. The intervention leverages technology to create an interactive learning experience that students can complete remotely and asynchronously. Utilizing video examples, practice opportunities, and self-assessment maximizes skill learning and minimizes demands on preceptors. The intervention may also serve unmet needs for low-stakes skill practice to complement complex learning opportunities such as SP or actual patient sessions.

Future studies can also lend more insight into the processes behind students' skill development. While students had a five-week window to complete the modules with the intention of completing approximately one module per week, it is possible that a different time frame would be optimal. Future studies should assess the extent to which timing moderates intervention effectiveness. There are also opportunities to gain insight into the processes of skill acquisition by observing students' communication and skill use during sessions with actual as well as standardized genetic counseling patients. It may also be valuable to assess the extent to which the intervention effects may generalize to clinical settings and scenarios other than the cancer and prenatal scenarios from this study.

While this study focused on individual students, moving forward with this research, we will consider the contexts of existing genetic counseling training programs and additional stakeholders such as program leadership, instructors, and fieldwork supervisors. Future research should examine the perspectives and values of program stakeholders and consider how a similar training approach could be incorporated into existing instruction plans. For instance, is it most helpful to introduce these skills prior to clinical rotations as a preparatory exercise, or later in training, when students may be more comfortable with instrumental tasks such as contracting and history-taking? And how can the modules and skills be most effectively paired with other educational strategies, such as simulation, roleplay, feedback, and supervision?

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Competing interests:

Debra Roter is the author of the Roter Interaction Analysis System (RIAS) and holds the copyright for the system. Johns Hopkins University also has rights to some enhancements of the system. Neither Debra Roter nor Johns Hopkins collects royalties for use of the system in research, as is the case for the current study. Debra Roter is also owner of RIAS Prime LLC, a company that provides consulting services related to doctor-patient communication and it is possible that the company may benefit indirectly from dissemination of the current research.

Citations

[1]. Balint E, The possibilities of patient-centered medicine., J. R. Coll. Gen. Pract. 17 (1969) 269–76. [PubMed: 5770926]

[2]. Guan Y, Roter DL, Erby LH, Wolff JL, Gitlin LN, Roberts JS, Green RC, Christensen KD, Communication Predictors of Patient and Companion Satisfaction with Alzheimer's Genetic Risk Disclosure, J. Health Commun. 23 (2018) 807–814. 10.1080/10810730.2018.1528319. [PubMed: 30325721]

[3]. Roter DL, Erby L, Larson S, Ellington L, Oral literacy demand of prenatal genetic counseling dialogue: Predictors of learning, Patient Educ. Couns. 75 (2009) 392–397. 10.1016/j.pec.2009.01.005. [PubMed: 19250792]

[4]. Kelly KM, Ellington L, Schoenberg N, Agarwal P, Jackson T, Dickinson S, Abraham J, Paskett ED, Leventhal H, Andrykowski M, Linking Genetic Counseling Content to Short-Term Outcomes in Individuals at Elevated Breast Cancer Risk, J. Genet. Couns. 23 (2014) 838–848. 10.1007/s10897-014-9705-8. [PubMed: 24671341]

[5]. Haskard Zolnierek KB, Dimatteo MR, Physician Communication and Patient Adherence to Treatment A Meta-Analysis, Med. Care. 47 (2009) 826–834. 10.1097/MLR.0b013e31819a5acc. [PubMed: 19584762]

[6]. Kelly KM, Ellington L, Schoenberg N, Jackson T, Dickinson S, Porter K, Leventhal H, Andrykowski M, Genetic counseling content: How does it impact health behavior?, J. Behav. Med. 38 (2015) 766–776. 10.1007/s10865-014-9613-2. [PubMed: 25533642]

[7]. Veach PM, Bartels DM, LeRoy BS, Coming full circle: A reciprocal-engagement model of genetic counseling practice, J. Genet. Couns. 16 (2007) 713–728. 10.1007/s10897-007-9113-4. [PubMed: 17934802]

[8]. Accreditation Council for Genetic Counseling, Practice-Based Competencies for Genetic Counselors, 2019.

[9]. Roter DL, Ellington L, Hamby Erby L, Larson S, Dudley W, The Genetic Counseling Video Project (GCVP): Models of Practice, Am. J. Med. Genet. C Semin. Med. Genet. 142 (2006) 209–220. 10.1002/ajmg.c.

[10]. Paul J, Metcalfe S, Stirling L, Wilson B, Hodgson J, Analyzing communication in genetic consultations-A systematic review, Patient Educ. Couns. 98 (2015) 15–33. 10.1016/j.pec.2014.09.017. [PubMed: 25312331]

[11]. Accreditation Council for Genetic Counseling, Standards of Accreditation for Graduate Programs in Genetic Counseling, 2019.

[12]. Pan V, Yashar BM, Pothast R, Wicklund C, Expanding the genetic counseling workforce: Program directors' views on increasing the size of genetic counseling graduate programs, Genet. Med. 18 (2016) 842–849. 10.1038/GIM.2015.179/ATTACHMENT/8277EDA8-FB44-4598-BA95-45B76AF6F4A1/MMC1.DOC. [PubMed: 26741410]

[13]. Kaplonyi J, Bowles KA, Nestel D, Kiegaldie D, Maloney S, Haines T, Williams C, Understanding the impact of simulated patients on health care learners' communication skills: a systematic review, Med. Educ. 51 (2017) 1209–1219. 10.1111/medu.13387. [PubMed: 28833360]

[14]. MacLean S, Kelly M, Geddes F, Della P, Use of simulated patients to develop communication skills in nursing education: An integrative review, Nurse Educ. Today. 48 (2017) 90–98. 10.1016/j.nedt.2016.09.018. [PubMed: 27741440]

[15]. Kessler LJ, LaMarra D, MacFarlane IM, Heller M, Valverde KD, Characterizing standardized patients and genetic counseling graduate education, J. Genet. Couns. 30 (2021) 493–502. 10.1002/jgc4.1335. [PubMed: 33025686]

[16]. Lane C, Rollnick S, The use of simulated patients and role-play in communication skills training: A review of the literature to August 2005, Patient Educ. Couns. 67 (2007) 13–20. 10.1016/j.pec.2007.02.011. [PubMed: 17493780]

[17]. Gilligan C, Powell M, Lynagh MC, Ward BM, Lonsdale C, Harvey P, James EL, Rich D, Dewi SP, Nepal S, Croft HA, Silverman J, Interventions for improving medical students' interpersonal communication in medical consultations, Cochrane Database Syst. Rev. 2021 (2021). 10.1002/14651858.CD012418.pub2.

[18]. Lau KHV, Computer-based teaching module design: Principles derived from learning theories, Med. Educ. 48 (2014) 247–254. 10.1111/medu.12357. [PubMed: 24528459]

[19]. Roter DL, Wexler R, Naragon P, Forrest B, Dees J, Almodovar A, Wood J, The impact of patient and physician computer mediated communication skill training on reported communication and patient satisfaction, Patient Educ. Couns. 88 (2012) 406–413. 10.1016/j.pec.2012.06.020. [PubMed: 22789149]

[20]. Massey M, Roter DL, Assessment of immigrant certified nursing assistants' communication when responding to standardized care challenges, Patient Educ. Couns. 99 (2016) 44–50. 10.1016/j.pec.2015.08.010. [PubMed: 26337004]

[21]. Setzer M, Roter DL, Feasibility and face validity of a web-based simulation tool for assessing genetic counseling communication, (2019).

[22]. Lowe C, Setzer M, Roter DL, Assessing genetic counselor communication in response to virtual, asynchronous simulated video prompts, J. Genet. Couns. 31 (2022) 424–432. 10.1002/JGC4.1508. [PubMed: 34665897]

[23]. Erby LAH, Roter DL, Biesecker BB, Examination of standardized patient performance: Accuracy and consistency of six standardized patients over time, Patient Educ. Couns. 85 (2011) 194–200. 10.1016/j.pec.2010.10.005. [PubMed: 21094590]

[24]. Nestel D, Fleishman C, Bearman M, Preparation : developing scenarios and training for role portrayal, in: Nestel D, Bearman M (Eds.), Simulated Patient Methodol. Theory Evid. Pract, 1st ed., John Wiley & Sons, Ltd, 2015: pp. 63–70. 10.1002/9781118760673.ch9.

[25]. National Society of Genetic Counselors, Professional Status Survey 2022 - Work Environment, 2022. 10.1109/9780470083963.ch4.

[26]. Lurie SJ, Mooney CJ, Nofziger AC, Meldrum SC, Epstein RM, Further challenges in measuring communication skills: Accounting for actor effects in standardised patient assessments, Med. Educ. 42 (2008) 662–668. 10.1111/j.1365-2923.2008.03080.x. [PubMed: 18507768]

[27]. Lowe C, Roter DL, Genetic counseling students' use of patient-centered communication skills predicts standardized patient satisfaction during virtual simulated sessions, J. Genet. Couns. n/a (2022) 1–10. 10.1002/jgc4.1652.

[28]. Roter DL, Larson S, The Roter interaction analysis system (RIAS): utility and flexibility for analysis of medical interactions., Patient Educ. Couns. 46 (2002) 243–51. 10.1016/S0738-3991(02)00012-5. [PubMed: 11932123]

[29]. Kessler S, Psychological Aspects of Genetic Counseling: XIII. Empathy and Decency, J. Genet. Couns. 8 (1999) 333–343. 10.1023/A:1022967208933. [PubMed: 26140824]

[30]. Schillinger D, Piette J, Grumbach K, Wang F, Wilson C, Daher C, Leong-grotz K, Castro C, Bindman AB, Closing the Loop: Physician Communication With Diabetic Patients Who Have Low Health Literacy, Arch. Intern. Med. 163 (2003) 83–90. 10.1001/archinte.163.1.83. [PubMed: 12523921]

[31]. Ha Dinh TT, Bonner A, Clark R, Ramsbotham J, Hines S, The effectiveness of the teach-back method on adherence and self-management in health education for people with chronic disease: a systematic review, JBI Database Syst. Rev. Implement. Rep. 14 (2016) 210–247. 10.11124/jbisrir-2016-2296.

[32]. Shersher V, Haines TP, Sturgiss L, Weller C, Williams C, Definitions and use of the teach-back method in healthcare consultations with patients: A systematic review and thematic synthesis, Patient Educ. Couns. 104 (2021) 118–129. 10.1016/j.pec.2020.07.026. [PubMed: 32798080]

[33]. Biesecker BB, Lillie SE, Amendola LM, Donohue KE, East KM, Foreman AKM, Gilmore MJ, Greve V, Liangolou B, O'Daniel JM, Odgis JA, Rego S, Rolf B, Scollon S, Suckiel SA, Zepp J, Joseph G, A review and definition of 'usual care' in genetic counseling trials to standardize use in research, J. Genet. Couns. 30 (2021) 42–50. 10.1002/jgc4.1363. [PubMed: 33278053]

[34]. Riddle L, Amendola LM, Gilmore MJ, Guerra C, Biesecker B, Kauffman TL, Anderson K, Rope AF, Leo MC, Caruncho M, Jarvik GP, Wilfond B, Goddard KAB, Joseph G, Development and early implementation of an Accessible, Relational, Inclusive and Actionable approach to genetic counseling: The ARIA model, Patient Educ. Couns. (2021). 10.1016/j.pec.2020.12.017.

[35]. Joseph G, Lee R, Pasick RJ, Guerra C, Schillinger D, Rubin S, Effective communication in the era of precision medicine: A pilot intervention with low health literacy patients to improve genetic counseling communication, Eur. J. Med. Genet. (2018). 10.1016/j.ejmg.2018.12.004.

[36]. Guan Y, Roter DL, Wolff JL, Gitlin LN, Christensen KD, Roberts JS, Green RC, Erby LH, The impact of genetic counselors' use of facilitative strategies on cognitive and emotional processing of genetic risk disclosure for Alzheimer's disease, Patient Educ. Couns. 101 (2018) 817–823. 10.1016/j.pec.2017.11.019. [PubMed: 29203084]

[37]. Ellington L, Kelly KM, Reblin M, Latimer S, Roter DL, Communication in Genetic Counseling: Cognitive and Emotional Processing, Health Commun. 26 (2011) 667–675. 10.1080/10410236.2011.561921. [PubMed: 21660793]

[38]. Lowe CLT, A Remote Web-Based Approach to Assessing and Developing Genetic Counseling Students' Patient-Centered Communication Skills, Thesis, Johns Hopkins University, 2022. https://jscholarship.library.jhu.edu/handle/1774.2/67497 (accessed November 28, 2022).

[39]. Sedgwick P, Greenwood N, Understanding the Hawthorne Effect, BMJ Online. 351 (2015) 1–2. 10.1136/bmj.h4672.

Highlights:

- Genetic counselors' communication skills can improve patient experiences and outcomes.
- We made modules to teach genetic counseling students basic communication skills.
- The modules increased emotionally responsive statements and teach-back use.
- The modules could be used as an introduction or supplement to existing trainings.

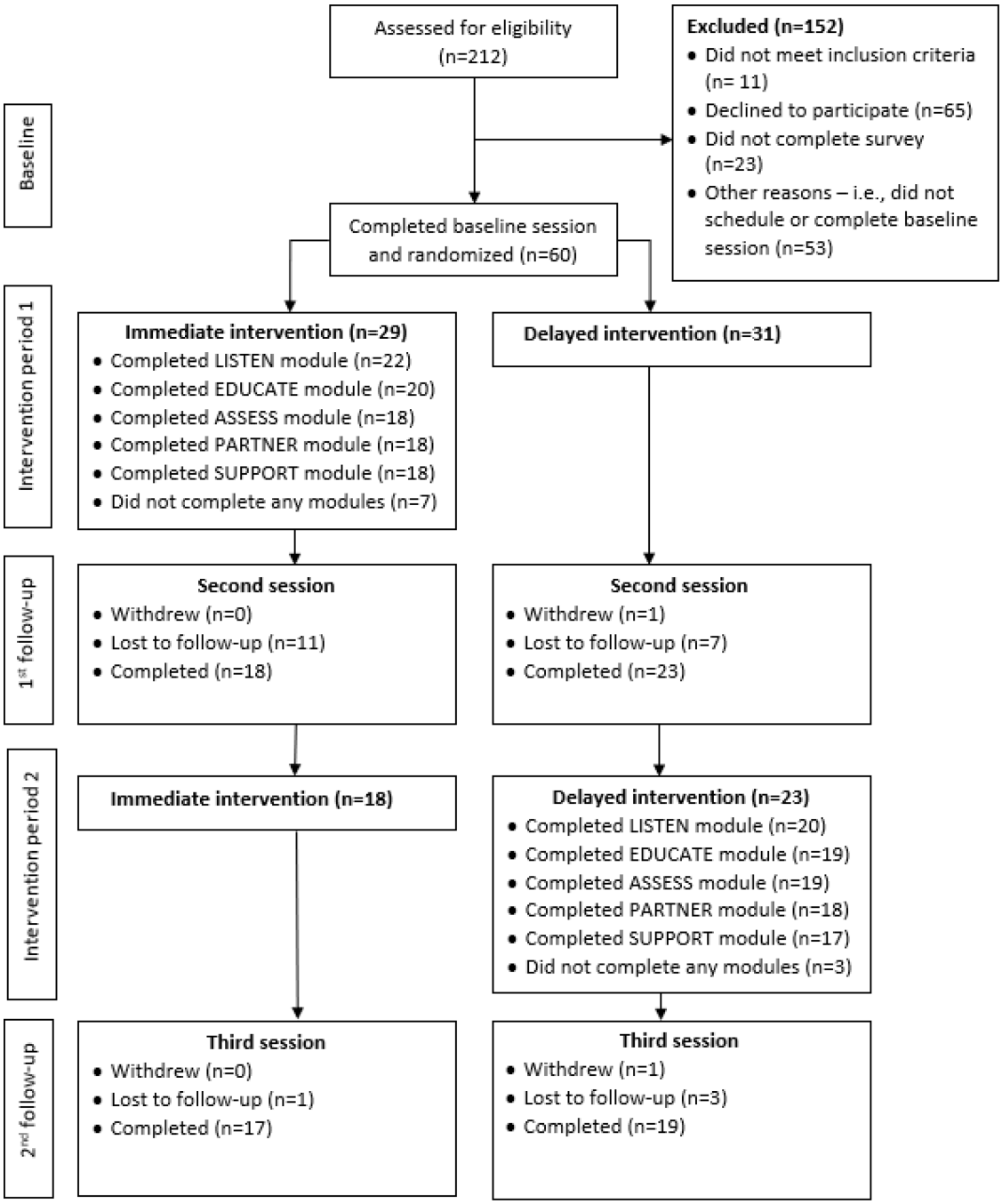

Figure 1.
Participant flow through study

Table 1.

LEAPS skills for effective clinical communication – genetic counseling adaptation

Domain	Skills
LISTEN	• Begin with open-ended probes for problems/concerns
	• Use verbal and nonverbal cues of interest to encourage disclosure
	• Elicit full spectrum of concerns
	• Paraphrase to reflect back
	• Ask patient's opinion about problem and treatment/testing options
EDUCATE	• Prioritize patient concerns
	• Discuss and set visit agenda
	• Show how information is personally relevant
	• Reinforce accurate information
	• Correct misconceptions
	• Break up teaching monologue
	• Ask for teach-back
	• Summarize key points
ASSESS	• Ask non-judgmental questions about problems, concerns, and decisions
	• Ask patient understanding of recommendations, instructions, and treatment/testing options
	• Explore current and anticipated problems and issues with adherence to medical recommendations
PARTNER	• Ask patient what s/he knows and believes about the condition, problem, or decision
	• Ask for patient opinion about what makes the problem or decision worse or better
	• Brainstorm and problem-solve by discussing possible solutions and options for the problem or decision with the patient
SUPPORT	• Express empathy
	• Compliment effort
	• Reassure when appropriate
	• Express willingness to work together

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Table 2.

Study communication outcomes - definitions and categories

Communication outcomes	Definition/Calculation	RIAS example
Facilitative statements	Sum of the following RIAS codes divided by all student statements: • Student asks for client's permission • Student asks for client's opinion • Student asks for reassurance • Student back-channels • Student paraphrases or checks for understanding	• "Any questions?" • "Is it okay if I take your family history now?" • "Are you doing okay?" • "Mmmhmm." • "Did I get that right?" • "Does that make sense?"
Emotionally responsive statements	Sum of the following RIAS codes divided by all student statements: • Student uses empathy/legitimation statements • Student expresses concern or worry. • Student reassures or expresses optimism • Student makes partnership statements • Student uses self-disclosure	• "I'm sorry to hear that." • "You don't need to worry" • "I'm here to help you." • "You look worried." • "Anyone would feel that way." • Long • "My mother had breast cancer as well."
% of personal (vs. general) information	Divide student's statements that provide clinical information in an individual frame by all clinical information statements	Personal framing example: • "Since you have a BRCA1 mutation, you have about a 60% chance of getting breast cancer." General framing example: • "Women with BRCA1 mutations have about a 60% chance of getting breast cancer."
% of open questions	Divide student's open-ended questions by all questions made during the session	Open question example: • "What do you remember about your mother's cancer?" Closed question example: • "How old was your mother when she got cancer?"
Verbal dominance	Ratio of all student statements to all SP statements	N/A
Patient-centeredness score	Sum of student psychosocial, emotional, and facilitative statements and SP psychosocial and emotional statements and medical questions, divided by the sum of student clinical information-giving statements, procedural statements, and clinical questions.	N/A
Proficiency: Elicit all concerns	Student asks the patient if there is "anything else" (also includes "what else?" or "anything?') after eliciting the patient's main concerns and/or discussing the visit agenda before moving on to history or counseling. Coded as present vs. absent.	"What else would be helpful to discuss today?"
Proficiency: Summarize key points	Student summarizes major decisions or next steps that were previously discussed before moving on to the next topic and/or at the end of the session. Coded as present vs. absent.	"To summarize, we looked at your family history and your chances of getting breast or ovarian cancer will be informed by the genetic testing. We can make a follow-up plan for you based on your family history. And we'll do that when I see you at your follow-up appointment."
Proficiency: Teach-back	Student asks the SP to repeat back, in their own words, what the management plan is or what is important for them to understand. Coded as present vs. absent.	"Just so I can be sure I have been clear, can you tell me what you need to do next in terms of cancer screenings?"
SP-reported skill use	Sum of SP-reported skills used in each of five skill domains and overall	N/A

Table 3.

Student communication during the second and third standardized patient sessions

	SESSION 2				SESSION 3	
Outcome	**Delayed (n=23)**	**Immediate (n=18)**	**Total**	**P-value: Immed. vs. Delayed**	**Immediate (n=17)**	**P-value: Immed. 2 vs. 3**
RIAS-coded communication (Mean (SD))						
% information presented in personal terms	46.6 (15.2)	49.45 (14.4)	47.87 (14.73)	0.550	58.05 (14.22)	0.594
Student % open questions	60.70 (10.85)	56.06 (14.97)	58.66 (12.86)	0.257	56.41 (13.26)	0.943
Student facilitative statements (%)	15.84 (4.67)	16.33 (6.13)	16.06 (5.29)	0.771	15.85 (6.68)	0.892
Student facilitative statements without back-channels (%)	11.47 (2.65)	11.83 (3.77)	11.63 (3.15)	0.726	12.11 (4.51)	0.721
Student emotional statements (%)	5.29 (2.99)	7.27 (2.36)	6.16 (2.88)	0.027**	5.98 (3.02)	0.049**
Patient- centeredness summary score	0.53 (0.17)	0.63 (0.19)	0.57 (0.18)	0.061*	0.55 (0.20)	0.208
Verbal dominance (Ratio of student to SP talk)	1.75 (0.35)	1.69 (0.40)	1.72 (0.37)	0.590	1.79 (0.53)	0.299
Session length in minutes	33.83 (8.02)	34.63 (6.95)	34.18 (7.49)	0.738	34.14 (6.81)	0.772
Proficiencies (%)						
Elicit all concerns	15 (65.2%)	14 (77.8%)	29 (70.7%)	1.00	13 (76.5%)	1.000
Summarize key points	5 (21.7%)	5 (27.8%)	10 (24.4%)	0.655	7 (41.2%)	.683
Teach-back	1 (4.3%)	7 (38.9%)	8 (19.5%)	0.006***	4 (23.5%)	.617
SP-reported skill use (Mean (SD))						
Total (max: 22)	18.76 (2.90)	19.66 (2.08)	19.13 (2.60)	0.296	20.21 (0.83)	0.336
LISTEN (max: 5)	4.30 (1.02)	4.81 (0.40)	4.51 (0.85)	0.067*	4.88 (0.33)	0.670
EDUCATE (max: 6)	5.70 (0.47)	5.75 (0.58)	5.72 (0.51)	0.748	5.94 (0.24)	0.271
ASSESS (max: 4)	2.41 (0.60)	2.47 (0.64)	2.44 (0.61)	0.783	2.68 (0.43)	0.320
PARTNER (max: 3)	2.70 (0.76)	2.75 (0.77)	2.72 (0.76)	0.829	2.94 (0.24)	0.384
SUPPORT (max: 4)	3.65 (0.71)	3.88 (0.34)	3.74 (0.59)	0.255	3.76 (0.44)	0.670