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Status Of Abortion Curriculum In Genetic Counseling: Survey Of Graduate Programs And Recent Graduates In The United States

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Genetic counselors are trained to help individuals navigate the medical and psychological implications of genetic test results, familial conditions, and ultrasound anomalies. Therefore, familiarity of reproductive options, including abortion, is vital. Previous studies have found gaps in genetic counselors' knowledge regarding abortion care. Currently, there are currently no recommendations regarding abortion curriculum or education. Thus, this study aimed to assess the state of abortion curriculum in genetic counseling programs in the United States (U.S.) and to examine and compare the satisfaction levels of program representatives and recent graduates. Program representatives and recent graduates were invited to complete an anonymous survey evaluating abortion curriculum, satisfaction with said curriculum, and preparedness to counsel on abortion. Quantitative data from 46 program representatives and 123 recent graduates were analyzed using descriptive statistics and appropriate statistical analyses, including Mann-Whitney-U test and Kruskal-Wallis test. Large variability existed in the amount and types of abortion training. Results showed greater satisfaction and feelings of preparation to counsel on abortion in recent graduates whose program provided a dedicated abortion curriculum ($p<0.001$, $p=0.005$). Additionally, recent graduates with abortion counseling experience felt less prepared to counsel on abortion than their programs believed them to be ($p=0.04$). Graduates perceived procedural timing, facilitation of genetic testing, support desired, decision making, and

federal legislation to be the most important topics, though these were not covered in all programs; therefore, the inclusion of these topics into genetic counseling practice-based competencies should be considered. Program representatives and recent graduates alike noted that variability in clinical training is a barrier in abortion education, therefore role plays and use of standardized patients are proposed as potential solutions. Our results demonstrate a need for curricular reform in order to reduce variability in training and ensure that all graduates receive the same foundational abortion education.

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Introduction

Genetic counselors are masters-level professionals who are trained to help people understand and adapt to the medical, psychological, and familial implications of the genetic contributions to disease (National Society of Genetic Counselors' Definition Task Force et al., 2006). This process involves integrating the interpretation of family and medical histories with education regarding inheritance, testing, and recurrence risk, and providing counseling to promote informed decision making for management and adaptation to the risk or condition. In 2010, the National Society of Genetic Counselors (NSGC) released position statements that support the right of individuals to make reproductive decisions, including the termination of a pregnancy, through the use of unbiased, comprehensive information received from a genetic counselor (National Society of Genetic Counselors, 2018). Though prenatal genetic counselors are often the healthcare providers responsible for educating patients and facilitating decision-making after the identification of risk for fetal disease, the discussion of reproductive options is not limited to the prenatal specialty. Instead, reproductive options are often discussed when patients receive diagnostic genetic testing and/or consider presymptomatic genetic testing (Crook et al., 2022; Gorman et al., 2016). Thus, it is vital that genetic counselors in all specialties have a baseline knowledge of available reproductive options, including abortion, to help patients make informed decisions that align with their needs and values.

Previous studies have identified gaps in abortion knowledge and care among practicing genetic counselors. In a study assessing the experience of genetic counselors working with patients facing the decision to terminate a pregnancy after 24 weeks gestation, Graziani et al. found that while 93.5% of respondents reported genetic counselors are the health care providers responsible for discussing abortion options with these patients, one-third of participants indicated some or no understanding of abortion procedures, and three-quarters reported some or

no understanding of federal abortion law (Graziani et al., 2018). Additionally, Smith et al. reported that patients with a prior history of abortion following a fetal anomaly would have liked their genetic counselor to provide more information about the abortion procedure, to provide more compassionate care and emotional support, to help with coordination of the process, and to provide referrals and support resources for follow-up care. While this study noted that these desired roles are encompassed within the genetic counseling scope of practice, the authors speculated that the inconsistency in care could be due to the lack of guidance regarding abortion care by the Accreditation Council of Genetic Counseling (ACGC), (Smith et al., 2021).

In 2019, the ACGC set forth updated Standards for Accreditation which constitute the minimum requirements for accredited genetic counseling programs and provide guidance for the development of new programs. Additionally, 22 practice-based competencies (PBC), which entry-level providers must successfully demonstrate to practice as a genetic counselor, were delineated (Accreditation Council for Genetic Counseling, 2019; Doyle et al., 2016). These PBCs are used to guide programs in the required skills necessary for an entry level genetic counselor. The ACGC has stated that the didactic and experiential components of a genetic counseling program must support these aforementioned guidelines. While the Standards for Accreditation state that one of the general content areas required to support the development of the PBCs must include human reproduction, this document provides no further instruction regarding the information or topics that should be included. Thus, there is little guidance on how to offer genetic counseling training in abortion care, let alone regarding what may constitute as best practices. This lack of guidance risks the possibility of widely varied training approaches among programs.

Prior studies regarding genetic counseling education have shown that there is significant variability in how and what content is presented to students. Profato et al. assessed the integration of genomic medicine in genetic counseling programs and found variability in the availability of a dedicated genomics curriculum (Profato et al., 2014). Time devoted to genomic medicine instruction was also found to vary between 2 to 35+ hours, and Loudon et al. described variable levels and methods of pharmacogenomic education across genetic counseling training programs in North America (Hooker et al., 2014; Loudon et al., 2021). Additionally, not all content deemed important by program directors is reflected in the standards set forth by the ACGC. Sanborn et al. found that while most program directors agree on the importance of including disability training in the genetic counseling curriculum, the ACGC only minimally includes the integration of disability training in both the Standards for Accreditation and the PBCs (Sanborn & Patterson, 2014).

Variation in abortion curricula has been observed in other healthcare professions. Abortion curricula has consistently been described as limited or been completely omitted in United States (U.S.) medical student education, and Cessford et al. noted that medical students in both their second and fourth training years at the study site demonstrated a poor overall understanding of abortion (Cessford & Norman, 2011; Espey et al., 2005). The Accreditation Council for Graduate Medical Education (ACGME) requires Obstetrics and Gynecology (OB/GYN) residency programs to provide “opt out” abortion training for all OB/GYN residents, but surveys of OB/GYN residency programs have demonstrated variability in routine abortion education, which may not consistently be provided (Horvath et al., 2021).

Currently, the state of abortion curriculum and graduate satisfaction with said education in genetic counseling graduate programs is unknown. Therefore, the aim of our study was to assess the status of abortion education in genetic counseling graduate programs and compare

graduates' and programs' attitudes and satisfaction toward such curricula. Additionally, this study explored potential differences in curriculum depending on the legislative landscape of the graduate program's state, using categorization from the Guttmacher Institute (Elizabeth Nash, 2019). The intended goal of this study was to identify areas of improvement in genetic counseling graduate programs so graduates entering the workforce are best prepared to help their patients and communities in the discussion of abortion care.

Methods

Study Design & Inclusion Criteria

This study surveyed two populations: accredited genetic counseling programs in the U.S. and recent alumni of those programs (2017-2021 graduates). Study participation was voluntary and confidential. Institutional Review Board approval was obtained through the University of Texas Health Sciences Center at Houston Committee for the Protection of Human Subjects. Exempt status was obtained on 08/23/2021 (HSC-MS-21-0708).

Participants

Genetic counseling program representatives were recruited from the Association of Genetic Counseling Program Directors (AGCPD) 2021 listserv. Program directors from each of the 52 ACGC accredited genetic counseling programs in the U.S. were sent a cover letter outlining the purpose of the survey, including instructions for selecting the most appropriate individual involved with their program's abortion curriculum to complete the survey, as well as the survey link on 08-31-21. A survey reminder was sent via the AGCPD listserv on 09-16-21 and personalized emails were distributed to individual program directors on 10-21-21 and 12-01-21. The survey was open from 08-31-21 through 12-15-21.

Recent graduates were initially recruited in three ways: through the NSGC Student Research Survey email blast on 09-08-21; via social media, including Twitter, Instagram, and Discord on 09-09-21; and via genetic counseling programs in the form of alumni newsletters or alumni mailing lists by personal email sent to program directors on 10-12-21. A second NSGC Student Research Survey email blast was sent on 11-03-21, a second personal email was sent to program directors on 12-01-21, and various posts were made on social media throughout this period, with the last post made on Twitter on 12-08-21. To be eligible for inclusion, participants had to graduate from an accredited genetic counseling program in the U.S. between 2017 and 2021. At the conclusion of the recent graduate survey, participants had the opportunity to share their email address to enter into a gift card drawing. Email addresses were collected separately from the survey to preserve anonymity of responses. Data collection closed on 12-09-21.

Instrumentation

An online data collection and survey tool, Qualtrics (Qualtrics, Houston, TX) was used to create two distinct surveys and administer the correct survey to eligible participants. Both surveys were investigator-designed questionnaires consisting of various question formats that included multiple choice, multiple-select, Likert scale, and free response questions.

Program representatives were asked to complete a survey of 18 questions, which were divided into three sections. The first section focused on the current status of abortion curriculum in the program and included questions regarding the presence of dedicated abortion curriculum, influential factors, specific topics covered, teaching formats, opportunities for students to practice providing abortion counseling, and the amount of time dedicated towards abortion instruction. In the second section, respondents were asked to indicate their overall satisfaction with the abortion curriculum on a five-point Likert-scale ranging from extremely unsatisfied to

extremely satisfied. Additionally, program respondents were asked to assess graduates' level of preparedness to counsel about abortion on a second five-point Likert scale ranging from extremely unprepared to extremely prepared. The final section posed demographic questions, including affiliated roles in the genetic counseling program, graduation year, and state.

The number of questions a recent graduate was given varied and was dependent on their experience in providing abortion counseling and their answers to specific gateway questions. The recent genetic counseling graduate survey was divided into six main sections. The first section focused on general abortion curriculum and included questions regarding the presence of dedicated curriculum, educators involved, teaching formats and their perceived benefit, and availability of opportunities to practice providing abortion counseling. A five-point Likert-scale ranging from extremely unsatisfied to extremely satisfied also asked respondents to detail their overall satisfaction with the abortion curriculum. The second, third, and fourth sections included questions on the inclusion and importance of the following subjects: abortion procedure specifics, abortion policy and justice, and psychosocial issues in abortion counseling, respectively. Average importance scores were calculated for each topic by tallying all importance ratings (3= important, 2= neither important or unimportant, 1=unimportant) and dividing by the number of recent graduates in the population of interest. The fifth section was reserved for participants that had experience providing abortion counseling as a practicing genetic counselor and focused on determining how prepared these participants felt based on their graduate training and how well their education truly reflected their abortion counseling. Finally, alumni were asked demographic questions including their graduate program's state, patient care models, specialty areas, age, gender identity, and race and ethnicity.

Data Analysis

Survey responses were collected in Qualtrics and coded into a Microsoft Excel file stored on a secure UTHealth server. If the participant started but did not complete the survey, data from that participant was excluded from the analysis. Quantitative data were analyzed using the Stata (v. 13) software available through the University of Texas Health Science Center at Houston. States were categorized according to abortion hostility status of hostile, middle-ground, and supportive, following the classifications proposed by the Guttmacher Institute (Elizabeth Nash, 2019). Categorical variables were reported as frequencies and percentages. Continuous, non-parametric variables were assessed using the Mann-Whitney-U rank sum test, as well as the Kruskal-Wallis test with post-hoc Dunn test. Statistical significance was assumed at a p-value of $p<0.05$.

Results

Demographics

A total of 54 responses were received from program representatives in the U.S. Of these responses, 46 were complete and therefore deemed eligible for analysis. Given the 52 accredited genetic counseling graduate programs in the U.S., we estimate a response rate of 88.5% (46/52) (Accreditation Council for Genetic Counseling, 2022); however, this may be an overestimate as some programs may have had multiple representatives complete the survey. The majority of individuals who participated in this survey were involved in program leadership (36/46, 76%) and either currently specialize in reproductive medicine (21/46, 45.7%) or had previously specialized in reproductive medicine (20/46, 43.5%). Over half of program representatives were affiliated with a genetic counseling program located in a hostile state (28/46, 60.9%), (Table 1).

Table 1 Demographics- Program Representatives

Characteristic	n (%)
Graduation Date (n=45)	
1980-1989	7 (15.6)
1990-1999	11 (24.4)
2000-2009	16 (35.6)
2010-2019	10 (22.2)
After 2019	1 (2.2)
Specilaize in Reproductive Medicine (n=46)	
Yes, currently	21 (45.7)
No, but have in the past	20 (43.5)
No, never	5 (10.9)
Current Role (Select all that apply) (n=46)	
Program leadership	36 (78.3)
GC not in leadership	9 (19.6)
GC outside of program	2 (4.3)
State Hostility (n=46)	
Hostile	28 (60.9)
Middle	1 (2.2)
Supportive	16 (34.8)
Prefer not to answer	1 (2.2)

A total of 320 alumni responses were received. Survey completion and open-ended responses were monitored after each distribution of the survey link and/or each social media post. Ninety-six responses were received minutes apart from each other within a twenty-four-hour period after the final survey announcement on Twitter on 12-08-21. Past response rates had not exceeded 25 survey submissions per day and were not received throughout all hours of the night. Open-responses associated with these submissions were unintelligible and led to concern that individuals who did not meet the inclusion criteria were taking the survey in order to add their emails for the gift card raffle. For this reason, all responses from the month of December were excluded. Of the 165 remaining responses, 123 met eligibility for inclusion. As it is unclear how many 2017-2021 genetic counseling graduates were able to be reached, we cannot

determine an accurate alumni response rate. Of these responses, 51 (41.4%) participants indicated experience providing abortion counseling. Half of these graduates reported practicing in a different state than their graduate program (26/51, 51.0%). Of the 44 participants who currently provide abortion counseling, 15.9% (7/44) do so 1-5 times per year, 27.3% (12/44) do so 6-10 times per year, 9.1% (4/44) do so 11-15 times per year, and 47.7% (21/44) do so more than 15 times per year. The largest number of participants graduated from a program in a hostile state (80/123, 65.0%) in 2021 (51/123, 41.5%). The majority of individuals reported being White (109/123, 88.6%), women (114/123, 92.7%), and between the ages of 20-30 years (109/123, 88.6%), (Table 2).

Table 2 Demographics- Recent Graduates

Characteristic	All Graduates n out of 123 (%)	Counselors with Abortion Experience n out of 51 (%)
Graduation Date		
2017	12 (9.8)	10 (19.6)
2018	15 (12.2)	9 (17.6)
2019	16 (13.0)	10 (19.6)
2020	29 (23.6)	7 (13.7)
2021	51 (41.5)	15 (29.4)
Age (years)		
20-30	109 (88.6)	43 (84.3)
31-40	13 (10.6)	7 (13.7)
41-50	1 (0.8)	1 (2.0)
Gender		
Agender	1 (0.8)	0 (0)
Genderfluid	1 (0.8)	0 (0)
Man	6 (4.9)	3 (5.9)
Woman	114 (92.7)	48 (94.1)
Questioning	1 (0.8)	0 (0)
Race and/or Ethnicity (select all that apply)		
Indigenous Peoples	1 (0.8)	0 (0)
Black, African American, or of African descent	2 (1.6)	1 (2.0)
East Asian	4 (3.3)	1 (2.0)
Hispanic, Latino, Latina, or Latinx	6 (4.9)	2 (3.9)
Middle Eastern/Southwest Asian or North African	1 (0.8)	0 (0)
South Asian	6 (4.9)	2 (3.9)
Southeast Asian	1 (0.8)	0 (0)
White	109 (88.6)	46 (90.2)
State hostility		
Hostile	80 (65.0)	31 (60.8)
Middle	1 (0.81)	1 (2.0)
Supporitve	40 (32.5)	19 (37.3)
Prefer not to answer	2 (1.6)	0 (0)

Status of Abortion Curriculum

All program representatives reported that abortion was discussed within their curriculum. Over 80% (37/46, 80.4%) of program representatives stated that their affiliated genetic counseling program has a dedicated or structured curriculum regarding abortion. The remaining program representatives stated that abortion is discussed with other topics (9/46, 19.6%). The presence of

a dedicated abortion curriculum did not differ by the program's state hostility status (U= 169.5, p= 0.92).

Fewer than 70% of participating recent graduates reported having a dedicated abortion curriculum (85/123, 69.1%), while the remaining participants reported that abortion was discussed with other topics (37/123, 30.1%) or not discussed at all (1/123, 0.8%). More than 60% of alumni from programs located in both hostile (58/80, 72%) and supportive states (24/40, 60.0%) reported receiving dedicated abortion curriculum, with no significant difference found between them (x^2(3) =3.1, p=0.37). Participating alumni from the class of 2021 (42/51, 82.4%) described more dedicated abortion curricula than those who graduated between 2017-2020 (43/72, 59.7%), (U=2256, p=0.007).

Content and Factors Associated with Curriculum

Content included in abortion curricula largely varied throughout programs, but timing of procedure (i.e., gestational age restrictions) and facilitating patient decision-making were selected by all program representatives as topics included in the curriculum (46/46, 100%) (Table 3). Factors that most influenced the curriculum included input from program leadership (43/46, 93.5%), input from genetic counselors affiliated with the program but not in leadership roles (43/46, 78.3%), and recommendations from professional societies (29/46, 65.2%). Less influential factors included state legislature (12/46, 26.1%), personal views and beliefs (12/46, 26.1%), federal legislature (13/46, 28.2%), and hospital and university boards (2/46, 4.3%). Program representatives noted that the most common opportunities available for students to practice abortion counseling were clinical experience (41/46, 89.1%) and in-class discussion (37/46, 73.9%), while less than 60% reported the use of role plays (27/46, 58.7%) or standardized patients (13/46, 28.2%). One program representative stated that there were no opportunities for students to practice abortion counseling. Formats used to provide abortion

education are shown in Table 5, with lectures being the most frequently used (45/46, 97.8%), followed by in-class discussion (40/46, 88.9%). The median time dedicated to abortion instruction was 4 hours, with a range from one to 12 hours reported. There was no difference in dedicated time between programs located in hostile and supportive states (U=169.5, p=0.92).

Abortion curriculum content reported to be included in the abortion curriculum by recent graduates somewhat varied from that reported by program representatives, but timing of procedure (i.e., gestational age restrictions) and facilitating patient decision-making were selected by most respondents (Table 3). The importance of each topic was calculated and found to differ between recent graduates with and without abortion counseling experience. Timing of procedure (i.e., gestational age restrictions) and facilitation of genetic testing on products of conception (e.g., the option of, availability for, and how to facilitate such testing) were found to have the highest importance scores regardless of abortion counseling experience (Table 4). Recent graduates with abortion counseling experience were asked to rank the three abortion content blocks in order of importance, and "Psychosocial Topics" was ranked as most important (25/50, 50.0%) followed by "Abortion Procedure Topics" (21/50, 42%) and "Abortion Policy" (4/50, 8.0%). Recent graduates noted that the individuals who most frequently taught their abortion curriculum were genetic counselors (112/123, 91.1%) and medical providers (78/123, 63.4%), while chaplains, therapists, grief counselors, and patient advocates were described as providing this education less than 18% of the time, collectively. The most common opportunities to practice abortion counseling were within clinical experiences with practicing genetic counselors (97/123, 78.9%), role plays (71/123, 57.7%), and in-class discussions (67/123, 54.5%). Less than 25% (30/123) of recent graduates reported the use of standardized patients in their abortion graduate training, and 11.4% (14/123) stated that they had no opportunities to practice providing abortion counseling during graduate training.

Table 3 Topics Included in Abortion Curriculum

Topic	All Program Representatives n (%)	All Graduates n (%)
Timing of procedure (gestational age restrictions)	46 (100)	110 (89.4)
How to facilitate patient decision making	46 (100)	108 (87.8)
Option/Availability of D&C procedure	44 (95.7)	100 (81.3)
Option/Availability of D&E procedure	44 (95.7)	102 (82.9)
Option/Availability of Induction procedure	44 (95.7)	96 (78.1)
Option/Availability of memory making (e.g. holding baby, footprints, pictures)	43 (93.5)	103 (83.7)
Option/Availability of autopsy and/or fetal dysmorphology examination	42 (91.3)	93 (75.6)
Option/Availability/How to facilitate genetic testing on products of conception	42 (91.3)	88 (71.5)
Resources/support desired and available to pregnant person or family before, during, or after an abortion (e.g. books, chaplaincy, grief counseling, post abortion GC session, support groups)	42 (91.3)	96 (78.1)
Length of procedure (including number of visits required)	41 (89.1)	75 (61.0)
Specific state legislation (e.g. requirement of ultrasound prior to procedure, state-required counseling prior to procedure, burial requirements)	41 (89.1)	97 (78.9)
Discussion of the stigma surrounding abortion	39 (84.8)	96 (78.1)
Coping strategies used by patients and families after an abortion	39 (84.8)	90 (73.2)
Type of facility (inpatient vs. outpatient, hospital vs free-standing clinic)	37 (80.4)	83 (67.5)
Medications used, inlcuding mife/miso, KCl/lidocaine/digoxin (on pregnant person and fetus)	36 (78.3)	78 (63.4)
Discussion of how providing abortion counseling may impact the genetic counselor	34 (73.9)	61 (49.6)
Discussion of reproductive advocacy (e.g. discussion of the role of GC in destigmatizing abortion, how to navigate abortion advocacy and disability advocacy)	33 (71.7)	62 (50.4)
Insurance coverage (e.g. major commerical insurers, Medicaid)	31 (67.4)	45 (36.7)
Federal legislation (e.g. Hyde amendment)	31 (67.4)	54 (43.9)
Cost of procedure	30 (65.2)	50 (40.7)
Immediate complications/risks associated with procedure for pregnant person	29 (63.0)	63 (51.2)
Long-term risks or effects on reproduction for pregnant person	27 (58.7)	43 (35.0)
External funding of abortion procedure	26 (56.5)	35 (28.5)
Information on fetal pain	21 (45.7)	41 (33.3)
Medical contraindications for pregnant person	16 (34.8)	24 (19.5)
Option/Availability of doula services	12 (26.1)	25 (20.3)
Other	1 (2.2)	N/A

Table 4 Abortion Education Formats Reported by Program Participants and Recent Graduates

Format	Program Representatives n out of 46 (%)	All Graduates n out of 123 (%)	Designated as Helpful by Counselors who Selected Format n (%)
Lectures	45 (97.8)	109 (88.7)	41 (89.1)
In-class discussion	40 (88.9)	87 (70.7)	33 (94.3)
Assigned articles	32 (69.6)	42 (34.1)	13 (59.1)
Observing abortion counseling/Clinical experiencewith a GC	28 (60.9)	79 (64.2)	35 (100)
Case presentation	27 (58.7)	42 (34.1)	14 (82.4)
Assigned review of state and/or federal laws	20 (43.5)	42 (34.1)	11 (78.6)
Case conference presentations	18 (39.1)	28 (22.8)	9 (64.3)
Role play	17 (37.0)	48 (39.0)	18 (90.0)
Book	16 (34.8)	19 (15.4)	6 (85.7)
Clinical experience with a medical provider that is NOT a GC	12 (26.1)	17 (13.8)	9 (100)
Support group involvement	12 (26.1)	2 (1.6)	0 (0)
Standardized patient	11 (23.9)	17 (13.8)	6 (85.7)
Vidoe/Documentary	9 (19.6)	13 (10.6)	4 (80.0)
Patient advocate presentation/discussion	9 (19.6)	12 (9.8)	5 (100)
Other	6 (13.0)	6 (4.9)	2 (100)
Podcast	3 (6.5)	2 (1.6)	1 (50)

Formats used to provide abortion education are shown in Table 5, and while lectures (109/123, 88.7%) and in-class discussion (87/123, 70.7%) were described as most frequently used, alumni with experience in abortion counseling did not all agree that these methods were the most helpful. Roughly half of all participants reported that other instruction formats would have been helpful (57/123, 46.3%), while the other half reported they were unsure (57/123, 46.3%) or that there were no other educational formats which would have been more helpful (9/123, 7.3%). Most of the recent graduates with abortion counseling experience (39/51, 76.5%) reported feeling that their abortion education somewhat reflects the counseling they provide, but they have had to supplement their education since completion of their graduate training. The remaining participants either noted their education reflects their counseling (4/51, 7.8%) or that it does not, and they have had to supplement their graduate education greatly (8/51, 15.7%). The median for the perceived time dedicated to graduate school abortion instruction was 3 hours, with a range from 30 minutes to 120 hours reported. There was no difference in the reported

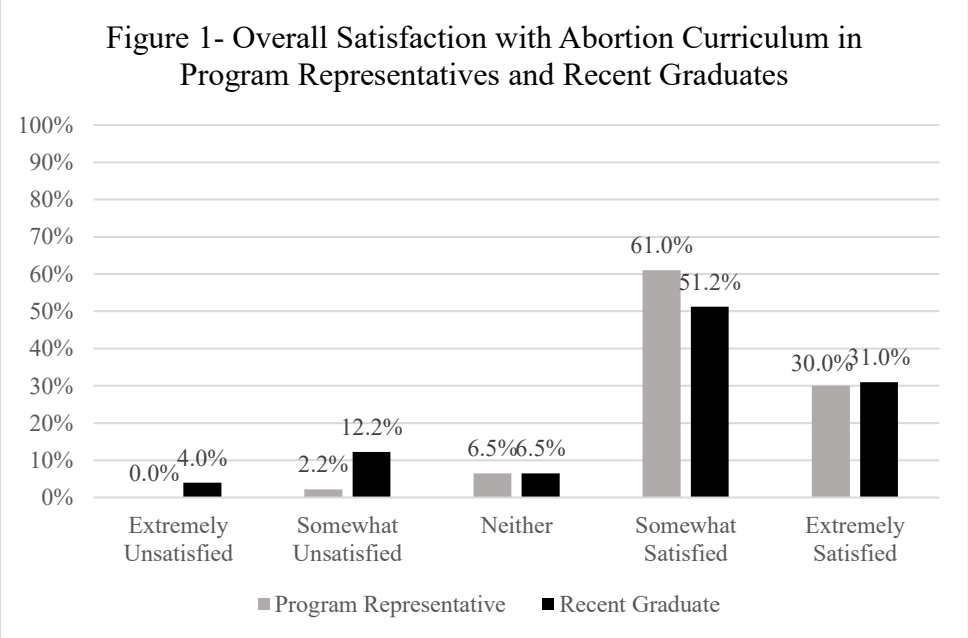
dedicated time between those that had graduated from programs located in hostile and supportive states ($x^2(3) = 0.73$, $p=0.86$).

Table 5 Topics by Average Importance Score

Topic	Average Importance Score for All Recent Graduates	Average Importance Score for Recent Graduates with Abortion Counseling Experience	Average Importance Score for Recent Graduates without Abortion Counseling Expereince
Timing of procedure (gestational age restrictions)	3	2.94	3
Option/Availability/How to facilitate genetic testing on products of conception	3	2.94	3
Resources/support desired and available to pregnant person or family before, during, or after an abortion (e.g. books, chaplaincy, grief counseling, post abortion GC session, support groups)	2.99	2.92	3
How to facilitate patient decision making	2.98	2.9	3
Federal legislation (e.g. Hyde amendment)	2.97	2.9	2.98
Option/Availability of Induction procedure	2.97	2.9	2.98
Option/Availability of D&E procedure	2.96	2.88	2.98
Option/Availability of D&C procedure	2.96	2.88	2.98
Coping strategies used by patients and families after an abortion	2.96	2.92	2.95
Discussion of reproductive advocacy (e.g. discussion of the role of GC in destigmatizing abortion, how to navigate abortion advocacy and disability advocacy)	2.95	2.92	2.94
Discussion of the stigma surrounding abortion	2.95	2.9	2.94
Option/Availability of memory making (e.g. holding baby, footprints, pictures)	2.94	2.84	2.98
Specific state legislation (e.g. requirement of ultrasound prior to procedure, state-required counseling prior to procedure, burial requirements)	2.94	2.88	2.95
Option/Availability of autopsy and/or fetal dysmorphology examination	2.93	2.86	2.94
Immediate complications/risks associated with procedure for pregnant person	2.9	2.8	2.94
Cost of procedure	2.88	2.74	2.94
Insurance coverage (e.g. major commerical insurers, Medicaid)	2.88	2.84	2.87
Long-term risks or effects on reproduction for pregnant person	2.87	2.82	2.87
Length of procedure (including number of visits required)	2.86	2.74	2.91
Discussion of how providing abortion counseling may impact the genetic counselor	2.85	2.8	2.86
External funding of abortion procedure	2.85	2.78	2.86
Medical contraindications for pregnant person	2.75	2.66	2.79
Type of facility (inpatient vs. outpatient, hospital vs free-standing clinic)	2.73	2.58	2.8
Information on fetal pain	2.73	2.7	2.7
Medications used, inlcuding mife/miso, KCl/lidocaine/digoxin (on pregnant person and fetus)	2.62	2.66	2.56
Option/Availability of doula services	2.55	2.43	2.61

Satisfaction

Overall satisfaction with the abortion curriculum for program representatives and recent graduates is shown in Figure 1. No difference in overall satisfaction was found between program representatives and recent graduates. (U= 3287.5, p=0.07). However, when satisfaction between program representatives and recent graduates with experience in abortion counseling was compared, those with experience in abortion counseling were found to be less satisfied than program representatives (U=1517.5, p=0.004). No difference in satisfaction was found between program representatives who reported a dedicated curriculum and those without one (U=218, p= 0.09), from those whose programs are located in hostile states compared to supportive states ($x^2(3) = 3.65$, p= 0.30), or from representatives who specialize in reproductive medicine compared to those that do not ($x^2(2) = 1.21$, p= 0.54).



Recent graduates from programs with dedicated abortion curriculum were found to be more satisfied than those who were not provided with a dedicated curriculum ($x^2(2) = 29.2$, $p<$ 0.001). Additionally, those with experience in abortion counseling were less satisfied than those without experience in abortion counseling (U=1482, p= 0.04). No difference in satisfaction was

found between recent graduates who graduated from programs in hostile states compared to supportive states ($x^2(3) = 1.90$, $p = 0.59$) or between those who graduated in 2021 compared to those who graduated from 2017 to 2020 (U=1638.5, $p = 0.27$).

Graduate Preparedness

Program representatives were asked to report their perception of how prepared graduates would be to counsel on the option of abortion based solely on the didactic and clinical components of the curriculum (Figure 2). Most program representatives described feeling their students were somewhat prepared to counsel on abortion upon graduation (34/46, 73.9%). No difference in perceived level of preparedness was found between program representatives who reported a dedicated curriculum compared to those without one (U=163, $p = 0.89$), those who reported programs in hostile states compared to supportive states ($x^2(3) = 0.45$, $p = 0.92$), or representatives who specialized in reproductive medicine ($x^2(2) = 1.67$, $p = 0.43$).

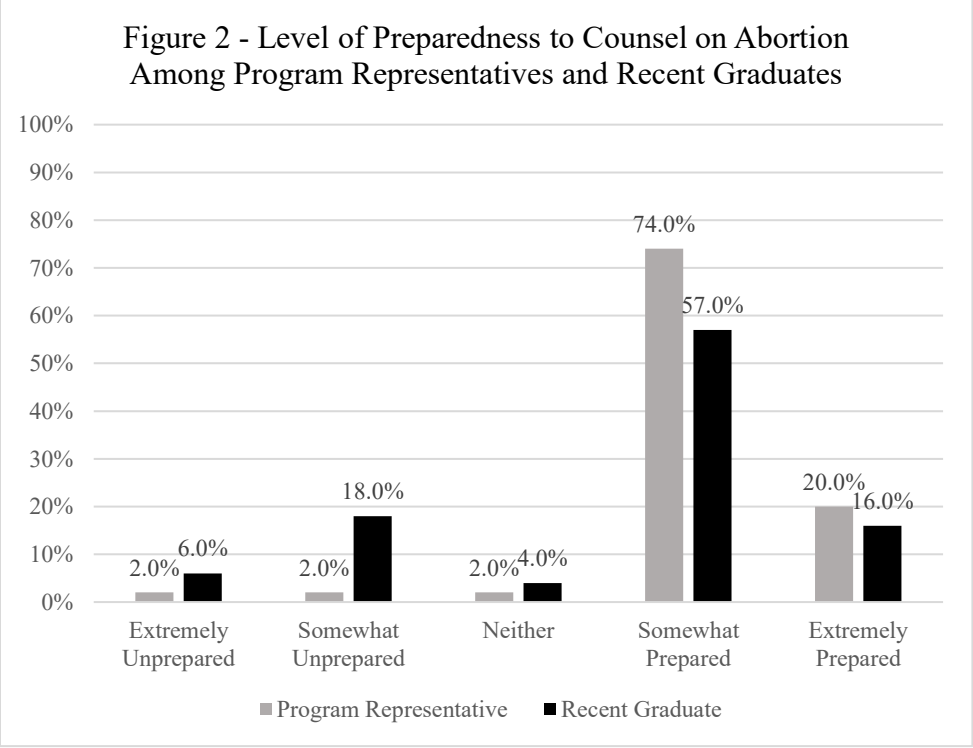


Figure 2 shows that the largest percentage of participants reported feeling somewhat prepared to provide abortion counseling (29/51, 56.9%) given only the didactic and rotation education

components provided by their affiliated genetic counseling graduate program. Recent graduates from programs with dedicated abortion curriculum described feeling more prepared to provide abortion counseling than those without a dedicated curriculum ($x^2(2) = 10.48$, p=0.005). There was no significant difference in feelings of preparedness based on their program's state hostility status ($x^2(2) = 0.24$, p= 0.88) or between those who graduated between 2017 and 2020 versus 2021 (U=269, p=0.98). When level of preparedness between program representatives and recent graduates with abortion counseling experience was compared, graduates were found to feel less prepared than their programs believed them to be (U=1414, p=0.04).

Discussion

This study is the one of the first to assess the status of abortion curriculum in genetic counseling programs and compare satisfaction levels of program representatives and recent graduates. Results from this study illuminate significant differences in satisfaction and perceived preparedness between recent graduates and genetic counseling graduate programs, regardless of program location in either a supportive or hostile state.

Didactic Curriculum

The presence of a dedicated abortion curriculum was associated with higher overall graduate satisfaction and higher perceived levels of preparedness to counsel on abortion. These results are consistent with findings from previous studies surveying other healthcare providers. OB/GYN residents surveyed in 2020 reported higher satisfaction with their induced abortion training when it was routinely offered in patient care (Horvath et al., 2021; Steinauer et al., 2013). In a 2021 statement released by the Society for Maternal-Fetal Medicine (SMFM), Maternal Fetal Medicine (MFM) physicians with exposure to family planning training programs were more likely to report current competence in providing options counseling and performing abortions than those without a family planning program exposure (Lappen et al., 2021). While all program representatives in our study noted offering some level of education on abortion,

results suggest that each program approaches the topic in markedly different ways and with varying depth. Though the lack of specific guidelines from ACGC allows flexibility for program leadership to design and tailor each curriculum as they see fit, results from this study suggest that more specific content areas are needed in order to ensure that all genetic counseling students receive the same fundamental knowledge regarding abortion. Open-ended responses highlighted that alumni would have appreciated more detailed information regarding abortion procedure specifics.

> "Our curriculum focused on learning about the legal barriers to abortion in various states and what the process of a late-term abortion is like for a patient. I wish we would have had more education on the different types of abortions that can be performed at different time points and how to talk to patients about abortion." - 2021 graduate, hostile state, somewhat unsatisfied.

Recent graduates noted the importance of each topic that was presented in this survey (Table 4). Based on these results, a foundational abortion education for all graduates should be considered and at minimum, include the five topics with highest average importance scores in our study: 1) timing of procedure (i.e., gestational age restrictions), 2) option/availability/how to facilitate genetic testing on products of conception, 3) resources/support desired and available to pregnant person or family before, during, or after an abortion (e.g. books, chaplaincy, grief counseling, post abortion genetic counseling session, support groups), 4) how to facilitate patient decision making, and 5) federal legislation (e.g. Hyde amendment). At a minimum, it is recommended that abortion be included in the Practice Based Competencies (PBCs) and this study serve as a framework for developing programs to consider what specific sub-topics would be important to include.

Findings from this study suggest that graduates from 2021 received more dedicated abortion education than graduates from 2017-2020. This distinction may be due to increased national attention towards reproductive rights and justice in light of recent restrictive abortion laws throughout several U.S. states, such as Texas' Senate Bill 8 (SB 8). An increase in the presence of formal abortion education in preclinical and clinical years of allopathic medical schools has also been noted since 2005 (Heger, 2020). Thus, it is even more important to ensure consistency in abortion education between genetic counseling graduate programs, or, at the very least, a standardized baseline education surrounding abortion care.

Use of Role Play and Standardized Patients to Supplement Clinical Experience

Participants from both program representatives and recent graduate populations reported that clinical experience varied not only by clinical rotation site(s), but also depended on specific patient experiences. Additionally, both populations reported they would prefer more curriculum-sponsored opportunities to practice conversations regarding abortion care.

> "Depending on the patients that happen to present for care during the course of a prenatal rotation, a student might not get an opportunity to counsel decision-making with patients during their supervision/clinical rotations experiences." - Program leadership, supportive state, somewhat prepared

> "I think offering us more opportunities to practice (e.g., role plays, standardized patients) would have been useful." - 2017 graduate, supportive state, somewhat satisfied

> "Again, the didactic component is the same for all students but with our students at different prenatal sites that can result in some slightly different experiences that we would love to standardize a little bit more." - Program leadership, hostile state, somewhat prepared

Opportunities to discuss the option of abortion during clinical rotations may have decreased in recent years due to the evolving reproductive legislative landscape in the U.S. Today's political climate surrounding abortion is increasingly hostile, and patients' reproductive options in many states are rapidly decreasing or vanishing altogether. At the time of this writing, the Guttmacher Institute has reported six states that prohibit abortions due to fetal anomalies - an increase from four states in 2021 (Guttmacher Institute, 2022). Previous studies have demonstrated the manner in which hostile federal and state legislation affects not only the information encompassed within a genetic counseling session, but also how that information is presented to a patient (Cooney et al., 2017.; Jayaraman et al., 2021). Free responses from this study echoed these previous findings.

> "It's important to acknowledge the difference in coursework/clinical work one trainee may experience from another based on the state they are training in. I was in a state with stricter rules so I rarely used the word "abortion" or "terminate" and would keep my discussions more vague [by] saying "information can be used to make decisions about pregnancy management." I used to see "management" as the secret word for abortion in restrictive states, but realized management can actually be applied to many different options in the pregnancy process. I did not have opportunities to practice counseling on abortion in clinic because the state was so restrictive and not all institutions openly provide the service. Once I began my job, which is based in a very open state in regards to laws, I realized I had never fully learned the basic concepts of abortion, basic steps to coordination of the procedure and genetic testing of POC, and how to navigate psychosocial counseling around the topic. Whereas, I imagine students who trained in the state I currently work [in] likely had greater exposure clinically and potentially more

> open conversations in the classroom about this topic." - 2021 graduate, hostile state, somewhat unprepared

While laws regarding availability and access to abortion vary by state, it is vital that genetic counseling graduates receive training that can sufficiently serve their patients, regardless of practice location, as half of the recent graduates with abortion counseling experience in our study noted practicing in a different state than their graduate program. Since state laws and the unpredictability of patient indications can create difficulties for students to counsel on varied options for abortion care in a supervised clinical setting, both role plays and standardized patient sessions provide a logical and practical solution to this potential gap in supervised training. While only 37% of program representatives reported the availability of role plays and 23.9% reported the ability to practice with standardized patients, most (90% and 85.7%, respectively) graduates with experience in abortion counseling stated that when afforded these opportunities, they were helpful.

> "I think the most valuable aspects of the abortion curriculum was the opportunity to role play and practice with a standardized patient, which made me feel much more comfortable when this concern came up during a rotation. I felt pretty well prepared to have the conversation with our patient because I had had the chance to practice in a lower-stakes setting, and to observe clinical supervisors walk patients through the discussion in the past." - 2021 graduate, hostile state, extremely satisfied

Xu et al. (2016) demonstrated that role-playing is an effective instructional strategy in genetic counseling training with over 97% of study participants reacting positively. Role plays serve an important function in graduate education as scenarios can be tailored to practice specific counseling skills and delivery of specific information, including that regarding abortion.

Standardized patients can also aid in practicing clinical skills in a safe and structured environment (Wallace et al., 2002). Holt et al. noted that participants found standardized patient simulations helpful and more realistic than role-playing with colleagues and that use of standardized patients allowed students to practice providing high-stakes information for rare learning opportunities (Holt et al., 2013). Because not every student is guaranteed to provide abortion counseling in a supervised clinical setting, standardized patients can provide an opportunity for abortion counseling with the benefit of offering feedback to the student after the encounter. Furthermore, the use of standardized patient sessions yields performance data that allows program leadership to ensure that overall curriculum needs are met (Jay Kessler et al., 2021).

Study Limitations

Limitations of this study include the small sample size of the alumni population, which may not represent the opinions of all recent graduates from 2017-2021. Furthermore, the possibility of recall bias exists, especially in alumni that are farther out from graduation. Responses from all states with genetic counseling graduate programs in the U.S were not received. While genetic counseling program names were purposefully not collected in order for participants to remain anonymous, there remains some uncertainty regarding which programs are represented in the survey. It is possible that programs and graduates who chose not to respond do not feel abortion counseling is an important topic and thus, our findings may be skewed. Both surveys utilized were developed by the authors and were not validated items. Thus, bias may have been introduced by the manner in which questions were asked of participants, the length of the survey, or interpretation of questions by respondents. Lastly, as syllabi from each program were not requested, there was no way to verify the content reported within abortion curricula.

Research Recommendations

While our study assessed which topics and educational formats are included in the genetic counseling abortion curricula, the depth of each topic was not investigated. Further research is required to assess which of these topics students, graduates, and programs believe to be the most vital in abortion education and which may need to be required in order for a student to be considered competent in counseling on abortion. These findings could potentially aid in standardization of the abortion curriculum that is offered during graduate school. Additionally, future research may wish to explore which of these topics should be included in the genetic counseling graduate education versus which topics may be better learned as a practicing genetic counselor following graduation. While this study did establish that there are barriers to providing in-depth abortion education, future research may be able further define these barriers and identify potential solutions. Furthermore, there is little information regarding how the scope of the genetic counseling profession fits in with the roles of other medical providers in abortion care. Additional research is needed to assess what information should be provided by a genetic counselor versus a physician regarding abortion.

Finally, in anticipation of the upcoming landmark decision in the SCOTUS case Dobbs v. Jackson Women's Health Organization, which holds the potential to overturn the constitutional right to abortion as determined by the 1973 decision in Roe v. Wade, future research should be directed to investigating the impact of a post-Roe world on genetic counseling graduate education on abortion care. As the legality of abortion would be left to individual states, the option of a legal abortion would only be available in states who provide reproductive health protection (Guttmacher Institute, 2022). The possibility exists that genetic counseling graduate education may mirror this division based on program and clinical rotation location. Research efforts at a national level (e.g. such as through the NSGC) might explore the

ethical impact of such potential disparities in genetic counseling education and training surrounding abortion care as it pertains to the equitable provision of comprehensive care across the reproductive lifespan and across the U.S. as a whole.

Conclusion

Findings from this study highlight differences in abortion curriculum in genetic counseling graduate programs in the U.S. and how such variation may impact graduate satisfaction and level of preparedness. Graduate satisfaction and perceived preparedness to counsel on abortion were both higher when a dedicated abortion curriculum was provided. However, various barriers in abortion education, including differences in the availability and extent of clinical abortion counseling training, were noted by program representatives and graduates alike. Given the evolving landscape of abortion legislation, incorporating the use of role plays and standardized patients can aid in minimizing these gaps in clinical training. Because genetic counselors in all specialties help patients make informed reproductive decisions, it is important that all counselors have a foundational knowledge of abortion. Therefore, the inclusion of abortion in the PBCs should be considered. The findings from this study may serve as a framework for genetic counseling programs to consider what specific abortion-related topics, as well as education formats, are most important and most helpful to include in their abortion curriculum in order to prepare graduates to provide abortion care.

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Vita

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