

SHADOWING OF CLINICAL GENETIC COUNSELORS AS AN ADMISSIONS CRITERIA

Shadowing of Clinical Genetic Counselors as an Admissions Criteria for Genetic Counseling
Programs

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Abstract

Introduction: Exposure to genetic counseling is a strongly recommended prerequisite for entrance into genetic counseling programs. Shadowing a clinical genetic counselor is the most common method of fulfilling that requirement. Despite this, a survey of the literature revealed no studies documenting the benefits of this experience to either genetic counseling training programs or their trainees.

Purpose and Methods: This study queried both program directors and genetic counseling students to determine the perceived value of shadowing and barriers to access, as well as identifying acceptable alternatives to shadowing. An online survey was distributed to 34 genetic counseling program directors using SurveyMonkey and completed by 20 for a response rate of 59%. A second survey was distributed to ~700 current genetic counseling students using SurveyMonkey and completed by 229 for a response rate of 33%.

Results: The majority of students (91%, n=208) reported shadowing a genetic counselor prior to acceptance, though many (19%, n=37) indicated that it was either "near to impossible" or "very difficult" to get this experience. Most described their experiences positively, with 94% of students (n=187) reporting that shadowing "confirmed their desire to pursue a career in genetic counseling." A substantial minority (47%, n=94) had alternate experiences they considered "as beneficial as shadowing." Most training programs (80%, n=16) reported shadowing as a recommended, but not required, admissions criterion. All program directors (100%, n=20) felt that shadowing gives applicants a better understanding of the profession. Despite the difficulty in getting this experience, 85% of directors (n=17) did not feel that the recommendation limits the applicant pool. Most program directors (83%

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n=15) considered interviewing a genetic counsellor an acceptable alternative; a minority (25%, n=5) looked unfavorably on shadowing done exclusively in a non-clinical setting.

Conclusion: Students and program directors both perceive value in shadowing a clinical genetic counselor. Given the level of difficulty in gaining this exposure, alternative experiences are also perceived to be of value to both populations. The perceived value of non-clinical shadowing in both populations is an area of further research as it will likely be more common as the field expands.

Keywords Genetic counseling · Shadowing · Graduate program · Clinical exposure · Non-clinical exposure · Additional experiences

Introduction

Exposure to genetic counseling is a required or strongly recommended prerequisite upon entrance into genetic counseling programs. One of the leading methods of obtaining access to the profession has been through the act of shadowing a clinical genetic counselor. The presence or absence of this experience can be a critical factor in an applicant's acceptance into a genetic counseling program (Online Resource 1).

Despite the importance placed on obtaining shadowing experience prior to entrance into genetic counseling, a survey of the literature revealed the absence of documented field specific studies reporting the basis of the principal motivation and rationale supporting the widespread affinity for applicants gaining shadowing experience. In addition, there is an absence of data reporting whether or not prior exposure to genetic counseling (through shadowing) aids in ensuring that the most qualified and appropriate applicants are admitted. With this in mind, the search expanded to other professional training programs, including medicine, dentistry, psychology, and occupational therapy. In order to capture as many relevant publications as possible, a broad search was conducted using synonymous terminology: "shadowing", "clinical exposure", "observational experience", "structured observership", "non-academic variables", and "non-cognitive variables". Surprisingly, despite the relative frequency with which applicants within the above professional fields obtain shadowing experience, a similar deficiency in the literature was discovered. Among the professional fields surveyed in the literature, few offered insight into the underlying purpose, process, and impact of shadowing experience as a means of recruiting the most qualified applicants. One study acknowledged shadowing as a means of identifying applicants that set themselves apart from their peers outside of academic success alone

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(Grapczynski and Beasley, 2013). In addition, other studies related to the field of medicine, alluded to an inequitable divide among applicants more successful at obtaining shadowing experience opposed to those that are not based on economic standing and/or minority status (Fincher et al., 2002; O'Connell and Gupta, 2006). A deeper look of the available literature related to shadowing, pertaining to the various professional fields, is outlined throughout the remainder of the introduction.

MEDICINE

The Association of American Medical Colleges (AAMC) states that shadowing allows for a proper introduction to a given profession as well as the day-to-day responsibilities of the specific health care professional. Shadowing a practicing health care professional, alternative to volunteering in a clinical setting, allows participants to "...gauge and affirm their interest[s]..." in a given career (AAMC, 2013). Furthermore, it is proposed that it is "essential" for an applicant considering a specific career to learn the meaning of the profession through shadowing (AAMC, 2013).

The majority of publications regarding shadowing of physicians focus on the following topics: (1) Long-term career satisfaction as a result of appropriate career motivations and realistic expectations of the profession (Chuck, 1996; Kitsis and Goldsammler, 2013; O'Connell and Gupta, 2006) (2) means of reducing professional burnout (Dyrbye and Shanafelt, 2011; Kitsis and Goldsammler, 2013) (3) determination of potential ethical problems associated with physician shadowing (Bing-You et al., 2014; Kitsis, 2011; Kitsis and Goldsammler, 2013) and (4) increase underrepresented minorities through "pipeline" educational programs (Fincher et al., 2002; O'Connell and Gupta, 2006).

DENTISTRY

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The literature regarding shadowing experience within the field of dentistry is limited. One commonality shared between medicine and dentistry is the existence of several pre-medical and pre-dentistry websites/blogs that reference the advantages of obtaining shadowing experience prior to admission. Shadowing experience has been referenced in a study investigating the inclusion of non-academic factors in dental school admissions (Lopez et al., 2009). The majority of research involving shadowing has focused on the use of shadowing for dental students as they transition between their preclinical to clinical education (Graham et al., 2013).

OCCUPATIONAL THERAPY

A review of the literature related to the field of occupational therapy (OT) demonstrates a similar absence of data related to shadowing exposure. However, investigations into altering the admission criteria as a means of identifying the most qualified applicants has been the subject of research. This came as a result of some feeling that identifying applicants based on academic success alone may result in the selection of students who are motivated by grades as opposed to professional suitability (Grapczynski and Beasley, 2013).

Hagedorn and Nora (1996) suggested the importance of "...identifying individuals who can develop the necessary competencies to carry on the work of the discipline", as well as highlighting specific characteristics held by applicants for the professionalization of their respective fields (Grapczynski and Beasley, 2013). Grapczynski and Beasley (2013) set out to develop a pilot study that created an "Achievement profile" as a means of identifying OT applicants that had engaged in various extracurricular activities leading to their "professional promise." Of note, the activities detailed within the *Achievement profile* did not have to be related to OT. Rather, the activities should demonstrate "key elements" related to core values

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in the field, such as altruism and autonomy, as well as exhibit an applicant's professional socialization (Grapczynski and Beasley, 2013). Subsequently, Grapczynski and Beasley (2013) propose their study as evidence for professional training programs to consider the implementation of "non-cognitive variables" for admission criteria as a means for identifying applicants with necessary characteristics suitable to the profession.

CLINICAL & COUNSELING PSYCHOLOGY

After a review of the literature related to clinical and counseling psychology, once again, a gap was identified regarding the importance of acquiring shadowing experience by applicants in the clinical and counseling psychology graduate programs. Instead, there is a general focus on applicants gaining competitive Graduate Record Examinations (GREs), competitive Grade Point Average (GPA), research experience, and completing required coursework in undergraduate studies (Mayne et al., 1994; Morgan and Cohen, 2008). This absence in the literature may be due to the nature of graduate programs within psychology. Graduates are able to work in a variety of settings outside of direct patient care. Consequently, obtaining shadowing experience by an applicant may not be valued in the same regard in the admissions process, as a genetic counseling applicant.

PURPOSE OF THE STUDY

While studies from other disciplines demonstrate some data pertaining to shadowing experience, it is evident that there is a significant gap in the literature, amongst all professional fields, with respect to the underlying purpose, process, and impact of shadowing experience as a means of recruiting the most qualified applicants. Thus, the proposed objectives of this cross-sectional study aims to capture the following: (1) the perceived value of shadowing by both genetic counseling students and program directors; (2) determining

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whether shadowing aids in the process of selecting the most qualified applicants; (3) understanding what the barriers are in acquiring this exposure; as well as (4) identifying acceptable alternatives to clinical shadowing.

Methods

Participants

Two distinct surveys were generated for each subject population: program directors of genetic counseling training programs and genetic counseling students in both their first and second year of training. Thirty-four program directors of North American genetic counseling programs, accredited by the Accreditation Council of Genetic Counseling (ACGC), were included. Approximately 700 students currently enrolled in an ACGC accredited genetic counseling programs in the United States and Canada were included. Non-English speaking individuals were excluded because the surveys were offered only in English.

Instrumentation

Anonymous surveys were administered via SurveyMonkey.com. Program directors were contacted via email through the use of the program director listserv, and were provided an introduction to the research project, the informed consent process, and the link to the survey. The students were sent an introduction of the research project, the informed consent, and the link to the student survey from their program directors. This study was approved by the Julia Dyckman Andrus Memorial's Institutional Review Board (IRB) on 11/11/2014.

Data Analysis

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Quantitative data from both surveys was analyzed utilizing Survey Monkey data analysis tools. Qualitative data from both surveys was analyzed in the following: initial themes and categories were generated from the descriptive data, the responses were organized under those themes, subcategories were created to reorganize the responses, and the final write-up was constructed utilizing the identified trends.

Results

Student Survey Data

Response Rate and Sample Demographics

A total of 229 current genetic counseling graduate students responded to the online survey, resulting in a response rate of 32.7% (n = 229/~700). The demographic characteristics of the student participants are presented in Table 1. The majority of respondents were women (91.7%) between the ages of 20 and 24 (58.08%) in an accredited graduate program at the time of survey completion (99.17%). The vast majority of respondents reported being born in the United States (86.04%) and held a Bachelor of Science degree (68.56%, n = 157/229). Lastly, at the time of applying to a graduate program, the majority of respondents reported an annual average household income (in US dollars) within the categories “under \$20,000” (25.76%) and “\$20,000-\$40,000” (26.20%).

Acquiring Shadowing Experience through a Clinical Genetic Counselor

Due to a strong emphasis placed on obtaining clinical shadowing experience by most graduate programs, the majority of respondents reported having been able to acquire such experience prior to their acceptance (n = 208/229, 90.83%). At this point, 10 respondents failed to complete the survey. For the remainder of the analysis, n = 198. The degree of difficulty acquiring clinical shadowing experience varied amongst respondents (Table 2).

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Nearly 19% indicated that the act of gaining such experience was either "near to impossible" or "very difficult". With the remaining respondents, there was found to be a nearly equal amount that found the experience as either "somewhat difficult" or "easy" (40.4% and 40.91%, respectively).

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Table 1: Participant demographics

Demographics	n	%
Age	229	
20-24	133	58.08
25-29	78	34.06
30-34	10	4.37
35-39	3	1.31
40-44	2	0.87
45-49	1	0.44
50-54	2	0.87
Sex	229	
Female	210	91.70
Male	18	7.86
Transgender	1	0.44
Other	0	0
Currently attending a ABGC accredited GC program	229	
Yes	227	99.13
No	2	0.87
Country of birth	222	
USA	191	86.04
Canada	31	31
Other †	7	
Education level achieved prior to entering current training program	229	
Bachelor of Arts	55	24.02
Bachelor of Science	157	68.56
Masters degree	16	6.99
Doctor of philosophy (Ph.D)	1	0.44
Master of business administration (MBA)	0	0
Average annual household income	229	
Under \$20,000	59	26.76
\$20,000 - \$40,000	60	26.20
\$41,000 - \$75,000	30	13.10
\$76,000 - \$100,000	20	8.73
\$101,000 - \$150,000	17	7.42
\$151,000 - \$200,000	7	3.06
Above \$200,000	10	4.37
Prefer not to answer	26	11.35

† "Other" responses included the following countries: China, India, Bosnia and Herzegovina, Ecuador, Hong Kong, Philippines, England and Taiwan

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Table 2: Respondents ability to acquire clinical shadowing experience		
Level of difficulty obtaining shadowing experience	<i>n</i>	%
	198	
“near to impossible”	6	3.03
“very difficult”	31	15.66
“somewhat difficult”	80	40.4
“easy”	81	40.91

As a means to describe and evaluate respondents shadowing experience, the study examined both the duration of time each respondent spent shadowing as well as the type of genetic counseling clinic in which the shadowing took place (Table 3). Greater than half of the respondents (53.54%, $n = 106/198$) indicated they shadowed a clinical genetic counselor for a duration between “2 to 14 days”. The next most commonly reported duration of shadowing experience was “one day”, reported at 14.65%.

Table 3: Shadowing experience data		
Duration of shadowing experience	<i>n</i>	%
	198	
“I did not observe patient sessions”	3	1.52
“One day”	29	14.56
“2 – 14 days”	106	53.54
“15-30 days”	16	8.08
“Between 2 – 6 months”	17	8.59
“Between 7 – 11 months”	13	6.57
“One year”	5	2.53
“Greater than one year”	9	4.55
Areas of exposure within genetic counseling	<i>n</i>	%
	198	
“Prenatal”	112	56.57
“Pediatrics”	106	53.54
“Adult”	54	27.27
“Cancer”	123	62.12
“Specialized”	38	19.19

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With respect to the areas of genetic counseling exposure, the majority of respondents indicated they obtained exposure in more than one area of genetic counseling, with cancer (62.12%), prenatal (56.57%) and pediatrics (53.54%) being the most common (Table 3). Furthermore, the methods to which respondents most identified with as a means of obtaining shadowing experience included, contacting a clinical genetic counselor directly (n = 117/198, 59.09%) as well as utilizing the National Society of Genetic Counselors (NSGC) "find a genetic counselor tool" (n = 90/198, 45.45%) (Table 4).

	<i>n</i> †	%
"Contacted genetic counselors"	117	59.09
"NSGC – Find a genetic counselor tool"	90	45.45
"Academic professional/colleague/TA/department head connection"	48	24.24
"Friend/family connection"	45	22.73
"Personal experience with a genetic counselor(s)"	27	13.64
"Volunteer services within local hospital"	21	10.61
"Use of a career counselor"	5	2.53

† Respondents were able to choose all methods that applied to them in this category

Students were asked in an open-ended question to explain how their shadowing experience impacted their desire to become a genetic counselor. The overwhelming majority of respondents indicated their respective shadowing experience "confirmed their desire to pursue a career in genetic counseling" (94.4%, n = 187/198). The remaining respondents described the impact of their shadowing experience as having "little impact" or felt that "it was not necessary". In addition, some respondents, within the latter group, further stated that they felt obtaining shadowing experience acted as a "barrier" to their application process. Students were asked whether shadowing provided them with a realistic understanding of the profession. Eighty-nine percent (n = 177/198) reported that it did.

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Of those respondents that did not feel their shadowing experiences provided them with a realistic overview of the profession (n = 21/198, 10.61%), the chief explanation for this centered around a "limited" exposure to the profession. Specifically, these respondents described their experiences as either having lacked exposure to the "behind the scenes work of a genetic counselor" or that the duration of their experiences was "too short" to get "the full picture".

Students were asked if they learned aspects about the genetic counseling profession that they would not have otherwise have acquired. Ninety-two percent indicated that they did. Respondents were able to provide further explanation. Of the 90 responses received, 75 respondents gained an appreciation for the day to day activities of a genetic counselor.

"Seeing a session in person gave me a better feel for what genetic counselors actually do on a daily basis and exactly how they do their jobs"

Respondents spoke specifically about case preparation, insurance company interactions, the role of a genetic counselor on a healthcare team and the general logistics of patient scheduling.

Acquisition of Additional Experience outside Shadowing a Clinical Genetic Counselor

This study investigated whether students acquired any additional experience(s) that contributed to their fundamental understanding of genetic counseling prior to applying to graduate school. It was found that 21.72% (n = 43/198) of respondents did not obtain any additional experience(s) outside of shadowing a genetic counselor (Table 5). The remaining respondents indicated they had obtained at least one type of additional experience. The most common additional experience acquired by respondents was an in-person meeting with a genetic counselor (n = 119/198, 60.10%). Other more common experiences included: attending a case conference and/or a genetics ground round (38.89%), over-the-phone

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interview (20.71%), job shadowing in a non-clinical setting (17.17%), and viewing the *Master Genetic Counselor Series* presented by the NSGC (15.15%).

Listed additional experience	n†	%
“I did not obtain any additional experience”	43	21.72
“Over the phone interview”	41	20.71
“In person meeting/interview with a GC”	119	60.10
“Attended case conferences/genetic rounds at local genetics clinic”	77	38.89
“Job shadowing genetic counselor in a non-clinical setting (i.e. research setting, marketing, lab, etc.)”	34	17.17
“Attended an NSGC conference”	11	5.56
“Observed mock genetic counseling sessions (i.e. Master Genetic Counselor Series – NSGC)”	30	15.15
“Other”	28	
Conference	6	21.43%
Internship	5	17.85%
Work	4	14.29%
Graduate program summer camp	3	10.71%
Interviews	3	10.71%
Email correspondence	2	7.14%
Open house	2	7.14%
Pedigrees	1	3.57%
Observed a genetic counseling class	1	3.57%
Met with a program director	1	3.57%

† Respondents were able to choose all methods that applied to them in this category

To better assess the relative impact and perceived value of these supplementary experiences, respondents were asked to compare their shadowing experience to their additional experiences in an open-ended question. The responses are characterized in Table 6. With reference to how these additional experiences impacted the respondents’ desire to become a genetic counselor, greater than 1/3 (37.88%) reported their additional experiences “confirmed their desire” to pursue genetic counseling as their chosen profession. Twenty-eight percent indicated their respective experiences enhanced their knowledge of the profession. Moreover, three respondents specifically stated that their additional experiences were *more* important

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than that of their shadowing exposure. One respondent who had an in-person meeting with a genetic counselor shared:

“These experiences were by far more insightful and important in my desire to become a genetic counselor. I had all of my questions answered and I felt that I got a much better idea of the life and work of a GC. In this setting, I got to know the counselor much more closely, and got a well-rounded view of the aspects of the job you miss in a day of shadowing (billing, phone calls, difficult cases, interacting with other health care providers, researching for cases, etc.)”

Response categories	<i>n</i>	%
	198	
“Confirmed desire”	71	35.86
“Enhanced knowledge of the profession”	51	25.76
“Additional experience had a <i>greater</i> impact than shadowing”	3	1.52
“Not much impact”	11	5.56
“Shadowing had a <i>greater</i> impact than additional experience”	7	3.54
“Inspired by GC’s personal career satisfaction”	12	6.06
“I did not achieve additional experiences”	43	21.72

When asked explicitly whether the additional experiences were more beneficial than shadowing, 43.43% replied that they were not (Table 7). Forty-eight percent of respondents felt that the additional experiences were “as beneficial as shadowing” and 9.09% felt that they were “more beneficial than shadowing”.

Response categories	<i>n</i>	%
	198	
“More beneficial than shadowing”	18	9.09
“As beneficial as shadowing”	94	47.47
“Not as beneficial as shadowing”	86	43.43
“I did not achieve additional experiences”	43	21.72

Respondents without Shadowing Experience

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For those respondents that reported to have not acquired clinical shadowing experience, this study attempted to explore the underlying reasons for their lack of shadowing, the potential alternative experience(s) they were able to obtain as well as how such experiences impacted their desire to pursue genetic counseling. Out of the 229 student respondents, 21 reported to have not shadowed a clinical genetic counselor prior to their acceptance into a graduate program. The most commonly reported reason for not acquiring shadowing experience, as noted by these students in an open-ended question, was their inability to locate a genetic counselor (n = 13, 61.90%). Some proposed confounding factors that included, remote geographic location (n = 9, 42.86%), limited time prior to application deadlines (n = 4, 19.05%) as well as privacy concerns held by hospitals/clinics (n = 8, 38.10%) (Table 8).

Reported Limitations	n	%
“Limited time”	4	19.05
“Location”	9	42.86
“Clinic/hospital privacy concerns”	8	38.10
“Unable to find a genetic counselor”	13	61.90
“Not a requirement”	1	4.76
“No reason”	1	4.76

* Respondents were able to choose more than one limitation if applicable.

While the respondents were unable to shadow, 20/21 obtained additional experience(s) (Table 9). An in-person meeting with a genetic counselor was the most common reported additional experience, with 71.43% of the respondents having had done this. The next most commonly reported experience (33.33%) was the utilization of the *Master Genetic Counselor Series* presented by the NSGC. Unique experiences that were described by respondents included, program sponsored genetic counseling summer camp, the opportunity to audit

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genetic counseling classes, volunteer work, and acting as a standardized patient within a genetic counseling program.

Table 9: Non-Shadowing: Acquired Additional Experience		
Listed additional experience	<i>n</i>	%
“I did not obtain additional experience”	1	4.76
“Over the phone interview”	4	19.05
“In person meeting/interview with a genetic counselor”	15	71.43
“Attended case conferences/genetic rounds”	3	14.29
“Job shadowed genetic counselors in a non-clinical setting”	3	14.29
“Attended the National Society of Genetic Counselors (NSGC) conference”	0	0
“Observed mock genetic counseling sessions (i.e. Master Genetic Counselor Series – NSGC)”	7	33.33
“Other”	8	
Volunteered	2	-
Role play as a patient	1	-
Met with a program director	1	-
Graduate program summer camp	1	-
Observed a genetic counseling class	2	-
Email correspondence	1	-

* Respondents were able to choose more than one limitation if applicable.

Seventeen out of the 21 respondents reported that these experiences had a positive impact on their desire to become a genetic counselor. Four respondents indicated that the experiences were not helpful.

“I appreciated being able to ask my questions in person to a genetic counselor, however looking back I don't think I fully grasped what happens in a session.”

Similarly, 17 out of 21 respondents felt that their experiences gave them a realistic understanding of the profession.

Program Director Survey Data

Response Rate and Sample Demographics

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A total of 20 program directors completed the online survey, resulting in a response rate of 58.8% (n = 20/34). The demographic characteristics of the program director participants are presented in Table 10. The majority of respondents have been a program director between 1-5 years (30%), were a practicing genetic counselor between 16-20 years (25%), and are from NSGC region 4 (40%) (Table 10). There were three additional participants that did not entirely complete the survey and were therefore excluded from the study.

Table 10: Participant demographics		
Demographics	n	%
Years as Program Director	20	
1-5	6	30
6-10	5	25
11-15	4	20
16-20	3	15
21-25	2	10
Years in Clinical Genetic Counseling Practice	20	
1-5	1	5
6-10	4	20
11-15	2	10
16-20	5	25
21-25	4	20
26-30	1	5
31-35	1	5
36-40	2	10
NSGC Region	20	
Region 1: CT, MA, ME, NH, RI, VT, CN Maritime Provinces	1	5
Region 2: DC, DE, MD, NJ, NY, PA, VA, WV, PR, VI, Quebec	3	15
Region 3: AL, FL, GA, KY, LA, MS, NC, SC, TN	3	15
Region 4: AR, IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, OK, SD, WI, Ontario	8	40
Region 5: AZ, CO, MT, NM, TX, UT, WY, Alberta, Manitoba, Sask.	3	15
Region 6: AK, CA, HI, ID, NV, OR, WA, British Columbia	2	10

Shadowing Admissions Criteria

Eighty percent (n = 16/20) of respondents reported their genetic counseling program's admissions criteria state job shadowing a clinical genetic counselor is recommended, but not required. Two respondents (10%) stated shadowing is a prerequisite, while the remaining two respondents claimed shadowing was neither required nor recommended in their admissions

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process. Of the respondents who did not describe shadowing as a prerequisite for admission into their program (90%, n = 18/20), 61.1% reported location as a limiting factor for applicants to acquire shadowing exposure. Moreover, 16.7% (n = 3/18) of these respondents believed the federal HIPAA to be another accountable barrier to shadowing. Program directors were questioned as to whether their requirement/recommendation to obtain shadowing exposure limits their overall applicant pool. The majority of respondents (85%, n=17/20) did not believe this to be the case.

“It limits it in the sense that people who are likely less serious about GC as a career may not be willing to take the time to shadow. That's not really a bad thing, as it keeps people from casually entering a graduate program that may not truly interest them as ‘something to do’...”

“Most applicants have had the opportunity to shadow. Of those who haven't, those who are otherwise really qualified on paper have pursued the other opportunities described above that we would deem as obtaining knowledge about the field.”

Attitudes towards Clinical Shadowing

All of the program director respondents (100%) reported shadowing a clinical genetic counselor enables an applicant to gain an understanding of the profession. Of these respondents, 60% (n = 12/20) stated the importance of being able to appreciate the inner workings of a clinical genetic counselor's day and work environment.

“It allows applicants to see the daily tasks that go into a GC role, not only the actual counseling sessions, but also the prep and follow-up work that is required. It also allows them to see how a GC can be a part of a healthcare team.”

In addition, 45% (n = 9/20) of respondents believed shadowing allows an applicant to discern whether genetic counseling is an appropriate career path for them.

The study asked program directors what other experiences, in their opinion, are deemed as adequate alternatives to shadowing. Participants who initially stated shadowing is a

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prerequisite for entrance into their program were excluded. Of the respondents who did not describe shadowing as a prerequisite (n = 18/20), the majority (83.3%; n = 15/18) stated at least interviewing a genetic counselor was vital. In the event that geographic location is a barrier, many respondents provided alternative ways for an interview to be conducted, such as over-the-phone. Fifty percent (n = 9/18) of respondents recommended that applicants view the *Master Genetic Counselor Series*. One third of participants (33.3%, n = 6/18) suggested attendance of NSGC or ABGC annual conferences as an alternative experience. Other alternative exposures brought forth by these respondents included: participating in a genetic counseling summer camp (as provided by institutions such as Sarah Lawrence College and Northwestern University), working as a genetic counselor assistant, crisis line counseling, and working with individuals with disabilities.

Approval of Non-Clinical Shadowing

Of the program director respondents whose programs do not describe shadowing as a requirement, 66.7% (n = 12/18) reported to have had applicants shadow genetic counselors exclusively in non-clinical/non-traditional settings (e.g. laboratory, marketing, or research/academic setting). The remaining 33% (n = 6/18) stated they have never had applicants who solely acquired non-clinical shadowing exposure. The respondents who require clinical shadowing were excluded from the non-clinical shadowing data. To assess the significance of non-clinical exposures, the study asked participants if they think non-traditional shadowing experience has equivalent value to that of clinical shadowing. Of the respondents who have had such applicants, 33% think non-clinical and clinical shadowing are of similar value. Conversely, 25% reported they are not of equal value. The remaining

respondents claimed non-traditional and traditional shadowing cannot be compared, and many reasoned that both are considered very different but valuable experiences.

Discussion

The majority of accredited genetic counseling programs in North America require/recommend shadowing clinical genetic counselors prior to applying to the program. Consequently, the proposed objectives of this study aimed to capture the following: (1) the perceived value of shadowing by both genetic counseling students and program directors; (2) determining whether shadowing aids in the process of selecting the most qualified applicants; (3) understanding what the barriers are in acquiring this exposure; as well as (4) identifying acceptable alternatives to clinical shadowing.

Perceived Value of Shadowing

Shadowing helps applicants (1) develop a realistic and accurate understanding of the profession; (2) determining one's motivation for choosing the specific profession; and (3) enhance the observer's knowledge of the field (AAMC, 2013; Chuck, 1996; Kitsis, 2011 and O'Connell and Gupta, 2006). The viewpoints of the program directors surveyed and the experiences reported by currently matriculating genetic counseling students support these objectives. Although student respondents in our study were not asked to describe their motivations for choosing genetic counseling as a profession, the majority of those that acquired shadowing experience stated the exposure both provided a realistic understanding and confirmed their initial desire to pursue this profession.

Student: *“Shadowing is really the only way to know what genetic counselors actually do.”*

While most student respondents found shadowing to be beneficial, the length of respondent's exposure did have an impact on some individuals' understanding of the profession.

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Student: *“I don't know if "realistic" is the right word. I think it was realistic for what I saw, but I don't think that my two days of shadowing really gave me a full picture of what the profession entails.”*

Student: *“I think that had I been able to shadow for longer periods of time this may have been the case. It's difficult to understand something realistically with snapshots of exposure.”*

Program Director: *“...Likewise, not all students who have shadowed seem to have come away with an insightful grasp on the profession...- as not all shadowing experiences are the same and the "take-away" for all students is not the same...”*

Shadowing Aids in Selection of Qualified Applicants

Some program directors articulated the experience of shadowing aids applicants in discerning whether the genetic counseling profession is an appropriate career path for them, which in turn aids genetic counseling programs in predicting qualified students who are serious about pursuing this profession.

Program Director: *“We have accepted a couple of students who had not shadowed, but were able to articulate the profession fairly well, who later left the program as it did not turn out to be what they thought genetic counseling was all about. So we are very hesitant to consider applicants with no exposure.”*

On the contrary, a few program director respondents (n = 3/20) believed shadowing admissions criteria is limiting and possibly resulting in a more homogeneous group of applicants.

Program Director: *“I do wonder if this actually makes for cookie cutter applicants. Do we not consider really different applicants who just happened on GC as a career?”*

Barriers to Shadowing

This study found that 9.58% of respondents did not shadow prior to applying to graduate school; and of those who did shadow, 18.69% found it “very difficult” or “near to impossible” to obtain the experience. The most common barriers were reported to be the limited number of clinics offering genetic counseling services in certain geographic regions

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and the federal Health Insurance Portability and Accountability Act (HIPAA) and/or hospital/clinic privacy policies. Genetic counseling training programs are aware of these barriers. Of 20 program directors surveyed, 16 reported that shadowing was recommended but not required, citing limited access to clinical counselors as the reason.

Program Director: *“...I don't want to discriminate against candidates who live in rural areas or who otherwise don't have access to these opportunities. Even those who live in the major cities...can't always get access because there are training programs and the clinics are jammed with trainees, or there are waiting lists for volunteers.”*

Even with these barriers, 85% of the respondents did not believe their requirement/recommendation to obtain shadowing experience limits their overall applicant pool. One possible reason for this is the small number of training slots available relative to the number of applicants. Acceptance rate for genetic counseling training programs is approximately 30% (unpublished data). Programs are able to reach their quota without having to compromise their admissions criteria.

Acceptable Alternatives

Given the level of difficulty in accessing shadowing, genetic counseling training programs take additional experiences into account when evaluating an applicant. According to the data, 83% of the program directors recommend interviewing a genetic counselor, either in person or by phone, and 50% recommend viewing the *Master Genetic Counselor Series*. It is important to note that these experiences are considered to be of value to *all* applicants, not just those who are unable to shadow a clinical counselor.

Program Director: *“I do not consider these alternatives, but these are better than no experiences: genetics case meetings, projects with GCs, interviewing multiple GCs, in addition to peer counseling, crisis line work, etc”*

This study found that 80% of student respondents pursued additional experiences either in supplementary to or instead of shadowing. The most common activities were an in-person

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meeting/telephone interview with a genetic counselor, attending a case conference and/or genetic ground rounds, job shadowing in a non-clinical setting, or viewing the *Master Genetic Counselor Series*. The majority of student respondents found these additional experiences to enhance their understanding of genetic counseling, and for those who shadowed, to be as beneficial or more beneficial than shadowing. Additionally, when students were asked to describe how their additional experiences impacted their desire to pursue genetic counseling, ~6% of the respondents who met with a genetic counselor stated to have felt inspired to pursue this profession because of the reported high job satisfaction from the genetic counselor. This finding is not a surprise as 88% of genetic counselors who participated in the 2014 Professional Status Survey reported they were satisfied with the profession (2014 Professional Status Survey: Professional Satisfaction).

As the role of a genetic counselor has expanded to non-clinical areas including, but not limited to, laboratory, research, education, and customer liaison (2014 Professional Status Survey: Work Environment), it was expected some of the student respondents would have obtained such non-clinical shadowing experience. According to the 2014 Professional Status Survey, 18% of genetic counselor respondents reported to work in a non-clinical setting. The top employers include commercial diagnostic laboratories, university medical centers and academic diagnostic laboratories. The primary roles of these non-clinical counselors include laboratory support, research/study coordinator and customer liaison. This study did not assess whether it was difficult, by comparison to obtain shadowing experiences in non-clinical settings. This is an area for further research. Seventeen percent of respondents in our study shadowed genetic counselors in a non-clinical setting (i.e. research setting, marketing, lab, etc.). Of these, ~53% described their non-traditional experiences were as beneficial compared

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to their clinical shadowing exposure, while ~32% described this experience as “not as beneficial” compared to their clinical exposure. Only three of the 21 student respondents who did not shadow clinical genetic counselors, indicated to have job shadowed genetic counselors in a non-clinical setting. Unfortunately, these respondents did not further describe the nature of their said experience. When asked the perceived value of non-traditional clinical shadowing experiences, 25% of program directors indicated that it was not of the same value and 42% feel that, while valuable it cannot be compared to traditional clinical shadowing. As the role of a genetic counselor continues to expand, it is anticipated that more future applicants will have had prior exposures in these non-traditional settings. It may be beneficial for programs to identify explicit goals perceived to be obtained by shadowing in a clinical setting, as a means to recognize whether these goals can be paralleled within a non-clinical setting. In the field of occupational therapy, Grapczynski and Beasley (2013) proposed the application of “non-cognitive” variables as part of their developed *Achievement Profile* tool used for screening applicants. Future research is necessary to determine whether the *Achievement Profile*, including the “non-cognitive” variables, could be adapted by genetic counseling programs.

Study Limitations

With a ~32% student response rate, these responses may not be representative of the current body of genetic counseling students and therefore may not accurately portray what experiences most students who did not shadow clinical genetic counselors obtained. Due to the study design, we did not capture former students or applicants who were not accepted into a genetic counseling program. Applicants who were not admitted would be another area of research in terms of barriers to shadowing. Another suitable subject population to delve

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into for a future follow-up study are practicing genetic counselors in order to gauge what their opinions are regarding the perceived value of clinical shadowing. Additionally, genetic counselor respondents can provide insight to the specific barriers applicants may face in their workplace. We do feel that the ~58% program director response rate was representative as the expressed opinions regarding shadowing was consistent among the program director respondents. Furthermore, this study did not allow for the program director respondents to describe the performances of students within the programs who both did and did not acquire shadowing experience prior to their acceptance. This is due to the observed difficulty for programs to measure the success of a student when taking into account only clinical shadowing or lack thereof.

Another recognized limitation of this study arose from a question within the program director survey, which sought to investigate whether location of a program impacted the degree of emphasis placed on shadowing. We hypothesized that larger cities would provide access to a greater number of genetic counselors and genetic counseling services, therefore programs within a rural location would be more accepting of non-clinical/non-traditional exposures to the field of genetic counseling. In an effort to maintain anonymity, program directors were asked what NSGC region they were from, however this proved not to be specific enough to prove or disprove our hypothesis. Every region includes both rural and urban cities, therefore it is unknown whether location within a major city influences a program's opinion on whether they state shadowing as a prerequisite or highly recommended criteria.

Lastly, another limitation of this study arose from the student survey. Students were asked their annual household income (dependent or independent) in US dollars. Identifying a common socio-economic background may have enabled this study to decipher a lack of

heterogeneity among genetic counseling applicants and students. Based on the response obtained, it was probable students elected to disclose their personal annual income rather than their collective household income. This question aimed to address a concern brought forth by the literature within the field of medicine regarding a correlation between lower socioeconomic status and an inability to obtain shadowing experience (Fincher *et al.*, 2002). Although this study was not able to provide evidence of this correlation, it nonetheless likely exists among matriculating genetic counseling students and genetic counseling applicants.

Conclusion

Most genetic counseling programs describe shadowing clinical genetic counselors as a distinguished criterion for applicants to acquire. Despite this, there is a gap in the literature underlying the perceived value of this experience. This study proposed the following objectives in order to quantitatively and qualitatively highlight the experience of shadowing: (1) determining what benefits are gained from shadowing, (2) appreciating the barriers to shadowing, (3) recognizing acceptable alternatives to clinical shadowing, as well as (4) understanding whether shadowing aids in the selection of appropriate applicants for the graduate programs. The subject populations of this study, program directors of genetic counseling programs and current genetic counseling students, overwhelmingly reported the importance of shadowing experience as a means to gain fundamental knowledge of what the profession entails. Similarly, both subject populations noted and appreciated apparent obstacles in acquiring shadowing exposure, such as geographic location and hospital privacy guidelines. However, regardless of such obstacles, acceptable alternatives to shadowing such as interviewing genetic counselors and viewing *Master of Genetic Counselor Series* were brought forth by program directors. Lastly, responses collected and analyzed from program

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directors regarding whether shadowing exposure aids in the process of selecting the most qualified applicants indicated this may not be a universal conclusion. While most program directors reported this experience does indeed help determine an applicant's qualification, other directors noted acceptable alternative experiences and evident knowledge of the profession gained from other experiences as a means to identify appropriate applicants. With the expansion of the genetic counseling profession into non-clinical practice (e.g. laboratory, research, and customer liaison), this study sought to capture students who have had exposure to this profession in these settings. Although there was reported evidence of such non-clinical exposures as well as their described benefit from some student respondents, the perceived value of non-clinical shadowing was discordant amongst the program director respondents. These expressed views by program directors may change in the future as more genetic counselors provide services in these settings as well as the potential increase of applicants and students who shadow genetic counselors in these non-traditional roles.

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Human studies and informed consent: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional

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and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

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