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Patient and Genetic Counselor Perceptions of In-person versus Telephone Genetic Counseling for Hereditary Breast/Ovarian Cancer

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Abstract

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Conflict of Interest: Ms. Jacobs, Dr. Valdimarsdottir, Ms. DeMarco, Ms. Heinzmann, Ms. McKinnon, Ms. Davis, Ms. Lebensohn, Dr. Graves, Ms. Similuk, Mr. Kelly, and Ms. Peshkin declare that they have no conflict of interest. Ms. Nusbaum and Ms. Moglia Tully are employees of GeneDx, a wholly owned subsidiary of BioReference Laboratories, which is a wholly owned subsidiary of Opko Health, Inc.; however, they were employed at one of the study sites when performing all study-related genetic counseling. Dr. Hooker is an employee of NextGxDx, but was employed at Georgetown University when performing study-related genetic counseling. Ms. Dalton is an employee of Ambry Genetics but was employed at Dana-Farber when performing all study-related genetic counseling. Ms. McCormick has received paid compensation from Myriad Genetics. Ms. Forman has received paid compensation from Myriad Genetics and Invitae. Dr. Schwartz serves as an uncompensated member of the Scientific Advisory Board for InformedDNA (St. Petersburg, FL).

Ethical Approval and Informed Consent: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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Telephone genetic counseling (TC) for high-risk women interested in *BRCA1/2* testing has been shown to yield positive outcomes comparable to usual care (UC; in-person) genetic counseling. However, little is known about how genetic counselors perceive the delivery of these alternate forms of genetic counseling. As part of a randomized trial of TC versus UC, genetic counselors completed a 5-item genetic counselor process questionnaire (GCQ) assessing key elements of pre-test sessions (information delivery, emotional support, addressing questions and concerns, tailoring of session, and facilitation of decision-making) with the 479 female participants (TC, N=236; UC, N=243). The GCQ scores did not differ for TC vs. UC sessions ($t(477) = 0.11$, $p = 0.910$). However, multivariate analysis showed that participant race/ethnicity significantly predicted genetic counselor perceptions ($\beta = 0.172$, $p < 0.001$) in that the GCQ scores were lower for minorities in TC and UC. Exploratory analyses suggested that GCQ scores may be associated with patient preference for UC versus TC ($t(79) = 2.21$, $p = 0.030$). Additionally, we found that genetic counselor ratings of session effectiveness were generally concordant with patient perceptions of the session. These data indicate that genetic counselors perceive that key components of TC can be delivered as effectively as UC, and that these elements may contribute to specific aspects of patient satisfaction. However, undefined process differences may be present which account for lower counselor perceptions about the effectiveness of their sessions with minority women (i.e., those other than non-Hispanic Whites). We discuss other potential clinical and research implications of our findings.

Keywords

BRCA1/BRCA2; genetic counseling; patient satisfaction; telephone counseling

Introduction

In the United States, genetic counseling and testing is the standard of care for women whose personal and/or family histories are consistent with mutations in the two major genes associated with hereditary breast/ovarian cancer, *BRCA1* and *BRCA2* (*BRCA1/2*) [1–3]. Increasing demand for such services can be attributed to several factors. These factors include heightened awareness after media reports regarding Angelina Jolie Pitt's prophylactic surgeries subsequent to testing positive for a *BRCA1* mutation; expanded coverage for genetic counseling and testing by health insurance companies; and broader availability and reduced costs of *BRCA1/2* testing, particularly in conjunction with multigene panel tests [4–10]. However, there is growing concern about whether there are sufficient numbers of credentialed genetics professionals to deliver such services, particularly for patients who are not near major metropolitan areas in the U.S., where most of these providers are located [11–13]. Indeed, recent reports indicate that a majority of patients referred for genetic testing in community settings may not receive any pretest genetic counseling [14].

To address this growing demand, academic medical centers and commercial companies are increasingly offering the option of telephone genetic counseling, which is covered by some insurance companies [15, 16]. Randomized trials comparing traditional in-person genetic counseling versus genetic counseling by phone have shown that the two methods yield

similar outcomes with respect to patient satisfaction, psychosocial outcomes, quality of life, and patient knowledge [17–21]. Despite these similarities, small differences in genetic testing uptake by high risk women who have received genetic counseling via telephone have been noted. For example, in our randomized non-inferiority trial comparing telephone genetic counseling (TC) to in-person genetic counseling (i.e., usual care or UC), 90.1% of women in UC opted for *BRCA1/2* testing compared to 84.2% of TC participants [21]. These findings are consistent with the results of a second trial in which TC also led to lower rates of genetic testing [18]. In a follow-up analysis, we found that minority women (i.e., those other than non-Hispanic Whites) randomized to TC had lower rates of *BRCA1/2* genetic testing when compared to minority women in UC (53.1% vs. 76.2%, respectively) [22]. When we examined participant perceptions of the genetic counseling sessions, we found that although delivery mode was not associated with overall satisfaction, TC participants perceived significantly lower levels of support and emotional recognition by their genetic counselor compared to women in UC [19]. These findings raise questions about whether there are meaningful differences in how telephone versus in-person genetic counseling is delivered and perceived by patients, including minority and non-minority participants.

It is also important to characterize how genetic counselors perceive their telephone versus in-person sessions. Evaluating the alignment of genetic counselors' and patient' perceptions of these sessions may identify key components that need to be refined and improved upon as new delivery methods are developed. Thus far, little data exist on this issue. A retrospective study of 88 genetic counselors with experience in TC reported that approximately one-fourth of them identified key genetic counseling elements that they performed differently in TC versus UC including contracting, psychosocial assessment, facilitation of genetic testing, and education about basic genetics concepts [23]. However, that study did not elucidate whether these process differences affect patient perceptions. Assessing provider and patient perceptions may identify key aspects of genetic counseling that can be enhanced to improve the delivery of information and emotional support, particularly to women undergoing telephone counseling. Thus, in the present study, we sought to explore whether specific patient characteristics predict genetic counselors' perception of the effectiveness of the genetic counseling sessions. Additionally, we examined whether the genetic counselors' perceptions of the genetic counseling sessions were concordant with those of participants based on various domains of patient satisfaction.

Methods

Participants

Women who contacted genetic counseling programs at the Georgetown Lombardi Comprehensive Cancer Center (Washington, DC), Icahn School of Medicine at Mount Sinai (New York, NY), University of Vermont Cancer Center (Burlington, VT), or Dana-Farber Cancer Institute (Boston, MA) were invited to participate in a parallel group randomized, non-inferiority trial comparing standard in-person genetic counseling (usual care; UC) to telephone genetic counseling (TC) for hereditary breast and ovarian cancer associated with a *BRCA1/2* mutation [21]. Eligible participants were recruited from 2005–2012 and included women between the ages of 21–85 years with a minimum risk of 10% of testing positive for

a pathogenic *BRCA1/2* mutation who did not have a newly diagnosed (<4 weeks) or metastatic cancer, and who lived within the defined catchment area of the study sites. Women were excluded from the study if they were non-English speaking, could not provide informed consent, or were candidates for genetic counseling for another hereditary cancer syndrome. Unaffected women were eligible for the study only if they had a biological relative with an identified *BRCA1/2* mutation.

Of 1033 eligible participants, 669 (64.8%) completed the baseline interview and agreed to be randomized to either the TC arm or the in-person (UC) arm of the study. Women were eligible for the present analysis if they completed an initial pre-test genetic counseling session and a telephone interview 2 weeks after their genetic counseling session but prior to receiving their genetic testing results (n=554). In addition, the participant's genetic counselor must have completed the genetic counseling process questionnaire (GCQ). The GCQ was not initially included in the study; thus, of the 554 potentially eligible participants, 75 (14%) women were ineligible for the present analysis because of missing GCQ forms. Therefore, our final sample included 479 women randomized to UC (n=243) or TC (n=236). There were no observed differences in baseline characteristics between those participants who were included in the final sample and those participants who were excluded.

Genetic counselors

Across the four sites, twelve genetic counselors participated in the study. They underwent training regarding the in-person and telephone genetic counseling standardization procedures described below [24], and delivered both interventions (i.e., genetic counselors were not assigned to see all TC or all UC patients at their site). All of the genetic counselors were female, 92% were non-Hispanic White, and 92% were board eligible or board certified when they started performing study-related genetic counseling. Among genetic counselors who saw more than 10 participants in the study, they had between 0–14 years (M= 3.5 (SD=4.7) years) of cancer genetic counseling experience when they started performing study-related genetic counseling. Although there were 12 genetic counselors across the sites, one genetic counselor performed genetic counseling for 43% (n=207) of the participants. As a result, we performed follow-up sensitivity analyses in which we excluded all participants seen by this counselor. In no case did a nonsignificant finding become significant or vice versa. As a result, all analyses reported in this paper include the full sample.

Procedures

Design details of the larger randomized controlled trial have been previously reported [21]. In brief, participants provided verbal consent and completed a baseline telephone interview during which we assessed sociodemographics, personal and familial cancer history and psychosocial status. Immediately following the baseline interview, study participants were randomized in blocks of four, stratified by study site using computer-generated random numbers to either the UC or TC study arm. Immediately following randomization, participants were informed about their randomization group by the telephone interviewer. To avoid contamination, all family members were randomized to the same mode of genetic

counseling. All study sites acquired approval from their institutional review board for this study.

Usual Care—Participants randomized to the UC arm received standard *BRCA1/2* genetic counseling and result disclosure in-person. Standardized visual aids were used during counseling sessions to communicate general concepts and risks associated with *BRCA1/2* mutations. At the conclusion of the initial counseling session, women could provide blood for DNA for testing or could opt to do so at a later time.

Telephone Counseling—Prior to their first telephone genetic counseling session, women randomized to the TC arm of the study were mailed a booklet containing the same visual aids used in standard genetic counseling sessions. The content of the TC session was comparable to that of UC [24]. After the initial counseling session, participants interested in pursuing genetic testing could provide blood for DNA testing at the study site or were given a kit to take to their local physician or laboratory.

Participants in both arms of the study completed a follow-up telephone interview approximately two weeks after their initial counseling session and prior to disclosure of their genetic testing results. Information regarding the participant's perception and satisfaction with their pre-test genetic counseling session was collected.

Measures

Sociodemographic Characteristics/Medical History—We used personal and familial cancer histories to calculate each participant's *a priori* risk of carrying a deleterious *BRCA1/2* mutation using the BRCAPRO model [25, 26] or by pedigree analysis for relatives of known *BRCA1/2* mutation carriers.

BRCA1/2 Knowledge—We evaluated *BRCA1/2* knowledge at baseline using the 27-item Breast Cancer Genetic Counseling Knowledge scale [27]. Total score was derived based on number of correct responses (Cronbach's alpha = 0.84).

Decisional Conflict Regarding BRCA1/2 Testing—Participants completed a 10-item version of the Decisional Conflict Scale (DCS) at baseline [28]. A weighted 3-point scale (yes=0; unsure=2; no=4) was used to calculate decisional conflict score with higher scores indicating greater decisional conflict (Cronbach's alpha = 0.82).

Distress—We measured cancer-specific distress at baseline using the Impact of Event Scale (Cronbach's alpha=0.88) and perceived stress using the 4-item version of the Perceived Stress Scale (Cronbach's alpha=0.70) [29, 30].

Quality of life—We assessed baseline quality of life using the Short Form 12-item Health Survey (SF-12). The SF-12 is comprised of a mental component summary (MCS) and physical component summary (PCS) with higher scores reflecting a better quality of life [31]. Given complex scoring procedures, we relied on published SF-12 internal consistency data (Cronbach's alpha = 0.86 and 0.87) [32].

Patient Perceptions of the Genetic Counseling Session—As reported previously [19], we assessed patient perceptions of their pre-test genetic counseling session at the 2-week follow-up interview via face-valid Likert-style measures. Specifically, we assessed patients' perceptions of: 1) *Satisfaction* with the session (Not at all satisfied to very satisfied); 2) *Convenience* of the genetic counseling process (Extremely inconvenient to extremely convenient); 3) Ability to maintain *attention* during the session (Extremely difficult to not difficult); 4) Counselor provision of *emotional support* (Extremely ineffective to extremely effective); and 5) Counselor's ability to recognize participant *emotions* (Extremely ineffective to extremely effective). All responses used a 4-point Likert scale, with the exception of attention which used a 3-point scale. Patient responses on several of these measures were skewed (reflecting positive perceptions), with participants often reporting the highest or next highest response. As a result, we dichotomized responses as high (highest ranking response) vs. low (all other responses). We also measured participant preference for telephone vs. in-person counseling using a 3-point response scale (in-person, telephone, no preference). For analysis, we calculated concordance between whether the patient preference indicated on the follow-up questionnaire administered after randomization matched the form of counseling or randomization group the patient actually received. Factors driving patient preferences were not assessed in this study. Finally, we assessed overall satisfaction with the genetic counseling experience using the validated 6-item Genetic Counseling Satisfaction Scale with responses based on a 5 point Likert scale (strongly disagree to strongly agree) (Cronbach's $\alpha = 0.82$) [33]. Higher scores indicated greater satisfaction with the genetic counseling session.

Genetic Counselor Perceptions—After each participant's pre-test genetic counseling session, genetic counselors completed a 5-item genetic counselor process questionnaire (GCQ) to assess their perceptions of the counseling session. The items were: 1) Information was conveyed effectively; 2) Emotional support was effectively provided to the participant; 3) Questions and concerns were effectively elicited and addressed; 4) The session was adequately tailored to the needs of the participant; and 5) I effectively facilitated decision-making, as appropriate. Responses to each item used a 5-point Likert scale ranging from strongly disagree to strongly agree. Scores were derived by summing the responses to individual items; thus, the highest possible composite score was 25. The composite measure exhibited high internal consistency with a Cronbach's α of 0.89.

Data Analysis

We identified bivariate predictors of the GCQ score using t-tests for binary predictors and Pearson's correlation coefficients for continuous predictors. To identify independent predictors, we included all bivariate predictors with p-values of $<.10$ in a multiple linear regression along with randomization group. In exploratory analyses, we tested race/ethnicity as a potential moderator of the association between randomization group and genetic counselor perception by adding the randomization group by moderator interaction term to the final model. In a second series of analyses, we evaluated the associations between the GCQ score and patient perceptions of the genetic counseling session using t-tests and Pearson correlations as above. We also used analysis of variance to explore potential interactions between randomization arm and measures of patient perception to determine

whether counselor perceptions were differentially associated with patient perceptions in TC vs. UC.

Results

Sample Characteristics

Details of the final sample ($n=479$) are displayed in Table 1. There were no differences observed on any baseline variables between women randomized to TC vs. UC.

Bivariate Predictors of Genetic Counselor Perception

Genetic counselors rated their sessions quite positively with a mean overall GCQ score of 22.3 ($SD=2.4$). Scores did not differ for UC (22.3, $SD=2.5$) vs. TC (22.3, $SD = 2.4$; $t(477) = 0.11$, $p = 0.910$). As shown in Table 2, the only significant patient predictor of GCQ score was race/ethnicity. Specifically, sessions in which the patient was non-Hispanic White were rated more positively than those in which the participant was in the minority group (those not identified as being non-Hispanic White) ($t(477) = -3.82$, $p = <0.001$).

To determine whether race/ethnicity was independently associated with genetic counselor ratings, we conducted a multivariate analyses in which we included patient race/ethnicity and randomization together in a multiple linear regression. Patient race/ethnicity was significantly independently associated with GCQ score ($\beta = 0.172$, $p = <0.001$) and randomization group was not associated with counselor score ($\beta = 0.004$, $p=0.924$). We also examined the interaction between race/ethnicity and randomization group. This interaction did not approach statistical significance ($\beta = -0.138$, $p=0.296$) suggesting the association between race/ethnicity and genetic counselor ratings was similar across TC and UC.

Associations of Patient and Genetic Counselor Perception

To determine whether patients and counselors had similar perceptions of the genetic counseling session, we compared the counselor GCQ scores to the patient ratings of their genetic counseling session (Table 3). We observed modest but consistent positive associations between patient and genetic counselor perceptions. As shown in Table 3, GCQ scores were significantly positively associated with patient ratings of session satisfaction ($t(477) = 2.46$, $p = 0.014$), convenience ($t(477) = 2.03$, $p = 0.042$), counselor emotion recognition ($t(477) = 2.13$, $p = 0.033$), counselor support ($t(477) = 2.90$, $p = 0.004$) and overall genetic counseling satisfaction ($r=0.178$, $p=<0.001$).

In exploratory analyses we used analysis of variance to test the interactions between patient perceptions and randomization group to determine whether the association between genetic counselor and patient perceptions varied for TC vs. UC. These analyses revealed no statistically significant interactions predicting the GCQ score, with the exception of preference for modality of genetic counseling. Although neither the main effect of preference ($F(1, 475)=0.00$, $p=0.973$) nor randomization group ($F(1, 475)=0.01$, $p=0.910$) attained statistical significance, the group by preference interaction was statistically significant ($F(1,475)=6.17$, $p=0.013$) (Figure 1). Simple effects analysis revealed higher genetic counselor session ratings for TC participants who reported that they would have

preferred UC (22.8, SD=2.2) vs. UC participants who would have preferred TC (21.6, SD=2.7); $t(79) = 2.21$, $p=0.030$). There was no difference in GCQ score among those who received their preferred mode of genetic counseling (UC (22.4, SD=2.4); TC (22.1, SD=2.4); $t(396) = 1.12$, $p=0.262$).

Discussion

We examined genetic counselors' perceptions of pre-test genetic counseling sessions delivered to high-risk women via either telephone or in-person. We identified three noteworthy findings. First, genetic counselor session ratings did not differ between TC and UC. This finding, in conjunction with other results from this trial [19, 21], suggests that TC and UC may be comparable in terms of how counselors perceive their ability to deliver key aspects of genetic counseling. Second, genetic counselors rated their sessions with non-Hispanic White participants as slightly more effective than their sessions with minority participants. Third, there was modest but consistent and statistically significant concordance between genetic counselor and patient perceptions of the genetic counseling process. That is, high session effectiveness ratings from the genetic counselors were associated with more positive patient perceptions of the session. These associations were consistent across TC and UC with the exception of patient preference for treatment modality. Genetic counselors reported higher session ratings for participants who preferred UC but received TC when compared to those who preferred TC but received UC. A possible explanation for this unexpected finding is that preference for in-person genetic counseling may be associated with a greater desire for information and/or support. Thus, these patients may have been more engaged regardless of counseling modality, resulting in higher counselor ratings. However, in interpreting this finding, it is important to note that the observed difference in GCQ rating for participants who did not receive their preferred mode of genetic counseling did not manifest in overall reported patient satisfaction. Further, as this was an exploratory analysis, caution should be taken in interpreting this finding.

Given that we assessed broad domains on the GCQ, it is not surprising that genetic counselors perceived that they could effectively deliver both telephone and in-person genetic counseling. The genetic counselors in this study were overall very experienced and highly trained on protocol adherence; as such, they were sensitized to challenges that may be presented by TC. However, it is interesting that the genetic counselors' ratings of the effectiveness of the sessions were lower for minority participants than non-Hispanic White participants. In our earlier work, we showed that minority participants were less likely to get *BRCA1/2* testing compared to non-Hispanic White participants and that this difference was particularly pronounced in the TC arm [21, 22]. Our previous work also revealed that minority women perceived less support from their genetic counselor when the session was delivered in-person compared to the telephone [19]. Together these findings suggest that there may be unintended process differences in the delivery of genetic counseling to minority women, as has been suggested by research on racial bias in health care providers and its effect on communication and satisfaction [34–36]. These preliminary findings merit further investigation in a more diverse sample. Finally, the fact that there was broad concordance in ratings of sessions between genetic counselors and patients suggests that the

factors that professionals perceive as key to a successful genetic counseling encounter may contribute to various aspects of patient satisfaction.

Study Limitations

The generalizability of our findings may be limited for several reasons. The genetic counselors who participated in this study were demographically similar, were well trained in TC delivery, used a standardized protocol for genetic counseling delivery, and were all employed at academic medical centers. Thus, these results may not apply to genetic counseling in community settings or to countries that employ other genetic counseling models that rely on other health care professionals to deliver genetic counseling (11, 37–40). These findings can serve as preliminary data for comparing genetic counselor and patient perceptions among a more diverse group of counselors in settings that utilize alternative practice models. Similarly, the genetic counseling participants were also highly selected based on their willingness to participate in a randomized controlled trial, the fact that they were referred for counseling at an academic medical center, and the fact that they were required to live within the catchment area of one of the study sites. As previously reported, the TC and UC groups in this study were comparable in their distances from the study sites (21). It is possible that patient and counselor perceptions of telephone counseling would differ for individuals from the community who did not have ready access to counseling at an academic medical center. In addition, the sample consisted predominately of well educated, non-Hispanic White women. The lack of racial and ethnic diversity in the sample required that we combine racial/ethnic minorities into a single category for analysis. As we have discussed in previous reports (21,22), the heterogeneity of this category limits the conclusions that we can draw from our race/ethnicity findings. Thus, our findings should be viewed as preliminary until replicated in studies with sufficient diversity to allow well-powered comparisons using more homogeneous race/ethnicity categories. Finally, because this study was part of a larger randomized controlled trial, specific patient subgroups were excluded from participation, including newly diagnosed breast cancer patients, unaffected probands, and men.

With respect to measurement, we assessed broad domains in our genetic counselor and participant assessments, and we observed high satisfaction ratings in all responses. While this may be evidence of overall high satisfaction with genetic counseling from both the patient and provider perspectives, it also suggests that our measures may not be identifying more subtle quality and satisfaction elements that could be central to effective genetic counseling and patient satisfaction. This may be partly due to the fact that the GCQ measure was designed initially as a quality assurance tool that was not constructed to map directly onto questions assessing patient perceptions. Further, we have not formally evaluated the psychometric properties of this measure. As a result, we urge caution in the use of this measure for clinical purposes until further research refinement and validation has taken place.

Clinical Implications

In non-commercial settings, genetic counselors who use telephone counseling are much more likely to do so for result disclosures than pre-test counseling [15, 41]. As multiple

centers consider how to scale up their services to meet increasing demand and competition, emerging data on the latter are important. Sie and colleagues found that Dutch breast cancer patients were more likely to choose pretest *BRCA1/2* counseling by phone, supplemented by print and web-information versus traditional in-person counseling [42]. Most of the patients in this study were satisfied with their mode of counseling and telephone counseling was not associated with increased distress. Within our large randomized trial, we showed that pre-test genetic counseling by phone yields similar favorable outcomes compared to in-person sessions [21]. As the current data reveal, genetic counselors believe that they can effectively deliver major elements of genetic counseling regardless of the delivery mode. In our present study, a considerable effort was made by the investigators to standardize the content and delivery of TC and UC, to develop visual aids and counseling probes, and to assess fidelity of the intervention. As the scope of genetic counseling practices expand and counselors employ alternative delivery methods, assessments of any key differences between genetic counselor and patient perceptions of a counseling session will allow for modifications to standard counseling practices so that genetic counseling can be adaptable to changing counseling modalities. Organizations such as the National Society of Genetic Counselors could consider results from assessments of genetic counselor and patient perception to develop online training modules for continuing education to help genetic counseling providers improve their techniques to better suit alternative delivery methods. For example, additional training can be provided to genetic counselors to identify key goals of TC delivery, improve their TC practices, and to refine their genetic counseling processes after measuring their and their patients' perceptions of the sessions.

Research Directions

These preliminary data can be used as a starting point to develop tools to assess the nuances involved in the delivery of genetic counseling. To develop these measures, formative work could be undertaken on what participants value and seek from genetic counseling, particularly TC. Moreover, formative research with genetic counselors who have extensive TC experience could help identify assessment domains that capture other dimensions of TC, including some of the unique process differences that arise compared to in-person counseling. Individual interviews conducted after genetic counseling with genetic counselor and participant dyads, particularly with racial/ethnic minority participants, could provide interesting and timely insights into what factors contribute to effective encounters and what components may need to be modified. It would also be interesting to have a third-party review audio or video recordings of TC and UC sessions to determine if the reviewer's GCQ ratings are concordant with those of the participating genetic counselor. Differences in the reviewer and counselor perceptions may elucidate aspects of the genetic counseling session that could be refined to better achieve session goals and responsiveness to participant needs or cues (or the absence thereof, particularly in TC). Subsequently, culturally tailored genetic counseling protocols and materials could be developed and assessed for use in both UC as well as TC [43–45]. Finally, it would be interesting to assess a more heterogeneous group of genetic counseling providers (i.e., more racially/ethnically diverse, with different medical backgrounds and different practice settings) and patients (with more diverse racial/ethnic, and socioeconomic statuses) to determine what characteristics of each group may predict genetic counseling outcomes. As genetic testing becomes more complex, particularly with

increasing use of multigene panels, extending our research to assess and improve the delivery of genetic counseling will continue to be important.

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Figure 1.

Interaction between participant preference for modality of genetic counseling by group randomization and genetic counselor session rating*

*Based on GCQ (genetic counselor process questionnaire) score; Plot lines for Usual Care and Telephone represent participants' actual randomization group.

Table 1

Sample Characteristics of Participants

	UC n=243	TC n=236
Characteristic	No. (%)	No. (%)
<i>Age, years</i>		
Mean	48.8	48.7
SD	14.4	13.5
<i>BRCA1/2 probability</i>		
Mean	26.0	23.7
SD	24.1	21.8
<i>Education</i>		
<College	45 (18.5)	47 (19.9)
College or more	198 (81.5)	189 (80.1)
<i>Employment Status</i>		
Full Time	134 (55.1)	138 (58.5)
<Full Time	109 (44.9)	98 (41.5)
<i>Race</i>		
Non-Hispanic, White	215 (88.5)	200 (84.8)
Other	28 (11.5)	36 (15.3)
<i>Marital Status</i>		
Married/partner	150 (61.7)	142 (60.2)
Single/widow/divorced	93 (38.3)	94 (39.8)
<i>Jewish Ethnicity</i>		
Jewish	73 (30.0)	64 (27.1)
Non-Jewish	170 (70.0)	172 (72.9)
<i>Proband Status</i>		
Proband	140 (57.6)	137 (58.1)
Relative of known carrier	103 (42.4)	99 (42.0)
<i>Recruitment Site</i>		
Lombardi Cancer Center	155 (63.8)	141 (59.8)
Mount Sinai	41 (16.9)	47 (19.9)
University of Vermont	17 (7.0)	19 (8.1)
Dana-Farber Cancer Institute	30 (12.4)	29 (12.3)

Table 2**Bivariate Predictors of Genetic Counselor Perception**

Variable	Genetic Counselor Perception (GCQ Score) M (SD)
Randomization	
Usual Care (n=243)	22.3 (2.5)
Telephone (n=236)	22.3 (2.4)
Race	
Non-Hispanic, White (n=415)	22.4 (2.4) ***
Other (n=64)	21.2 (2.7)
Proband Status	
Proband (n=277)	22.2 (2.4)
Relative (n=202)	22.4 (2.5)
Education	
<College Grad (n=92)	22.0 (2.6)
College Grad + (n=387)	22.3 (2.4)
Household Income	
75, 000 (n=161)	22.1 (2.7)
>75, 000 (n=300)	22.3 (2.3)
Employed	
<Full Time (n=207)	22.1 (2.4)
Full Time (n=272)	22.4 (2.5)
Married	
Unmarried (n=187)	22.1 (2.7)
Married (n=292)	22.4 (2.3)
	Genetic Counselor Perception Pearson r
Age	0.072
BRCA probability	0.013
Knowledge	0.005
Impact of Events	-0.031
Perceived Stress	0.026
Physical Function	0.031
Mental Function	-0.003
Decisional Conflict	0.005

p<.001

Table 3

Association between Genetic Counselor and Patient Perceptions

Patient Perception	Genetic Counselor Perception (GCQ Score) M (SD)
Satisfaction	
Low (n=71)	21.6 (2.6)
High (n=408)	22.4 (2.4) *
Preference	
No (n=81)	22.3 (2.5)
Yes (n=398)	22.3 (2.4)
Convenience	
Low (n=222)	22.0 (2.5)
High (n=257)	22.5 (2.4) *
Emotions	
Low (n=178)	22.0 (2.6)
High (n=301)	22.5 (2.4) *
Support	
Low (n=191)	21.9 (2.5)
High (n=288)	22.5 (2.4) **
Attention	
Low (n=35)	21.6 (2.4)
High (n=444)	22.3 (2.4) +
	Genetic Counselor Perception Pearson <i>r</i>
Genetic Counseling Satisfaction Scale	0.178 ***

+ p<10,

* p<05,

** p<01,

*** p<001