Gerrard S, Inglis A, Morris E, Austin J. Relationships between patient- and session-related variables and outcomes of psychiatric genetic counseling. *EJHG* 2020, 28: 907–914
https://doi.org/10.1038/s41431-020-0592-1

Relationships between patient- and session-related variables and outcomes of psychiatric genetic counseling

Running head: Variables and outcomes of genetic counseling

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Conflict of interest: All authors declare no conflict of interest.

ABSTRACT

Little data currently exists regarding whether and how different characteristics of a patient and session influence outcomes of genetic counseling (GC). We conducted an exploratory retrospective chart review of data from a specialist psychiatric GC clinic (where patients complete the Genetic Counseling Outcome Scale (GCOS) as part of routine care before and after GC). We used ANOVA and linear regression to analyze GCOS change scores in relation to twelve patient/session-related variables. Three hundred and seven charts were included in analyses. Overall, GCOS scores increased significantly after GC ($p<0.0005$, $d=1.10$), with large effect size, and significant increases in all GCOS subdomains except adaptation. Significant associations with GCOS change score were identified for three variables: mode of delivery of GC (in-person/telephone/telehealth, $p=0.048$, $\eta^2 = 0.020$), primary indication for the appointment (understanding recurrence risk versus other primary indications, $p=0.001$, $\eta 2 = 0.037$), and baseline GCOS score ($p<0.000$, $R=0.353$). Our data showing that those with low baseline GCOS scores benefit most from GC could be used to explore the possibility of triaging those referred for GC based on this variable, and/or to identify individuals to refer to GC.

Key Words

Outcomes research; predictors of patient outcomes; empowerment; genetic counseling outcome scale; medical genetics services; clinical genetics; triage

INTRODUCTION

The genetic counseling (GC) profession has recognized the importance of identifying and measuring patient outcomes[1,2]. GC outcomes research has historically focused on cancer GC[3,4,5,6] and most studies have used simple pre-post study design and the assessment of knowledge/satisfaction-based outcomes[7]. There has been comparatively less research addressing psychological outcomes of GC, especially outside of the cancer context, and very little research exploring the effects of patient- or session-related variables on these outcomes. Studies have explored patient outcomes of GC in relation to: patient age and education level[8], sex and referral indication[9], mode of service delivery[10,11], method of family history collection[12], provision of chance for illness recurrence[13], and physical counseling environment[14], revealing few relationships between patient outcomes and the studied variables that are both statistically and clinically significant. However, important knowledge gaps remain. For example, in the psychiatric context, though GC is associated with important benefits to patients, including marked increases in empowerment[12,13,15,16,17,18,19,20], no studies have explored the relationships between empowerment and patient/session-related variables such as sex, ethnicity, diagnosis, mode of referral or mode of GC. Furthermore, though studies have explored how different domains of the empowerment construct are more substantially impacted by the provision of GC in other areas[9,21] this has yet to be explored in the context of psychiatric GC.

Given that understanding factors that influence patient outcomes of GC at a more nuanced level may allow for prioritizing patients who might benefit most, or for adjustment of service delivery strategies to promote the best possible outcomes for difference types of patients, we set out to analyze - in an exploratory manner - the change in empowerment (as measured by the Genetic Counseling Outcome Scale (GCOS)[22], from pre- to post-psychiatric GC in relation to twelve

patient/session variables. Additionally, we sought to examine – again in an exploratory manner - the effect of psychiatric GC on individual GCOS items and domains.

MATERIALS AND METHODS

We conducted a retrospective chart review using data collected at a specialist psychiatric GC clinic in Vancouver, BC. This study was approved by the BC Children and Women's Research Ethics Board (H15-02632).

Clinical Context

Broadly, GC is designed to help people to "understand and adapt to the medical psychological and familial implications of genetic contributions to disease"[23]. In the psychiatric context more specifically, GC aims to help people understand how genes and environment contribute together to the development of illness, how to protect their mental health, and to address the guilt, fear blame shame and stigma that are often attached to people's explanations for causes of these conditions. The content and structure of the psychiatric GC appointment is generally consistent between sessions (i.e. regardless of indication of referral, etiology of mental illness and strategies for protecting mental health are discussed in a personalized manner, and emotional issues related to explanations for cause of illness are explored), with specific numeric estimates of risk for recurrence provided according to patient wishes[13]. Details of the process and structure of the session, including common core elements (in the form of a manual) have been described in detail elsewhere[24]In qualitative explorations, patients have described their experience with psychiatric GC as "an empowering encounter"[25], and quantitative studies show marked increases in patient empowerment[12,13,15,16,17,18,19,20] after psychiatric GC.

GC appointments are covered by the publicly funded healthcare system for all residents of British Columbia and are provided by two board certified genetic counselors. The clinic uses the GCOS as a clinical assessment tool; it is typically completed by all English-speaking patients at the beginning of their GC appointment (T1), and again at a standard follow-up telephone appointment (T2) approximately 1 – 2 months post GC. This service is available to anyone with a personal and/or family history of a psychiatric disorder, and all clinical data (including demographic information and GCOS scores from T1 and T2) is collected and managed using REDCap (Research Electronic Data Capture) tools hosted at BC Children's and Women's Hospital (Harris et al., 2009). REDCap is a secure, web-based application designed to support data capture for research purposes, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Inclusion Criteria

We extracted data from charts of index patients (family members were excluded) who attended their first appointment between February 1, 2012 and January 31, 2017, and who had completed the GCOS (defined as ≤5 missing items) at both timepoints.

Genetic Counseling Outcome Scale

The GCOS is a validated, clinical genetics-specific patient reported outcome measure that measures empowerment[22]. All 24 items are rated on a 7-point Likert scale (1= strongly disagree, 7 = strongly agree). Scores range from 24 to 168 with higher scores indicating higher levels of empowerment. The scale comprises of seven sub-domains, or putative subscales: hope, powerlessness, emotional regulation, adaptation, referral clarity, support and family impact[21].

Patient/Session Variables

We assessed change in GCOS scores in relation to 12 variables about which data were available, specifically: age, sex, ethnicity, mode of referral (self or health care provider), mode of genetic counseling (in-person, telephone or telehealth), primary indication for referral, type of appointment (family or individual), GC student involvement (yes or no), presence of observers (e.g. visiting trainee/physicians)(yes or no), history of mental illness (personal or family), diagnosis, and baseline (T1) GCOS score.

Analyses

Descriptive statistics were applied to the demographic data, and GCOS total scores at T1 and T2 were calculated according to instrument-specific instructions. We described the mean pre- and post-GC scores, and mean change scores, for each GCOS item using data from the entire cohort. Additionally, we calculated the mean change score for each of the seven GCOS subdomains and conducted a paired sample *t* test to examine change in GCOS scores for each subdomain. We calculated Cronbach's alpha for the scale as a whole, and for each of the subdomains at both timepoints.

Data were examined for continuity, independence of observations, homogeneity of variance and normality before conducting one-way between-group analyses of variance (ANOVAs) for all of the variables (except T1 GCOS score), using mean GCOS change scores (T2 – T1), with Tukey's HSD post hoc tests where applicable. To assess the effect of baseline GCOS score on change in GCOS score, we used a linear regression. Given that this was an exploratory, hypothesis generating study, we used a significance threshold of $p<0.05$ for all tests. To provide context for the analyses, we conducted a paired sample *t* test to compare the change in GCOS scores from T1

to T2 for the cohort as a whole. We excluded any group of n=1 from analyses. Changes in GCOS scores were considered in light of a threshold change score of 10.3, that was determined in a previous study to correlate with the minimum clinically important difference (MCID)[26]. All analyses were performed using IBM SPSS Statistics 24 (IBM Corp., Armonk, N.Y., USA).

RESULTS

There were 307 charts in the clinical database that met the inclusion criteria. Demographic data for the cohort of patients included in the analyses is shown in Table 1.

Cronbach's alpha for all 24 items of the GCOS was 0.827 at T1, and 0.845 at T2, thus showing good reliability. Overall, GCOS scores increased from T1 to T2 (T1: M=111.09, SD=17.68, T2: M=127.17, SD=18.20, $p<0.0005$, d=1.10), with mean increases in score being greater than the MCID[23]. Assumptions for continuity, independence of observations, homogeneity of variance and normality were met. At the individual level, GCOS scores increased for 86% of patients (see Table 1).

For each item of the GCOS, the average T1 and T2 (pre- and post-GC respectively) scale scores, and average change score is described in Supplemental Table 1. For each subdomain of the GCOS, Cronbach's alpha, average pre-and post-GC scores, and average change scores is described in Table 2. The subdomains of the GCOS where genetic counseling had the greatest effect were powerlessness and emotional regulation (Table 2).

Change in GCOS scores in relation to patient/session variables

All data regarding patient and session related variables are provided in Table 3. There was no significant difference in GCOS change scores (T2 – T1) according to age ($F(1, 305) = 3.357$,

p=0.068), sex (F (1, 304) = 2.158, p=0.143), ethnicity (F (4, 290 = 0.981), p=0.418), mode of referral (F (1, 305) = 1.266, p=0.261), type of appointment (F (1, 305) = 0.326, p=0.568), GC student involvement (F (1, 299) = 0.036, p=0.851), presence of observers (F (1, 167 = 0.061, p=0.805), or personal versus family history of mental illness (F (1, 305) = 1.233, p=0.268).

A significant relationship was found between GCOS change scores and mode of GC (F (2, 304) = 3.067, p=0.048). The effect size was small ($\eta^2 = 0.020$). Though changes in GCOS scores were numerically greater for the in-person counseling group compared to the telephone and telehealth groups (by 4.62 and 6.31 points respectively), the differences between groups were not statistically significant according to Tukey's post hoc test (p=0.111 and p=0.234 respectively).

GCOS change scores were greater for patients who stated that recurrence risk was a primary indication for referral, compared to the individuals who did not indicate this referral indication (F (1, 305) = 11.624, p=0.001). The effect size was small to medium ($\eta^2 = 0.037$). There were no significant differences in GCOS change scores when we compared the other primary indications individually (see Table 3).

Mean increases in GCOS scores were greater than MCID for all categorical variables, with the exception of those with a diagnosis of schizophrenia or schizoaffective disorder, but the number of individuals in these groups were too small to draw meaningful conclusions (see Table 3).

GCOS *change* scores were significantly related to *baseline* GCOS scores (F(1, 304)=43.8, p<0.000, R^2=0.125), with a moderate effect size (R=0.353): specifically, we found a linear relationship between the two (See Figure 1), those with lower baseline GCOS sores had greater increases in

GCOS scores after genetic counseling. This model shows that a baseline GCOS score of ≤131 predicts meeting or surpassing the MCID GCOS change score of 10.3[26]. Those with baseline GCOS scores higher than 131 are predicted to have increases in GCOS scores smaller than the MCID threshold. The demographic characteristics of those above and below this threshold baseline (T1) GCOS score are shown in Table 4; those who indicated a desire to discuss protective factors had higher baseline GCOS scores, and older individuals and those with a family history of mental illness rather than a personal history had lower baseline GCOS scores.

The characteristics of those with GCOS change scores above and below the MCID threshold are shown in Supplemental Table 2.

When we examined individuals who only had one diagnosis, there was no significant difference in GCOS change scores according to diagnosis ($p= 0.283$), however the effect size was medium ($\eta 2 = 0.056$). Additional data regarding pre-, post- and change scores by diagnosis for individuals with multiple diagnoses are shown in Supplemental Table 3.

DISCUSSION

This study represents the first examination of how these specific patient and session-related variables influence patient outcomes of psychiatric GC, and the first examination of the impact of psychiatric GC on individual items and subdomains of the GCOS. Overall, our data shows significant increases in levels of empowerment from before to after GC. There were also significant increases with large effect sizes in all of the sub-domains of empowerment except adaptation, where the effect was moderate and non-significant at a threshold of 0.05. In this regard, our study aligns with the findings of Ison et al, who also found significant improvement in post-GC scores in six of the seven subdomains, with adaptation being the subdomain that was not significant[9]. We found that the subdomains of empowerment on which psychiatric GC had the largest effect were

powerlessness and emotional regulation. Though we cannot directly compare data with the findings of Costal-Tirado et al (as effect sizes were not reported) emotional regulation was the one subdomain of empowerment in their study in which significant improvements were not observed from pre to post GC. This raises interesting questions about differences in GC outcomes between different patient populations, and/or different practice models of GC that are worthy of further exploration.

With regard to the influence of patient and session related variables on GC outcomes, we found that several of those we studied had no significant relationship with change in empowerment associated with receiving psychiatric GC. These included: age, sex, ethnicity, self-referral versus referral from a health care provider, individual versus family appointment, the involvement of students or observers, and personal versus family history of mental illness.

Though as far as we are aware, there is no previous data with which to compare it, our finding that the presence of observers or students did not influence GC outcomes will be reassuring for trainees, who may worry that they negatively impact the quality of a patient's care. Similarly, while family appointments can be more challenging for the genetic counselor to manage, anecdotally/from clinical experience, it may be assuring to providers to see that this complexity is not accompanied by a negative influence on patient outcomes.

For some of the other variables studied, data is available with which to compare our findings. For example, in other GC contexts (non-psychiatric) age has been found to influence outcomes of GC; specifically, older participants had smaller increases in knowledge after cancer GC[4]. However, one of the key differences is the outcome variable being assessed; knowledge in the cancer study, and

empowerment in the data reported here: variables that affect knowledge-based outcomes will not necessarily influence emotional or psychological outcomes.

Another area in which data exists with which to compare our findings related to self-, versus healthcare provider referrals. Some previous studies have suggested that individuals who self-refer are more likely to change health behaviors in response to the information they receive, compared to those who are referred by a health care provider in clinical genetics and healthcare services[27,28]. Relatedly, it has been suggested that those who self-refer may have higher levels of anxiety, or other psychosocial variables that may play a role in their response to treatment[29,30]. However, our data showed no difference in GCOS scores between those who self-referred and those who were referred by a healthcare provider.

A third area in which some data exists with which to compare our findings is mode of delivery; i.e. in person versus telephone/telehealth GC. In the current study, though the initial ANOVA suggested a marginally statistically significant difference in change in empowerment according to mode of delivery (with those who received GC in person having larger gains in empowerment) it did not survive Tukeys post hoc testing, perhaps due to discrepancies between group sizes - only 48 patients received telephone GC, and 15 patients were seen through telehealth, compared to 244 patients who attended the GC appointments in-person. Though we found no previous research that has explored the impact of mode of GC on empowerment specifically, *patient satisfaction* has been compared between those receiving cancer GC by telegenetics and those receiving in-person service. The study revealed no differences in this measure between groups, but identified the need for further randomized trials to compare longer-term psychosocial and behavioral outcomes[10]. It is possible that while acceptability of the two modes of delivery is comparable (as assessed by satisfaction), the effectiveness may differ (e.g. a possible small effect on empowerment). Adding

some degree of credence to this possibility, one study found telephone counseling to be non-inferior to in person counseling for a variety of measures including both satisfaction, and distress and decisional conflict, but rate of testing uptake differed between groups[11].

We identified a significantly greater increase in levels of empowerment for patients for whom understanding recurrence risk was a primary indication for referral, compared to patients with other primary indications ($p=0.001$, $\eta^2 = 0.037$). Data from Borle et al may provide some insight into this finding: specifically, in this study 27% of individuals who initially indicated that their primary motivation for GC was to receive recurrence risk estimates changed their minds after discussing etiology and protective factors. This subset of patients had significantly greater increases in empowerment after GC[13]. It is therefore possible that it is this subgroup of patients who are driving the significant association between indication for referral and change in empowerment after GC in the present study.

While specific psychiatric diagnosis had no statistically significant impact on change in levels of empowerment associated with GC, the effect size was moderate ($\eta 2 = 0.056$), suggesting the possibility that a larger sample size may have yielded a statistically significant association between greater increases in empowerment for those with bipolar disorder, anxiety, or depression as compared to individuals with schizophrenia. Some support for this idea comes from previous research, which demonstrated psychiatric GC reduces internalized stigma with a larger effect size for people with bipolar disorder and schizoaffective disorder as compared to those with schizophrenia[18].

Our finding that baseline (T1) GCOS scores predict the degree of change in empowerment after GC is to our knowledge – novel - and raises interesting possibilities for future research and clinical

practice, as described below. The finding that those who indicated a desire to discuss protective factors had higher baseline GCOS scores makes a degree of intuitive sense (these individuals are ready to talk about protecting their mental health for the future), but that older individuals and those with only a family history of mental illness (rather than a personal history) had lower baseline GCOS scores may need deeper exploration (e.g. qualitative study) to fully understand.

Study limitations

The majority of patients were female, European and had a personal history of mental illness. The psychiatric diagnoses were per patient report, and not confirmed via medical records. Furthermore, GCOS scores were measured approximately one-month after GC, but longer-term effects were not assessed.

Practice implications

Our data demonstrate that patients with a range of different ethnicities, sexes and diagnoses benefit from psychiatric GC, and provide some initial insight into some of the patient and session-related variables that could influence GC outcomes. Although additional research (as described below) is required, our data may lay the foundations for considering the clinical use of baseline GCOS scores for the purpose of identifying patients to refer to GC, and/or triaging those already referred (i.e. providing first available appointments to those with the lowest scores).

Future Research

The growing body of data reporting on using the GCOS in different practice settings, opens the opportunity to consider comparing how different specialties and practice models within GC compare in terms of their impact on empowerment and its subdomains. Future work could build on the data we report here regarding baseline GCOS scores – specifically, studies could explore the

possibility of triaging those referred for GC based on this variable. For example, it could be worthwhile to explore the outcomes of prioritizing (e.g. providing first available appointments to) those with lower baseline (T1) GCOS scores, given our data suggesting that these individuals benefit most from GC (as evidenced by greater improvements in GCOS scores after GC). As well, studies exploring the use of tools like the GCOS to identify patients who would not typically be referred/eligible but who could benefit from GC may be warranted (e.g. those with family history of cancer who would not be prioritized for GC services using current risk-based triage models could perhaps be offered appointments if they had a GCOS score below a given threshold). Future research could also usefully explore the wide variety of additional factors not explored here (e.g. coping style, personality characteristics) that may influence patient outcomes.

ACKNOWLEDGEMENTS

The authors thank Dr. Arianne Albert for her assistance regarding the statistical analyses and Caitlin Slomp for her insight throughout the research process. This research was supported by Janelle Villiers, and the Joan H. Marks Graduate Program in Human Genetics at Sarah Lawrence College. JA was supported by the Canada Research Chairs program, and the British Columbia Mental Health and Substance use Services. The authors thank the members of the Translational Psychiatric Genetics Group for their varied support and contributions.

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Figure 1

Title: Relationship between baseline GCOS score and change in GCOS after genetic counseling

Legend: The model shows a linear relationship between baseline GCOS score and change in GCOS after genetic counseling (predicted change in GCOS = 47.068 + -0.281 baseline GCOS). The dotted lines indicate the MCID threshold (10.3) on the y axis, and the threshold baseline its corresponding baseline GCOS (131).

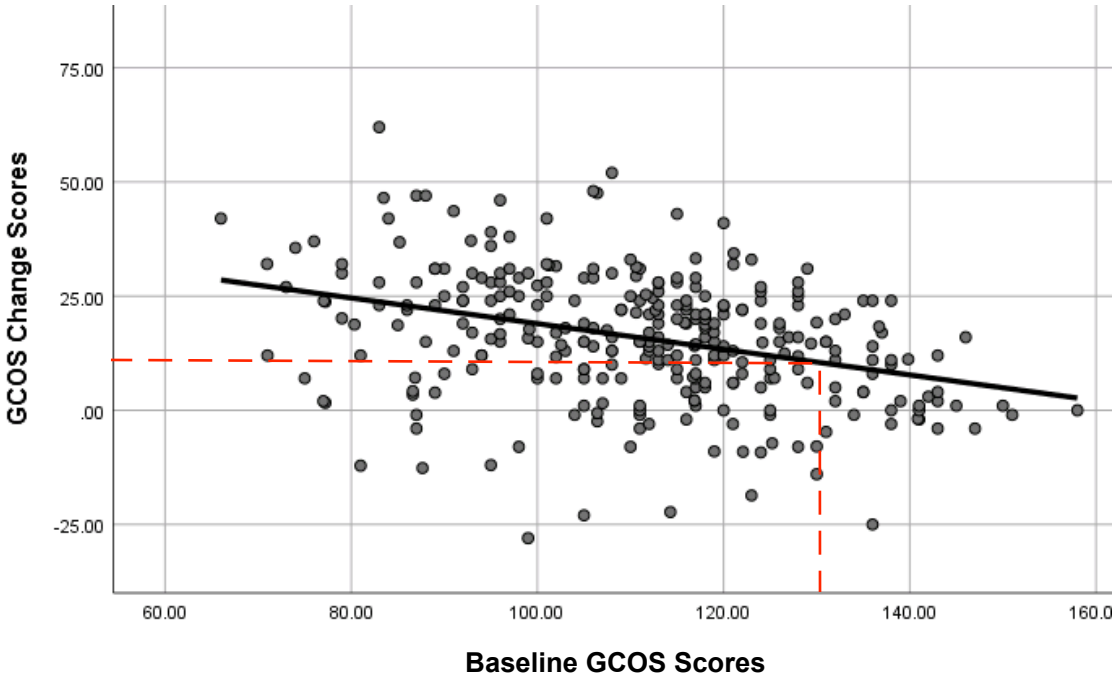
GCOS Change Scores
75.00
50.00
25.00
.00
-25.00
60.00
80.00
100.00
120.00
140.00
160.0
Baseline GCOS Scores

Table 1 Demographic information

	All patients N = 307
Age [mean(SD)]	41.13 (12.09)
Sex [n (%)]	
Male	50 (16.3)
Female	256 (83.4)
Other	1 (0.3)
Ethnicity [n (%)]	
European	208 (67.8)
Asian	46 (15.0)
Aboriginal	1 (0.3)
African	3 (1)
Mixed	34 (11.1)
Other	3 (1)
Unknown	12 (3.9)
GCOS T1 scores [mean(SD)]	111.09 (17.68)[a]
GCOS T2 scores [mean(SD)]	127.17 (18.20)[a]
Change scores (T2-T1) [mean(SD)]	16.08 (14.63)
Change score category [n(%), mean Change scores (SD)]	
Any Increase	265(86.3), 19.68(12.01)
Increase ≥MCID[b]	209 (78.9), 23.5(10.6)
Increase <MCID	56 (21.1), 5.44(2.84)
Decrease	36(11.7), -7.74(7.49)
No Change	6(2)

[a] p=<0.0005, Cohen's d=1.10, [b] Minimum Clinically Important Difference = 10.3

Table 2 Subdomains of GCOS: T1 and T2, change (T2-T1), and Cronbach's alpha

	T1		T2		Change (SD) (T2-T1)	p	Cohen's *d*
	GCOS mean (SD)	Cronbach's Alpha	GCOS mean (SD)	Cronbach's Alpha			
Hope	5.32 (0.37)	0.748	5.76 (0.30)	0.775	0.44 (0.12)	0.005	1.19
Support	4.94 (0.59)	0.626	5.63 (0.50)	0.642	0.69 (0.14)	<0.0001	1.17
Emotional Regulation	3.29 (0.27)	0.575	3.96 (0.46)	0.667	0.67 (0.25)	0.045	2.48
Family Impact	4.02 (0.75)	0.482	5.15 (0.66)	0.520	1.13 (0.20)	0.010	1.5
Powerlessness	4.40 (0.37)	0.548	5.39 (0.05)	0.613	0.99 (0.38)	0.045	2.68
Referral Clarity	5.72 (0.54)	0.561	6.21 (0.51)	0.510	0.49 (0.05)	0.003	0.91
Adaptation	3.95 (0.98)	0.561	4.36 (1.05)	0.573	0.41 (0.23)	0.094	0.42

Table 3 GCOS change scores for categorical variables (one-way between groups ANOVA)

	N	T1 mean (SD)	T2 mean (SD)	Change (SD) (T2-T1)	ANOVA p value	η^2
Age						
13-40	160	113.12 (17.27)	130.66 (16.78)	17.54 (14.65)	0.068	0.011
41-77	147	108.88 (17.90)	123.37 (18.97)	14.49 (14.49)		
Sex						
Male	50	111.65 (17.15)	125.05 (19.50)	13.40 (17.26)	0.143	0.007
Female	256	110.93 (17.82)	127.63 (17.97)	16.70 (13.97)		
Ethnicity						
European	208	111.38 (17.42)	128.30 (17.69)	16.92 (14.60)	0.418	0.013
Asian	46	113.48 (15.73)	126.93 (17.83)	13.45 (14.05)		
African	3	95.29 (17.28)	111.29 (29.65)	16.00 (12.62)		
Mixed	34	107.22 (22.22)	124.46 (17.18)	17.23 (13.56)		
Other	4	109.17 (21.06)	116.37 (36.05)	7.20 (16.55)		
Mode of referral						
Self-referral	114	109.62 (16.38)	124.48 (18.12)	14.86 (15.61)	0.261	0.004
Health care provider	193	111.96 (18.38)	128.76 (18.11)	16.80 (14.01)		
Mode of GC						
Telephone	48	111.08 (19.54)	123.57 (18.47)	12.49 (13.35)	0.048	0.020
In-person	244	110.89 (17.22)	128.00 (18.13)	17.11 (14.84)		
Telehealth	15	114.37 (19.64)	125.17 (18.15)	10.80 (12.90)		
Primary Indication						
Recurrence risk	147	110.87 (17.56)	129.87 (16.04)	19.00 (13.83)	0.001	0.037
Understanding causes	189	110.47 (17.80)	127.26 (18.58)	16.79 (14.72)	0.285	0.004
Protective factors	81	114.76 (16.98)	129.69 (18.11)	14.93 (12.52)	0.411	0.002
Had genetic testing	4	93.39 (18.03)	110.00 (23.76)	16.61 (17.17)	0.942	0.000
Pregnancy related	17	121.74 (15.41)	134.50 (15.50)	12.76 (9.37)	0.337	0.003
Other	6	98.00 (10.55)	122.50 (13.03)	24.50 (10.03)	0.155	0.007
Unsure	20	117.19 (13.98)	127.49 (21.56)	10.30 (17.84)	0.067	0.011
Type of appointment						
Family	89	110.72 (16.16)	127.54 (16.63)	16.83 (15.60)	0.568	0.001
Individual	218	111.24 (18.29)	127.02 (18.84)	15.78 (14.24)		
GC student involvement						
Yes	72	112.45 (17.23)	128.51 (20.62)	16.06 (13.45)	0.851	0.000
No	229	110.59 (17.70)	127.03 (17.23)	16.44 (14.99)		
Presence of observer						
Yes	38	116.31 (15.20)	132.45 (17.18)	16.13 (11.82)	0.805	0.000
No	131	111.51 (17.92)	127.04 (18.11)	15.53 (13.75)		
History of Mental Illness						
Personal History	259	111.16 (18.10)	127.64 (18.35)	16.48 (14.61)	0.268	0.000
Family History Only	48	110.73 (18.10)	124.66 (18.35)	13.93 (14.72)		
Personal History						
Schizophrenia	5	114.40 (19.58)	119.96 (14.83)	5.56 (7.36)	0.283	0.056
Bipolar disorder	30	110.97 (20.79)	129.95 (19.53)	18.98 (19.01)		
Schizoaffective	4	116.91 (17.60)	121.76 (28.58)	4.85 (20.52)		
Anxiety	17	118.06 (12.49)	134.10 (10.61)	16.04 (13.51)		
Depression	53	111.44 (17.38)	129.02 (18.37)	17.59 (13.04)		
Other	3	110.67 (4.04)	130.67 (6.11)	20.00 (2.65)		

Table 4 Demographics and patient characteristics for individuals above and below baseline GCOS threshold predicted to achieve a MCID (GCOS change score of 10.3).

	T1 GCOS ≤ 131 N= 268	**T1 GCOS >131** N= 39	**p**
Age			.025
13-40	134 (50.0)	27(69.2)	
41-77	134(50.0)	12(30.8)	
Sex			.891
Male	43 (16.1)	7 (17.9)	
Female	224 (83.8)	32 (82.1)	
Ethnicity			.883
European	181 (70.7)	27 (69.2)	
Asian	40 (15.6)	6 (15.4)	
Mixed	29 (11.3)	5 (12.8)	
African	3 (1.2)	0 (0.0)	
Other	3 (1.2)	1(2.6)	
Mode of Referral			.217
Self Referral	103 (38.4)	11 (28.2)	
Health Care Provider	165 (61.6)	28 (71.8)	
Primary Indication[1]	131 (48.9)	16 (41.0)	.359
Recurrence risk	166 (61.9)	23 (59.0)	.722
Understanding	65 (24.3)	16 (41.0)	.026
causes	4 (1.5)	0 (0.0)	1.0
Protective Factors	13 (4.9)	4 (10.3)	.248
Had genetic testing	6 (2.2)	0 (0.0)	1.0
Pregnancy related	17 (6.3)	3 (7.7)	.728
Other			
Unsure			
History of Mental Illness			.016
Personal History	221 (82.5)	38 (97.4)	
Family History only	47 (17.5)	1 (2.6)	
Personal History[2]			
Schizophrenia	4 (4.3)	1 (5.6)	.495
Bipolar disorder	24 (25.5)	6 (33.3)	.243
Schizoaffective	3 (3.2)	1 (5.6)	.421
Anxiety	14 (14.9)	3 (16.7)	.462
Depression	46 (48.9)	7 (38.9)	.904
Other	3 (3.2)	0	1.0

P values from Pearson Chi-Square, or Fisher's Exact test when appropriate

[1] Individuals can have more than one primary indication

[2]Personal history is only for those individuals with 1 diagnosis. If they have more than one diagnosis they are not included.