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Attitudes on Pharmacogenetic Testing in Psychiatric Patients with Treatment Resistant Depression

Michael J. McCarthy, MD, PhD[1,2], **Yucui Chen**[1,2], **Anna Demodena**[1], **Eileen Fisher**[3,4], **Shahrokh Golshan**[1,2], **Trisha Suppes**[3,4], **John R. Kelsoe**[1,2]

[1]VA San Diego Healthcare System, San Diego California

[2]UC San Diego Department of Psychiatry

[3]VA Palo Alto, Palo Alto California

[4]Stanford University Department of Psychiatry

Abstract

Background—Novel technologies make it possible to incorporate pharmacogenetic testing into the medical management of depression. However, previous studies indicate that there may be a subset of subjects who have concerns about genetic testing and may be psychologically vulnerable. If so, pharmacogenetic testing in depressed subjects could negatively impact their mental health and undermine treatment goals.

Methods—In this study, we developed a standardized instrument to assess motivations and attitudes around pharmacogenetic testing in a cohort of 170 depressed veterans participating in a multi-center clinic trial.

Results—Testing reveals that subjects were largely positive about the use of genetic testing to guide pharmacological treatment and help plan their future. Most subjects showed only modest concerns about the impact on family, inability to cope with the results and fear of discrimination. The severity of depression did not predict the concern expressed about negative outcomes. However, non-Caucasian subjects were more likely on average to endorse concerns about poor coping and fear of discrimination.

Conclusions—These data indicate that while the overall risk is modest, some patients with depression may face psychosocial challenges in the context of pharmacogenetic testing. Future work should identify factors that predict distress and aim to tailor test results to different populations.

Keywords

Depression; Genetic Testing; Pharmacogenomic Testing; Motivation; Attitude; Risk; Veterans

Corresponding Author: Michael J. McCarthy MD, PhD, VA San Diego Healthcare, San Diego, CA 92161, mmccarthy@ucsd.edu.

Conflict of Interest Statement.
None of the authors have relevant conflicts of interests to report.

Data Availability Statement.
De-identified data that support the findings of this study are available from the corresponding author upon reasonable request.

Introduction

Depressive symptoms are common across multiple psychiatric conditions including major depressive disorder, bipolar disorder and post-traumatic stress disorder and impose occupational and social impairment upon affected patients, often leading to disability and increased risk for suicide. While many effective drug therapies exist for depression, treatment response is often inadequate (Zisook, Ganadjian, Moutier, Prather, & Rao, 2008). Advances in psychiatric genetics show extraordinary promise for the development of improved diagnostic approaches and pharmacogenetic tools that may help to personalize drug treatments, and allow more efficient selection of pharmacotherapies tailored to an individual based on unique genetic characteristics (Bradley et al., 2018; Greden et al., 2019; Hall-Flavin et al., 2013; Hall-Flavin et al., 2012; Perez et al., 2017). The use of an individual's genomic data to personalize treatment promises to transform psychiatry by replacing the standard trial and error approach to pharmacotherapy with more precise and targeted drug selection strategies. Indeed, it is already increasingly common for patients to utilize pharmacogenetic information, either purchased directly from a company, or ordered by a treating physician to improve treatment outcomes (Brennan et al., 2015; Perlis, Mehta, Edwards, Tiwari, & Imbens, 2018), and an emerging literature indicates that indicates pharmacogenetic testing may provide therapeutic benefit to selected patients (Bousman, Arandjelovic, Mancuso, Eyre, & Dunlop, 2019; Greden et al., 2019; Rosenblat, Lee, & McIntyre, 2018). However, in order to deploy these tests more widely and effectively, a number of important questions need to be addressed including efficacy and cost-effectiveness.

Often overlooked but critically important are the potential psychosocial effects of the test on the patient. Genetic testing brings up a variety of potential issues for patients around stigma, privacy, patient expectations and family dynamics. There exists the potential that some psychiatrically vulnerable subjects may respond adversely to the test results, potentially worsening their mood symptoms, creating psychological stress and impeding treatment. In studies of non-clinical populations, healthy users of direct to consumer genetic tests were provided their genetic risk information about common medical disorders. The majority of these subjects tolerated the results well. However, a minority of subjects were deemed psychologically vulnerable and were more concerned about testing, both before and after the test was completed (Bloss, Schork, & Topol, 2011; Broady, Ormond, Topol, Schork, & Bloss, 2018). Perhaps reflecting increased worry, some reports indicate that patients may increase healthcare utilization in response to genetic test results (Bloss, Schork, & Topol, 2014). These findings indicate that some subjects may have adverse emotional responses to testing or develop distorted expectations from treatment. However, to date this concept has not been well-studied in depressed patients seeking clinical treatment while undergoing pharmacogenetic testing.

In the present study, we developed a standardized test called the Motivations and Attitudes on Psychiatric Pharmacogenetics (MAPP). The MAPP instrument was used to assess motivations, attitudes and concerns about pharmacogenetic testing in depressed patients with past drug-treatment failures indicating some degree of treatment resistance. We hypothesized that subjects with more severe depression would be more vulnerable to exacerbation of

psychiatric symptoms while undergoing pharmacogenetic testing. To examine this hypothesis, we tested the MAPP instrument in veterans participating in a pharmacogenetic treatment trial. We found that the depressed subjects were largely enthusiastic about using genetic test results to guide their care, and that in general, negative psychological implications were likely to be modest. However, we did find indications that some individuals were more vulnerable to concerns about being emotionally overwhelmed and/or facing discrimination based upon the test results. However, social factors were the predictor that best identified these subjects and not the degree of depression.

Methods

Subjects

All subjects were Veterans receiving care for depression at the San Diego VA or Palo Alto VA between 2015–2018. Subjects were participants in an industry-funded pharmacogenetic treatment trial in which they were subject to a genetic test to help guide pharmacological treatment selection. Patients were referred for study participation by their treating psychiatrist. The overall aim of the study was to implement pharmacogenetic testing in a "real world" clinical environment. Therefore, entry criteria were purposefully broad and included any psychiatric diagnosis, so long as significant depression was a prominent clinical feature of the presentation. Primary inclusion criteria for the study participation were current depressive symptoms, and past treatment failure with at least one previous adequate trial of an anti-depressant or mood stabilizer medication. There was no exclusion for co-morbid anxiety/psychosis/suicidal ideation, mild-moderate substance use, concomitant psychotherapy or the use of multiple medications. Diagnosis was determined by the treating psychiatrist based on patient interview and historical chart review. The most common mood disorder diagnoses were major depression (MDD, n= 95), and bipolar disorder (BD, n=60). Approximately 27% (n= 46) of the subjects were diagnosed with post-traumatic stress disorder (PTSD) either alone or in addition to a mood disorder. Subjects were given the MAPP questionnaire at the baseline visit shortly after consent to participate was obtained, and at the same time as providing a saliva sample for DNA testing. Participants were not given any specific education about pharmacogenetics or genetic testing but were free to ask their psychiatrist or study staff any question about the test. Subjects were blinded to their genetic test results and group assignment in the clinical trial. On the first study visit (typically 1–2 weeks after consent), the subjects filled out the QIDS-SR16 scale of depression (Rush et al., 2003). Description of the clinical trial methods and outcomes will be detailed in a later report.

Oversight

The study was conducted in accordance with all pertinent local and national regulations and guidelines for clinical research. The project was approved by the VASDHS and VAPAHS IRB. All subjects proved written informed consent to participate.

Survey Instrument

The questions on the MAPP were based upon a similar questionnaire developed for use in cancer patients and described previously (Balmana, Stoffel, Emmons, Garber, & Syngal,

2004). Questions were extensively modified to apply to psychiatric disorders, and particularly treatment resistant depression. The questions cover five dimensions: perceived clinical utility, family's wish to know, planning for the future, coping and fear of discrimination. Due to the important differences between cancer and depression treatments, some questions were eliminated (see below). The full survey is reported in the results section (Table 2). Missing data were rare. Only in cases where the majority (>50%) of values were missing were data excluded. There was no imputation of missing data. Three questions (one each in section A, D, and E) were determined to have problematic wording, were removed from the data and not considered in the final analysis. Ultimately 27 items were included in the final analysis.

Statistical Analyses

Raw data each of the question from individual subjects were examined by principle component analysis (PCA) and factor loading was evaluated to determine the underlying latent variables structure of the data. Cronbach's alpha and McDonald's omega were calculated using the R statistical software to estimate internal reliability of the test (Zinbarg, Revelle, Yovel, & Li, 2005). Next, mean values for each test item were analyzed. Differences reported in individual scores within a dimension were examined post-hoc using a one-way ANOVA. Next, sub-group analyses were run to examine the impact on MAPP of age, sex, race and the severity of baseline depression. To reduce the number of tests performed in sub-group analyses and reduce the risk of false positive associations, each of the five test dimensions was collapsed into a single score (i.e. single value each for perceived clinical utility, impact on family, planning for the future, coping and discrimination). For most sections, positive scores were simply summed. For section B (i.e. Family's Wish to Know), two questions (B2, B3) were oppositely valenced from the others and their values were subtracted from the total. Statistical analyses were then conducted using the total scores of each dimension. For demographic variables we used the subject's self-reported data for age, sex and race. The sex and race demographics of the study cohort were representative of Veterans living in the recruitment areas. Due to the relatively small numbers of non-Caucasians data for subjects identified as being African American (n=18), Asian American (n=15), American Indian (n=3), Pacific Islander (n=1) were combined into a single group. Subjects endorsing Hispanic heritage were classified as Caucasian. For depression severity, we used the total QIDS-SR16 score obtained at the baseline visit. Finally, a correlation matrix with statistical tests for significance was performed using the collapsed total score to identify underlying structure within the test across dimensions. For two all group analyses, a t-test was used, for tests with three or more groups, a One-Way ANOVA was used. In all cases, statistical significance was defined as $p<0.05$. PCA was performed using StatistiXL (Broadway, Western Australia). Other analyses were performed using GraphPad Prism (Version 5.03, San Diego, CA). De-identified data that support the findings of this study are available from the corresponding author upon reasonable request.

Results

170 subjects participated in the study (N= 122 from San Diego, 48 from Palo Alto). Basic demographic information is provided in Table 1.

Medical care and prevention

Subjects held largely favorable views on the potential utility of genetic testing as it relates to a medical treatment (Table 2). The most strongly endorsed individual statements were “If my genetic profile predicts a poor response to medication treatments, I want to know (A3)”; “If my genetic profile predicts I metabolize some drugs poorly, I want to know (A4)”; and “I want to know the chances that drug treatment will make my mood feel normal. (A6)”. Statements that were significantly less strongly endorsed, but still seen positively were: “Learning my genetic test results will allow me to plan for the future more effectively (A1)”; “Learning my genetic test results will help treat my depression (A5)”; “I want to learn my genetic test results, so I will know my children’s chances of having a psychiatric illness (A7)”, “Learning my genetic test results will help me live a better life (A9)”. In sub-group analyses, perceived utility of genetic testing for medical care and prevention did not differ significantly across sex, race, ages, severity of depression or diagnosis (Table 3).

Family’s wish to know

Subjects had more various responses regarding questions around the impact on family and the family’s wish to know genetic test results (Table 2). Subjects on the whole believed that family members would want to know about the genetic test results: A minority of subjects (12%) worried their families would not want to know the results, but only 3% of subjects worried strongly that their family would be angry about testing. Subjects were mostly neutral about whether getting the test was important for family members (Table 2). Perceived impact on family did not differ significantly by age, sex, race or level of depression. However, there were non-significant trends towards differential responses in females and non-Caucasians (Table 3), with both groups showing a nominal trend towards perceiving a more beneficial impact of testing on family. There was also a significant difference by diagnosis whereby patients with MDD were less likely to endorse a family’s wish to know the test results compared to patients with BD (Table 3). PTSD diagnosis did not predict any differences (not shown).

Future planning

Subjects were also mostly positive about the ability of genetic testing to help them understand their illness and to “live life to the fullest”. They were more neutral and significantly less positive that the test might help family members make decisions about family and marriage ($p<0.05$ One-Way ANOVA). There were no significant differences in concerns about future planning in any of the sub-group analyses (Table 3).

Ability to cope with the results

The majority of subjects reported having confidence with respect to their ability to emotionally cope with the genetic test results despite being depressed (Table 2). None of the items on average were endorsed with mean scores ≥ 3 indicating overall low levels of concern about coping. Statements most strongly rejected were: “I do not know how I would cope with knowing that I have a gene that predicts poor treatment response (D2);” and “It seems wrong to have this type of testing. Time will tell if I have an altered gene. (D6)” Somewhat less strongly rejected were the statements: “I do not know how I would cope with

knowing that I have a gene that predicts poor treatment response (D1);" "Knowing my genetic test results will change how I feel about myself (D3);" and "It would be overwhelming to know that I have an extremely high chance of having treatment resistant (difficult to treat) depression (D5)." Only 5/170 subjects (3%) strongly endorsed an inability to emotionally cope with the test results. In this small subset of respondents, there was no demographic or clinical factor that significantly predicted their high level of distress. Interestingly, there was no apparent relationship between the severity of depression, and the reported ability to cope with genetic test results. Similarly, there was no significant difference in coping between patients with BD, MDD or PTSD. However, there was a statistically significant difference in self-reported coping that was associated with race. Self-reported test-related distress in non-Caucasians was overall modest, but slightly higher than Caucasians indicating possible group differences in coping (Table 3).

Fear of discrimination

The majority of subjects rejected major fears about pharmacogenetic testing leading to discrimination. Most subjects expressed a moderate degree of certainty that genetic testing would not be used to discriminate against them, both in general and with respect specifically to their health/life insurance or employment (Table 2). However, not all subjects were assured of their safety as 17/170 (10%) endorsed agreement (i.e. scored 4 or 5) with the statement "I may be discriminated against if I learn my genetic test results (E5)" and another 45/170 subjects were neutral/unsure (i.e. scored a 3) on the question. In analyses of the various sub-groups, there were no differences about discrimination across sex, diagnosis, age or severity of depression. However, there were significant differences by race. While overall concern was modest, the non-Caucasian group endorsed greater overall concern about discrimination compared to Caucasians (Table 3).

Overall relationship among variables

PCA of the individual test items indicated that two factors account for 40.8% of the total variance. Eight factors with Eigenvalues > 1 were identified, which cumulatively accounted for 65% of the variance. Cronbach's alpha for the MAPP instrument was calculated to be 0.88. McDonald's omega was calculated to be 0.91 overall and revealed two main factors with omega values of 0.91 and 0.83 respectively. Overall, these data indicated good internal consistency of the test items. To examine this further, a correlation matrix of all subject scores across the collapsed five dimensions revealed additional underlying structure of the MAPP instrument. Perceptions of test utility were significantly positively correlated with the utility for future planning ($r=0.68$, $p= 9.9 \times 10^{-25}$) and positive impact on the family ($r= 0.55$, $p= 6.7 \times 10^{-15}$). Conversely, perceived positive impact on the family was significantly negatively correlated on both coping ($r= -0.27$, $p=0.0003$) and discrimination ($r= -0.36$, $p=1.9 \times 10^{-6}$). Fear of discrimination and self-reported inability to cope were significantly associated with each other ($r=0.54$, $p=2.9 \times 10^{-14}$).

Discussion

Pharmacogenetic testing is likely to significantly alter the landscape of clinical treatment for depression. However, in addition to the many technical and clinical challenges faced, there

also exist important social and psychological factors that must be considered before the tests can be deployed widely. Our data indicate that most subjects prior to initiating guided treatment, are favorably predisposed to the use of genetic testing in psychiatry for the treatment of depression. The results suggest patients generally think the tests may be useful both for medical management and personal planning and moreover that there is generally little concern about problems coping, discrimination, and adverse impact on family relationships. In fact, the high degree of positivity may in some instances reflect a degree of unrealistically high expectations among the subjects (e.g. high endorsement of question A7 regarding genetic risk to children, something the test may have no ability to predict). This implies widespread education and effectively communicating the limits of testing may be needed as tests become more common in clinical practice. However, these generally favorable attitudes were not universally held, and there exist minority populations that may have concerns, especially about their ability to cope and/or face discrimination based on the test results. In particular, racial minorities may have less ability to cope and worry more about discrimination based on the test results. Contrary to our initial hypothesis, severe depression is not a predisposing risk factor for psychiatric patients receiving genetic tests.

In trying to identify vulnerable populations, it appears that illness severity, at least in terms of depressive symptoms, does not predict attitudes or expectations. However, diagnosis may play some role. There were minor differences between BD and MDD subjects with respect to reporting the test results to the family, whereas a PTSD diagnosis did not affect MAPP score on any dimension. We did not assess other potentially relevant dimensions of mental functioning including anxiety, cognition, or interpersonal stability/relationships. We also did not address patient's ability to distinguish a diagnostic genetic test from a pharmacogenetic test used preferentially to guide treatment, a distinction that could affect perceptions of risk. Previous studies of attitudes on genetic testing in psychiatry have identified concerns about discrimination among racial minority groups (Murphy, Wickramaratne, & Weissman, 2009). In line with this past work, we found that race, and not depression contribute to worry about discrimination and/or poor coping. Our analyses indicate that concerns about discrimination and poor coping from pharmacogenetic testing is associated with perceived negative impact on the family. While our results cannot identify causative factors, one might speculate that the most psychologically vulnerable populations in the context of pharmacogenetic testing may be those with strained family relationships and/or past victims of discrimination. Exactly how racial minority groups may be especially vulnerable is not obvious from our data and is likely related to social factors in complex ways. Importantly however, even among the more vulnerable groups in our sample, the expected adverse impact of pharmacogenetic testing was modest. Previous work in non-clinical populations has identified factors that predict sharing of genetic data with a physician (Darst, Madlensky, Schork, Topol, & Bloss, 2014). Factors that predicted more sharing and fewer concerns about privacy included older age, higher income, married status and religious identification, but did not find racial differences. While the is some overlap with our study, we did not examine most of these factors, or other key factors like education, and our data did not identify any significant effects of age. Therefore, additional work is required to understand what kinds of discrimination might be most salient (e.g. insurance, employment, racial, social), and how it relates to various demographic factors.

Our work is in line with previous reports indicating that genetic testing is largely well tolerated in other clinical settings. In a study of cancer patients using an instrument similar to ours, patients viewed the test as helpful in managing their medical illness, and patients had relatively few concerns about coping with test results (Balmana et al., 2004). In a study of a neuropsychiatric disorder, genetic testing was performed in asymptomatic subjects at risk for Alzheimer's Disease for the APOE4 allele. Carriers of the APOE4 risk allele for Alzheimer's Disease did not show any significant difference in depression or anxiety upon learning of their test result, again suggesting subjects generally tolerate testing without major psychological impact (Green et al., 2009). However, the latter study differs in important ways from ours in that asymptomatic subjects were tested for future disease risk, not for pharmacogenetic treatment guidance. Our subjects were already diagnosed with a neuropsychiatric disorder and for them, the test result may be viewed as having more potential upside benefit (i.e. helps treat the diagnosis) compared to a test that would reveal risk factors for a new neuropsychiatric diagnosis (i.e. suggests one may have a previously unrecognized disorder). In symptomatic patients with depression, a diagnostic test may also be a pharmacogenetic test since accurate diagnosis could determine optimum treatment strategy (e.g. identifying cases of bipolar disorder vs. major depression that require mood stabilizers vs. antidepressants), and we made little distinction between "genetic" and "pharmacogenetic" in our assessment. However, it may be possible that in asymptomatic subjects, diagnostic tests for psychiatric disorders with major genetic liability such as autism (Grove et al., 2019), schizophrenia ("Biological insights from 108 schizophrenia-associated genetic loci," 2014) or bipolar disorder (Stahl et al., 2019) may cause more distress and distinctions between diagnostic and therapeutic roles of genetic testing will be more salient. Therefore, the context of the genetic testing may be important, and our largely reassuring results must not be over generalized to the diagnostic setting.

Our study has some inherent limitations. The study population has a selection bias as all subjects agreed to participate in a pharmacogenetic trial before taking the MAPP and may there be favorably predisposed towards testing. Similarly, we only tested baseline attitudes, and did not assess any treatment-emergent changes and over the course of the trial. Moreover, our sample was comprised entirely of California Veterans. The cohort was largely male and majority Caucasian. Many were unemployed and/or medically retired and receiving disability pensions for a psychiatric disorder and/or eligible for care based on low income. Therefore, some of the attitudes we identified in this group may not generalize to other non-Veteran populations. This may be especially true with respect to concerns about health insurance and retirement benefits. Veterans typically receive more medical benefits with increasing levels of illness severity while in the general population, the most severe cases run higher risk of being denied insurance benefits. Therefore, the way Veterans assess discrimination risk pertaining to insurance benefits may differ from the general population in important ways. Among non-Veteran populations, pharmacogenetic testing for depression is not typically covered by insurance and at present is typically utilized by middle or higher socioeconomic classes who can self-pay for the test. Similarly, depression is more common in women, a group that was relatively under sampled in our study. Therefore, additional testing of attitudes related to genetic testing in other cohorts is indicated.

Conclusions

Pharmacogenetic testing in patients with treatment refractory depression is largely well tolerated, even among those with severe depressive symptoms. However, there are likely to be a minority of patients who experience increased fear of discrimination and/or have difficulty coping with the results. Understanding which patients may be vulnerable to negative social repercussions or risk psychological decompensation should be an active area for future study.

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Table 1.

Demographic data for the study population

	San Diego	Palo Alto	Total
Age Mean+SEM (Range)	48.9 ± 1.3 (23–82)	57.0 ± 2.0 (25–81)	51.2 ± 1.1 (23–82)
Sex Male (%)	90 (73.8)	38 (79.2)	128 (75.3)
Sex Female (%)	32 (26.2)	10 (20.8)	42 (24.7)
Caucasian (%)	91 (74.6%)	37 (77.1%)	128 (75.3%)
Non-Caucasian (%)	31 (25.4%)	11 (22.9%)	42 (24.7%)
Depression Mean QIDS-SR ± SEM	14.3 ± 0.5	12.0 ± 0.8	13.6 ± 0.4

Table 2.

Itemized results of the MAPP instrument.

A. Medical Treatment: **1=Strongly Disagree, 5=Strongly Agree**	**Mean**	**SEM**
1. Learning my genetic test results will allow me to plan for the future more effectively.	4.19	0.07
2. I want to learn about my genetics test results so I can get appropriate psychiatric care.	4.55	0.06
3. If my genetic profile predicts a poor response to medication treatments, I want to know	4.74	0.05
4. If my genetic profile predicts I metabolize some drugs poorly, I want to know	4.71	0.06
5. Learning my genetic test results will help treat my depression	4.15	0.07
6. I want to know the chances that drug treatment will make my mood feel normal.	4.64	0.05
7. I want to learn my genetic test results, so I will know my children's chances of having a psychiatric illness.	4.05	0.09
8. Learning my genetic test results will help my doctor and I make decisions about treatment.	4.49	0.06
9. Learning my genetic test results will help me live a better life.	4.08	0.07
10. If I do not have an altered drug response susceptibility gene, I want to know.	4.51	0.06
B. Family Wish to Know: **1=Strongly Disagree, 5=Strongly Agree**		
1. It is important for my family that I get genetic testing.	3.34	0.10
2. My family does not want to know if I have a gene linked to a serious psychiatric illness.	2.43	0.09
3. My family will be angry if I go ahead with genetic testing.	1.70	0.08
4. Getting genetic testing is a responsible thing to do.	4.11	0.08
C. Future Planning: **1=Strongly Disagree, 5=Strongly Agree**		
1. Knowing that I have a genetic variant linked to a serious psychiatric problem helps me understand my illness.	4.47	0.06
2. Knowing that I have a gene that predicts the response of my depression to drug treatment will help me to live my life to the fullest.	4.28	0.07
3. Learning my results will help my children make decisions about marriage and family.	3.46	0.10
D. Ability to Cope With Results: **1=Strongly Disagree, 5=Strongly Agree**		
1. I do not know how I would cope with knowing that I have a gene that predicts poor treatment response.	2.59	0.09
2. Learning my genetic test results will be upsetting to me.	1.85	0.08
3. Knowing my genetic test results will change how I feel about myself.	2.56	0.10
4. It would be overwhelming to know that I have an extremely high chance of having treatment resistant (difficult to treat) depression.	2.44	0.10
5. It seems wrong to have this type of testing. Time will tell if I have an altered gene.	1.68	0.09
E. Fear Of Discrimination: **1=Strongly Disagree, 5=Strongly Agree**		
1. I am worried about losing my health insurance if I have a gene that is linked to a serious mental illness or poor treatment response.	1.95	0.09
2. If I have a gene the makes my depression harder to treat, I will not be able to obtain or maintain life insurance.	2.05	0.09
3. Having a gene linked to a serious mental illness will make it difficult for my family members to get or keep health insurance.	2.36	0.08
4. I may be discriminated against if I learn my genetic test results.	2.15	0.10
5. I am worried about the consequences if my employer finds out my genetic test results.	2.12	0.10

Table 3.

Max Score for each dimension is 50 (High score indicates more useful), 8 (High score indicates more useful), 15 (High score indicates more useful), 25 (High score indicates more upsetting), 25 (High score indicates more worry).

		Medical Care	Family	Future	Coping	Discrimination
Age						
21–30	Mean	42.47	2.65	11.53	10.24	9.82
	SEM	0.89	0.68	0.42	0.88	1.07
	N	17	17	17	17	17
31–40	Mean	44.17	2.86	12.28	11.66	12.21
	SEM	1.22	0.53	0.48	0.96	0.92
	N	29	29	29	29	29
41–50	Mean	44.35	3.48	11.71	10.19	9.51
	SEM	0.86	0.50	0.38	0.55	0.80
	N	31	31	31	31	31
51–60	Mean	43.39	2.884	11.7	11.5	11.11
	SEM	1.09	0.45	0.43	0.59	0.76
	N	44	43	44	44	44
61–70	Mean	44.81	4.057	12.5	10.36	9.167
	SEM	0.85	0.50	0.40	0.70	0.75
	N	36	35	36	36	36
71+	Mean	44.08	4.231	12.62	12.69	11
	SEM	2.55	1.06	0.73	1.05	1.64
	N	13	13	13	13	13
	p=	0.82	0.32	0.52	0.28	0.12
Race						
Caucasian	Mean	43.63	3.397	11.86	10.65	9.94
	SEM	0.54	0.25	0.22	0.34	0.43
	N	128	126	128	128	128
Non-Caucasian	Mean	44.98	4.31	12.52	12.12	12.36
	SEM	0.96	0.66	0.36	0.69	0.72
	N	42	42	42	42	42
	p=	0.22	0.12	0.14	**0.04** *	**0.005** *
Sex						
Male	Mean	43.63	3.103	11.91	11.23	10.48
	SEM	0.55	0.26	0.23	0.36	0.43
	N	128	126	128	128	128
Female	Mean	44.98	3.95	12.36	10.36	10.4
	SEM	0.90	0.48	0.34	0.62	0.8036
	N	42	42	42	42	42

		Medical Care	Family	Future	Coping	Discrimination
	p=	0.21	0.11	0.32	0.23	0.93
Depression						
Low	Mean	43	2.744	12.47	10.98	10.81
QIDS 1–10	SEM	1.33	0.48	0.34	0.72	0.85
	N	43	43	43	43	43
Medium	Mean	44.36	3.47	11.89	10.87	9.81
QIDS 11–16	SEM	0.74	0.42	0.33	0.58	0.60
	N	53	53	53	53	53
Severe	Mean	44.13	3.71	12.04	11.4	10.84
QIDS 17+	SEM	0.73	0.45	0.37	0.49	0.82
	N	45	44	45	45	45
	p=	0.56	0.31	0.48	0.8	0.52
Diagnosis						
Bipolar Disorder	Mean	45.28	3.983	12.13	11.15	10.68
	SEM	0.72	0.39	0.34	0.50	0.64
	N	60	60	60	60	60
Major Depression	Mean	43.59	2.935	11.95	11.09	10.36
	SEM	0.5836	0.2920	0.2550	0.4278	0.4842
	N	95	93	95	95	95
	p=	0.07	**0.03** *	0.66	0.93	0.68

* indicates p<0.05 by T-test.