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Predictors of Psychological Distress and Interest in Mental Health Services in Individuals with Cancer

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Abstract

OBJECTIVE—Identifying risk factors for psychological distress in patients with cancer may help providers more efficiently screen, identify, and manage distress. The present paper presents predictors of psychological distress in a large heterogeneous sample of cancer patients.

METHODS—836 patients were enrolled in a large RCT and completed computerized psychosocial assessments (MHADRO).

RESULTS—Multivariate regressions examined predictors of distress and interest in mental health services. Final models suggest that psychological distress was related to six variables and interest in mental health services was related to previous history of mental health counseling, total number of cancer related symptoms, and race/ethnicity.

CONCLUSIONS—Results may be used to identify high risk patients who may benefit from proactive psychosocial interventions.

Keywords

Psychological distress; risk factors; cancer; intervention; social support

Competing Interests

This grant was funded through an STTR mechanism from the NIH/NIMH. Intellectual property as well as licensing and revenue income from the MHADRO program are shared between Polaris Health Directions and the University of Massachusetts Medical School. Dr. Boudreaux also does consulting work for Polaris Health Directions.

Introduction

At least one third of oncology patients experience psychological distress (Carlson and Bultz, 2003). Distress has been defined by the National Comprehensive Cancer Network as “a multifactorial unpleasant emotional experience of a psychological (cognitive, behavioral, emotional), social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms, and its treatment” (2012). A better understanding of psychological distress in patients with cancer is imperative as untreated psychological distress may result in significant negative outcomes (Sarna et al., 2002), which could be short term (e.g., non-adherence) or longer term (e.g., clinical depression). Distress affects quality of life because of the obvious personal suffering it can cause, but also because it can adversely impact social functioning and relationships (Deimling et al., 2006). Some researchers have even hypothesized that high rates of psychological distress may have the potential to affect survival rates in oncology patients (Jacobsen, 2007; Brown et al., 2003). Individuals may experience psychological distress during any phase of cancer treatment, from the moment of diagnosis to active treatment and even into survivorship. Henselmans et al. examined distress in patients both at the time of diagnosis and during active treatment in 171 women newly diagnosed with breast cancer and found that 33% of patients were highly distressed immediately after diagnosis and throughout active treatment (2010). Further, though distress in cancer survivors often stems from different concerns than those who are in active treatment, it is estimated that at least 22% of cancer survivors continue to experience psychological distress after treatment is complete (Sarna et al., 2002).

Although the impact of psychological distress has been well documented, there are inconsistencies in the literature regarding rates of psychological distress in oncology populations. For example, while Lynch and colleagues (2008) found that 47% of their sample was considered psychologically distressed, Skarstein, et al. (2000) only found that 17% of their sample experienced such problems. Such discrepancies may be due to a number of factors, including the demographic and clinical characteristics of samples, such as age, race, gender, and type of cancer. Zabora and colleagues examined cancer sites and psychological distress by analyzing a database of 4,469 patients with different types of cancer who had completed the Brief Symptom Inventory (BSI: 2001). The researchers found that patients who were younger, not married, and had lung cancer had the highest levels of distress. A number of other studies have found similar results. Parker, et al. assessed the relationship between depression and anxiety and age, marital status, level of education, social support, and quality of life (QOL) in 351 outpatients with cancer (2003). Older, married patients reported fewer depressive symptoms, and greater perceived social support was correlated with fewer depressive symptoms, decreased anxiety, and better QOL. Further, Deimling et al. conducted a study looking at race and psychological functioning in a random sample of 321 cancer survivors with either breast, prostate, or colorectal cancer from the cancer tumor registry of the Ireland Cancer Center (ICC: 2006b). Using a relatively diverse sample (38% Black/African American, 62% White/Non-Hispanic), the authors found that Black/African American patients reported significantly less depression and anxiety symptoms than their White counterparts. Finally, Thomas et al. (2011) examined the relationship of gender and psychological distress in 760 patients (357 males and 366

females) who had a range of cancer diagnoses and found that female patients were at higher risk for overall distress compared to men. Regardless of the population providers are working with, screening and addressing psychological distress is now considered to be part of standard practice in oncology settings. However, very few providers are able to keep up with consistent psychosocial distress screening due to overall time shortages as well as an absence of mental health professionals in oncology settings.

The purpose of the present study was to evaluate demographic, physical, and psychosocial predictors of psychological distress in a large sample of cancer patients with a range of disease sites. A secondary purpose of the paper was to investigate both physical and psychosocial predictors of interest in mental health counseling services offered to patients during their oncology visits.

Method

Participants

The sample used in these analyses were collected as part of a large randomized control trial (RCT) that examined whether or not a computerized psychosocial assessment and intervention program for patients with cancer could improve psychological, social, and physical outcomes. The larger RCT results are forthcoming in a future publication as we are still collecting follow up data. The present analyses were performed on the baseline data collected from 836 cancer patients recruited from three comprehensive cancer centers: the University of Massachusetts Medical School Cancer Center (n=581; 70%), the Cancer Institute at Cooper Hospital in New Jersey (n=126; 15%), and the University of Texas MD Anderson Cancer Center (n=129; 15%). Eligibility required: (1) a past or current cancer diagnosis, (2) age greater than or equal to 18 years, (3) a permanent residence in the same state as treatment center, and (4) a working telephone number. The following excluded enrollment: altered mental status (e.g., psychosis, delirium, disorientation, dementia, unresponsiveness), hostile or agitated behavior, severe illness that would preclude conversation or computer use (e.g., persistent vomiting, severe pain), or factors precluding follow-up (e.g., transient residence or lack of a telephone). Patients were recruited regardless of type, duration of illness, stage of cancer, or phase of treatment. The study was approved by the Institutional Review Boards of all three institutions.

Measures

The baseline Mental Health Assessment and Dynamic Referral for Oncology (MHADRO) assessment consisted of a maximum of 80 items. Branching logic ensured that participants only answered applicable items. Demographic and disease information including gender, race, ethnicity, age, marital status, type of cancer, time since cancer diagnosis, was collected on all participants. The psychosocial constructs that were measured in the MHADRO's baseline assessment included depression, anxiety, functional disability, subjective well-being, behavioral health status (BHS) index (a mixture of anxiety, depression, functional disability, and subjective well-being scores), NCCN distress thermometer, social support, alcohol abuse, tobacco abuse, patient/provider relationship, and cancer symptoms and side effects (pain, tiredness or fatigue, nausea or vomiting, insomnia or sleep difficulties,

difficulty with bowel movements, and sexual difficulties or lack of interest in sex). For all of these scales, higher scores indicated more positive outcomes on all of the scales with the exception of the alcohol use, tobacco use, total number of symptoms items and the Self-Reported Distress Scale (NCCN-DT). A full description of the assessment's major constructs of this study has been published (O'Hea et al., 2013). Finally, the MHADRO program also contained questions about mental health diagnostic and treatment history, which queried any existing mental health problem at present or in history (e.g., diagnoses, hospitalization, psychotropic prescriptions, counseling). Participants also indicated whether they believed seeing a counselor would be beneficial (yes, no, not sure).

Procedures

Recruitment/Enrollment—All participants signed a written consent prior to participating in the study. All subjects were treated in accordance with the NIH's Guidelines for Protecting Human Subjects. Participants arriving for routine oncology (treatment or follow up) appointments or chemotherapy infusions were screened for eligibility and approached in an exam room or an infusion chair. Each patient was given information about the study's purpose and participant requirements (one computerized assessment and three follow ups). Participants were randomly assigned to one of two conditions described below: control or intervention. For the control group, participants completed the MHADRO baseline assessment and follow up assessment; but did not receive the three feedback reports or the option for a dynamic referral. At the end of the 12 month follow up assessment, all control group participants were given the opportunity to take advantage of the dynamic referral option.

Participants in the intervention group received tailored feedback reports including a Health Care Provider Report, Patient Feedback Report, and if they reached a certain criteria, were also offered a Mental Health Referral Report upon completion of the baseline assessment. Patients in the intervention group who were not already in therapy received the option for having a faxed referral sent if any of the following applied: (1) a score of 3.2 or less out of a possible 4 on the MHADRO's depression scale (with higher scores indicating better outcomes), (2) a Behavioral Health Status score falling in the most severe range (scores in the top 70%) (3) an answer of "yes" or "not sure" when asked if seeing a counselor or therapist would be beneficial, (4) a rating of 9 or 10 on the self-reported measure of emotional distress OR (5) sexual difficulties endorsed. Participants who accepted a faxed referral signed an authorization form to release Personal Health Information. Upon completion of the assessment, a referral request was automatically sent to an appropriate mental health provider based on the participant's zip code and insurance. A copy of the mental health provider's information was also provided in the patient report, which was given to each patient in the intervention condition as they left their appointment. When requested, the mental health provider was given 72 hours to contact the patient who requested the referrals. A research assistant followed up with the mental health provider to confirm receipt of the request and also called the patient to ensure if he or she were contacted by the mental health provider. Control group participants were given the opportunity to have a dynamic referral sent after the completion of their final, 12-month follow-up assessment.

Statistical Analysis

Basic descriptive statistics were used to characterize the sample. To assess predictors associated with psychological distress we used a manual, backwards model selection process using multiple linear regression. As a first step, all variables under consideration were included (race/ethnicity, sex, marital status, education, alcohol use, cancer type, time since diagnosis, medication for emotional problems, counselor visits, mental health diagnosis, age, heavy smoking index, social support, patient provider partnership, number of cancer symptoms, rating of pain in last two weeks, rating of fatigue in the last two weeks, and rating of concern about sexual difficulties). At each subsequent step the model fit and statistical significance was assessed and a decision made as to the next variable to be removed from the model (based on the largest p-value). This procedure was repeated until a model with predictors significant at the $p < 0.05$ level was obtained. For categorical variables that remained significant we calculated least squares means with an adjustment for multiple comparison testing (see Tables 1 and 2).

As a final step we examined factors associated with the acceptance of dynamic referral (see Tables 3 and 4). Our initial analyses included descriptive statistics and proceeded to multivariable modeling. Similar to our approach of determining the predictors of psychological distress, we employed a manual, backwards selection process using multiple logistic regression. Using the same regressors from the model predicting psychological distress, we removed variables from the model until only predictors significant at the $p < 0.05$ level was obtained. Resulting odds ratios and 95% confidence intervals are reported. All statistical analyses were performed using SAS 9.3 (Cary, NC).

Results

The patient sample of 836 participants was primarily Non-Hispanic White (90.7%), female (86%), and married (65%) with a mean age at intake of 59 (SD=11.6). A large percentage of participants (56%) were alcohol users but did not screen positive for risky use at the time of assessment. The most prevalent cancer type in the sample was breast cancer (49.2%) with the majority of participants having been diagnosed more than 6 months ago (66%). Sample participants, in general, had few mental health challenges with 69% indicating they have never taken medication for emotional problems, 63% never having seen a counselor or therapist to manage emotions or stress, and 65% reporting no mental health diagnoses (Table 1).

Multiple linear regression modeling revealed that participants who had never taken medication for emotional problems and those who had but currently were not taking medications had lower psychological distress scores on the BHS than those who were currently taking medications, respectively (Table 2.) Additionally, ever having seen a therapist for emotional problems, and reported mental health diagnoses, were associated with higher psychological distress. Heavier smokers also had significantly higher psychological distress than non-smokers, as did participants with more pain and fatigue in the past two weeks (Table 2).

Of the 836 participants enrolled in the study, 415 were in the intervention group and therefore eligible to receive dynamic referral. The offering of dynamic referral among those eligible did not differ by sociodemographic characteristics (race/ethnicity, sex, marital status, and education), behaviors (alcohol use, heavy smoking index), time since diagnosis, social support, or patient provider partnership. Participants offered dynamic referral tended to be younger, had higher distress as measured by the BHS, had a higher number of cancer symptoms or side effects, higher ratings of pain and fatigue, and more concern about sexual difficulties or lack of interest. Those offered dynamic referral also were more likely to have reported a mental health diagnosis, had seen a counselor previously for help managing emotions or stress, and either previously or currently were on medication for emotional problems.

Of the 185 participants offered dynamic referral, because they met the aforementioned criteria, two changed their minds about being contacted and were removed from subsequent analysis. Of the remaining 183 participants offered the dynamic referral, 27.3% (N=50) accepted. Several factors were associated with the acceptance of a dynamic referral including higher psychological distress, race/ethnicity, the number of cancer symptom side effects, pain and fatigue ratings (Table 3). However, only three variables were retained in the final model. Specifically, those who had never seen a counselor or therapist for emotional help were less likely to accept a dynamic referral than those had seen one before but not currently (OR=0.48, CI (0.23, 0.99)). (Note: No participant in this subsample indicated that they were currently seeing a counselor; Table 4). Likewise, individuals from a Non-Hispanic Black background or a Hispanic/Latino background were 5.53 and 3.98 times more likely to accept a dynamic referral than Non-Hispanic Whites. Finally, each additional cancer symptom or side effect increased the odds of accepting a dynamic referral by 35%.

Discussion

The variables related to psychological functioning have established histories of being linked to distress, either in individuals with cancer or the general population. First, many researchers have demonstrated that younger oncology patients tend to experience more psychological distress than older patients (Hack et al., 2010). One recent study included 1057 newly diagnosed patients with either breast or prostate cancer and demonstrated that age was a significant predictor of distress as younger women were more distressed than older women with cancer (Hack et al., 2010). We also found younger age to be significantly related to psychosocial distress in our large, heterogeneous sample. These findings may be attributed to the responsibilities and dependents a young person has compared to older adults. For example, a young person may have young children or even still be paying off college loans. Further, being young when facing cancer has the additional burden of feeling like an anomaly and facing mortality much sooner than some others. In addition, individuals diagnosed with cancer at a younger age may also have live longer with the disease and its physical as well as psychosocial repercussions.

History of psychological problems, as indicated by previous diagnoses, past use of psychotropic medications, or history of counseling/therapy, was also related to psychological distress in this. This link has been established in the past (Senf et al., 2010; Jim et al., 2012)

and is important because it has the potential to impact clinical practice related to cancer care for high risk patients. That is, at the present time, although psychiatric history may be documented in cancer care, many practices do not use this information to systematically screen, monitor, and address psychological distress in this potentially high risk group. It may be beneficial to use previous psychiatric history to systematically, and therefore more consistently, place such patients in a 'higher risk' group that can be monitored for psychological distress more proactively and closely than the average patient. This proactive approach would be different than the more reactive approach where patients are referred to mental health specialists after the patient has begun to show significantly psychosocial distress symptoms. Having a mental health specialist on board from diagnosis may prevent higher symptom severity.

Two other common predictors of distress were significant in our model: smoking and reported low levels of social support. These variables are meaningfully related to distress and have established histories of being linked with negative outcomes, such as psychological dysfunction, in the general population (Lawrence et al., 2009) as well as in oncology samples (Ditre et al., 2011; Humphris and Rogers, 2004). For example, Ditre, Gonzalez, Simmons, Faul, & Brandon found higher pain ratings in patients with cancer who were smokers as compared to never smokers (Ditre et al., 2011). Also, Humphris and Rogers followed patients with oral cancer over 15 months and noted significantly greater psychological distress in smokers versus never-smokers (Humphris and Rogers, 2004). In regards to social support, in a relatively recent study of 2,595 women with breast cancer, Bardwell, et al. found that in comparison to a number of other variables such as physical health, physical activity, age, symptoms, and pain, only low social support remained a significant predictor of distress (2006). Similar to previous history of psychological problems, these personal variables, such as low support, could potentially be used in clinical oncology practices as a way to identify patients who have been recently diagnosed with cancer and who may be high risk for psychological problems during their care. Further, more integrative and intensive psychosocial care may be warranted for patients who are identified as having low levels of a history of psychological problems or low social support.

The last group of variables that were linked to high distress was physical problems. Specifically, high ratings of pain and fatigue were related to greater distress in our sample. Recent studies have established that interventions such as yoga (Wren et al., 2011), exercise (Cheville et al., 2013), and cognitive behavioral therapy/ interventions (Tatrow and Montgomery, 2006) can help cancer patients with pain, fatigue, sleep problems, and general distress. Ideally, providers could screen for such problems, using a program like the MHADRO, to identify patients early and, because there are empirically supported interventions, provide treatment before symptoms become too severe or debilitating.

It is notable that type of cancer, time since diagnosis, marital status, and race did not impact distress levels, which is interesting as these variables have been linked to distress in cancer in the past (Deimling et al., 2006; Zabora et al., 2001; Parker et al., 2003; Bardwell et al., 2006). However, as was established in the beginning of this paper, many times other studies have focused on only one type of cancer, which could impact findings.

In addition to predicting distress, we also examined variables that were linked with acceptance of mental health services, when offered to patients. Not surprisingly, those who had never seen a counselor or therapist for emotional help were less likely to accept a dynamic referral to see mental health counselor than those had seen one before but not currently. This may be related to familiarity with the process or past success and symptom relief from therapy. Since this was not queried, however, we can only make speculations at this time. Also, having more symptoms or side effects of cancer was also related to increased interest in seeking mental health services, which makes sense in that the more difficulties a person experiences, perhaps the more open he or she is to receiving help in managing such symptoms. We did not expect to find racial differences regarding interest in mental health services, but nonetheless, Non-Hispanic Black and Hispanic patients were significantly more likely to be interested in mental health services than their Non-Hispanic White counterparts. Because the present sample was not racially or ethnically diverse, this finding should be interpreted with caution and future research is needed to determine if this is indeed a valid and reliable finding. Along a similar line of thought, although the present study consisted of a very large sample of patients with various disease types who were attending three different cancer centers at various geographical locations, the sample was predominately women of a White/Caucasian background. Thus, all of the present findings should be interpreted cautiously in terms of extrapolation to men and patients of diverse backgrounds. Future research, of a similar scale, with men and patients of diverse ethnic/racial backgrounds is needed to determine if the same or different factors are predictive of psychological functioning.

There are a few notable limitations to the present study. First, in future studies it may help to assess patient attitudes toward computerized screening and assessment as this may have impacted responses and willingness to share information. Second, it may have been more helpful to have the oncology provider review the patient report before giving the patient the opportunity to send a dynamic referral for psychological services. The oncology provider's review of the symptoms may have yielded more patients who were interested in reaching out for help from a mental health provider. Finally, although the purpose of our study was to use a computerized program to screen and refer for psychological distress, in-person evaluations and interactions are still preferred, when possible, as they provide a professional evaluation and management of symptoms that a computer cannot. However, for clinics or health care providers who do not have the time or resources for personalized screenings, programs like the MHADRO may be helpful.

In sum, the present findings established that, in a large sample of patients with various types of cancers, certain psychosocial variables may increase the risk psychological distress. The important variables identified in this study were being younger at diagnosis, having a history of mental illness, high levels of tobacco addiction, experiencing low levels of social support, or reported high levels of pain and fatigue. In addition, patients who had a history of therapy, who were experiencing high levels of physical symptoms and side effects, or who were from a Latino/Hispanic or Black/African American background, were more interested in counseling/therapy than patients with other characteristics. These results may be used to inform screening and intervention practices as they provide some insight into attributes that may place oncology patients at higher risk for developing psychological problems during

their oncology care. Finally, intervention studies are needed that use these high risk identifiers as a way to provide early assessment and intervention for patients with cancer. Such studies would be able to help us determine if early identification and management can indeed improve longer term psychosocial outcomes for people with cancer.

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Table 1

Characteristics of the Sample: The MHADRO Study (N=836)

Characteristic	N (%)
Race/Ethnicity:	
White / Non-Hispanic	723 (90.7)
Black / Non-Hispanic	39 (4.9)
Hispanic	35 (4.4)
Sex:	
Male	118 (14.1)
Female	718 (85.9)
Marital Status:	
No	294 (35.2)
Yes	542 (64.8)
Education:	
College Graduate or Above	342 (40.9)
Less than College Graduate	494 (59.1)
Alcohol Use:	
None	296 (35.4)
Yes, but screening test not positive	471 (56.3)
Yes, screening test positive	69 (8.3)
Cancer Type:	
Breast	410 (49.2)
Lung	44 (5.3)
Colon/Rectal	45 (5.4)
Gynecologic	178 (21.3)
Prostate/Testicular	12 (1.4)
Other	145 (17.4)
Time Since Diagnosis:	
Today / Within the past week	27 (3.2)
1–4 weeks ago	41 (4.9)
1–6 months ago	216 (25.8)
More than 6 months ago	552 (66)
Ever Taken Medication for an emotional problem:	
No	576 (68.9)
Yes, but not currently	92 (11)
Yes, currently	168 (20.1)
Ever seen a counselor or therapist to help manage your emotions or stress:	
No	529 (63.3)
Yes, but not currently	239 (28.6)
Yes, currently	68 (8.1)
Reported any mental health diagnosis: N (%)	
No	543 (64.95)

Characteristic	N (%)
Yes	293 (35.05)
Characteristic	Mean (SD)
Age: Mean	59.35 (11.6)
Heavy Smoking Index: Mean	0.27 (0.9)
Anxiety	1.71 (0.61)
Depression	1.5 (0.54)
Behavioral Health Status (BHS)	1.9 (0.7)
Social Support: Mean (SD)	3.87 (0.8)
Patient Provider Partnership:	22.97 (3.4)
Number of cancer symptoms or side effects:	1.82 (1.8)
Rating of Pain in the last two weeks (0 – 10):	1.04 (2.2)
Rating of fatigue in the last two weeks (0 – 10):	2.42 (2.9)
Rating of concern about sexual difficulties or lack of interest in the last two weeks (0 – 10):	1.25 (2.8)

Table 2**Final Multivariable Model of Predictors of Psychological Distress**

Factor	Parameter Estimate	Std Error	P-value	Least Squares Means	Group Differences*
Intercept	2.553	0.12			
Ever taken medication for emotional problems					
No ¹	-0.262	0.062	<0.0001	1.95	
Yes, but not currently ²	-0.203	0.071	0.005	2.01	
Yes, currently ³	--			2.22	1 vs. 3, 2 vs. 3
Ever seen a counselor or therapist to help manage your emotions					
No ¹	-0.306	0.077	<0.0001	1.97	
Yes, but not currently ²	-0.33	0.076	<0.0001	1.94	
Yes, currently ³	--			2.27	1 vs. 3, 2 vs. 3
Reported any mental health diagnosis					
No ¹	-0.23	0.05	<0.0001	1.94	1 vs. 2
Yes ²	--			2.18	
Social Support	-0.095	0.024	<0.0001		
Heavy Smoking Index	0.0452	0.02	0.0243		
Number of cancer symptoms or side effects	0.065	0.014	<0.0001		
Rating of Pain in the last two weeks	0.043	0.01	<0.0001		
Rating of Fatigue in the last two weeks	0.076	0.008	<0.0001		

* All group differences are significant at least at the p<0.05 level

Table 3

Factors Associated with Acceptance of Dynamic Referral

	DR Not Accepted 72.7 (133)	DR Accepted 27.3 (50)	P-value
BHS Distress Categories			
Low (good)	12 (16)	4 (2)	<0.0001
Moderate	57.1 (76)	28 (14)	
High (bad)	30.8 (41)	68 (34)	
Race/Ethnicity			
White / Non-Hispanic	92.1 (117)	73.5 (36)	0.0037
Black / Non-Hispanic	3.9 (5)	16.3 (8)	
Hispanic	3.9 (5)	10.2 (5)	
Sex			
Male	15 (20)	14 (7)	0.86
Female	85 (113)	86 (43)	
Marital Status			0.35
No	34.6 (46)	42 (21)	
Yes	65.4 (87)	58 (29)	
Education			
College Graduate or Above	42.9 (57)	40 (20)	0.73
Less than College Graduate	57.1 (76)	60 (30)	
Alcohol Use			
None	29.3 (39)	38 (19)	0.52
Yes, but screening test not positive	64.7 (86)	56 (28)	
Yes, screening test positive	6 (8)	6 (3)	
Cancer Type			
Breast	39.1 (52)	34 (17)	0.96
Lung	6 (8)	6 (3)	
Colon/Rectal	6 (8)	8 (4)	
Gynecologic	26.3 (35)	28 (14)	
Prostate/Testicular	3.8 (5)	2 (1)	
Other	18.8 (25)	22 (11)	
Time Since Diagnosis: N (%)			
Today / Within the past week	4.5 (6)	0 (0)	0.31
1–4 weeks ago	6 (8)	6 (3)	
1–6 months ago	26.3 (35)	36 (18)	
More than 6 months ago	74.3 (84)	58 (29)	
Ever Taken Medication for an emotional problem			
No	65.4 (87)	54 (27)	0.28
Yes, but not currently	15 (20)	16 (8)	
Yes, currently	19.55 (26)	30 (15)	
Ever seen a counselor or therapist to help manage your emotions or stress			

	DR Not Accepted	DR Accepted	P-value
	72.7 (133)	27.3 (50)	
No	60.9 (81)	50 (25)	0.18
Yes, but not currently	39.1 (52)	50 (25)	
Yes, currently	0 (0)	0 (0)	
Reported any mental health diagnosis			
No	57.9 (77)	46 (23)	0.15
Yes	42.1 (56)	54 (27)	
Age	57.4	56.3	0.57
Heavy Smoking Index	0.22	0.41	0.18
Social Support	3.91	3.97	0.62
Patient Provider Partnership	22.7	22.6	0.86
Number of cancer symptoms or side effects	2.3	3.3	0.0014
Rating of Pain in the last two weeks (0 – 10)	1.18	2.24	0.0092
Rating of fatigue in the last two weeks (0 – 10)	3.04	4.24	0.0215
Rating of concern about sexual difficulties or lack of interest in the last two weeks (0 – 10)	2.08	2.78	0.23

Table 4

Final Multivariable Model of Acceptance of Dynamic Referral: The MHADRO Study

Factor	Odds Ratio	95% CI
Ever seen a counselor or therapist to help manage your emotions		
No	0.48	(0.23, 0.99)
Yes, but not currently	--	
Race / Ethnicity		
White / Non-Hispanic	--	
Black / Non-Hispanic	5.53	(1.62, 18.9)
Hispanic	3.98	(1.01, 15.65)
Number of cancer symptoms or side effects	1.35	(1.1.1, 1.64)