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## Psychosocial Correlates of Appointment Keeping in Immigrant Cancer Patients

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### Abstract

This study aims to determine the psychosocial correlates of self-reported adherence to cancer treatment appointments and treatment delays and interruptions. The sample included 622 immigrant cancer patients from New York City. Patients completed a survey which included sociodemographic, health-related and questions assessing missed appointments and delays/or interruptions, and quality of life and depression scales. After controlling for sociodemographic characteristics, having a positive depression screen, poor physical and emotional well-being were significant predictors of missed appointments and delays and/or interruptions of treatment. Non-adherence to treatment appointments in immigrant cancer patients is a complex outcome related to important modifiable or treatable factors.

### Keywords

Cancer; Adherence; Depression; Quality of life; Ethnic Minorities; Immigrant Health

### Background

Receipt of optimal dosage of chemotherapy (Lyman, 2009) and endocrine therapy (Weaver, Camacho, Hwang, Anderson, & Kimmick, 2013), through treatment adherence, is an important determinant of cancer survival. A higher number of missed appointments is a key negative determinant of survival (Howard, Penchansky, & Brown, 1998). Disparities in mortality and survival rates for ethnic minority and immigrant groups continue to exist partly due to treatment delays and suboptimal adherence to cancer treatment (Ashing-Giwa et al., 2010; Nurgalieva et al., 2013; Sail, Franzini, Lairson, & Du, 2012; Shavers & Brown, 2002). Black and Latino cancer patients are less likely to complete chemotherapy treatment (Nurgalieva et al., 2013) and more likely to have delays in initiation of chemotherapy (Fedewa, Ward, Stewart, & Edge, 2010) compared to non-Latino white breast cancer patients.

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Studies suggest that psychosocial factors play an important role in patients' adherence with their treatment regimens (DiMatteo, 2004; DiMatteo, Lepper, & Croghan, 2000). Depressive symptoms and disorders are significant risk factors for nonadherence (DiMatteo et al., 2000). In a meta-analysis of patients undergoing medical treatment, DiMatteo and colleagues (2000) found that depressed patients were three times more likely to be non-adherent with their medical treatment than their counterparts. While most adherence studies have not been conducted in the cancer setting, the small number of cancer-specific studies found an association between depressive symptoms or history of antidepressant use with non-adherence to anticancer treatment, such as chemotherapy and endocrine therapy (Ayres et al., 1994; Barron, Connolly, Bennett, Feely, & Kennedy, 2007; Gilbar & De-Nour, 1989; Lebovits et al., 1990; Manning & Bettencourt, 2011).

Quality of life measures typically include domains of physical, social, emotional and functional well-being (Cella et al., 1993). The impact of cancer treatment on the emotional, social, functional, and physical functioning of patients may impede optimal adherence. Fallowfield (Fallowfield et al., 2001) showed that a high proportion of women (38%) do not adhere to endocrine cancer therapy because of side effects affecting their quality of life; and Richardson and colleagues (2007) demonstrated that declines in global health-related quality of life predicted early discontinuation of chemotherapy after controlling for age and adverse events. In a study by Dittmer and colleagues (2011), patients cited side effects that were affecting their quality of life, such as rheumatic complaints of arthritis and pain, as reasons for discontinuing cancer treatment.

Other psychosocial, cognitive, and behavioral factors have been found to be associated with treatment adherence and delays, such as communication with providers, trust, treatment decision-making, and illness beliefs, among others. Sheppard and colleagues (2013), with a sample of white and Black breast cancer patients, found that better quality patient-physician communication was associated with higher odds of starting chemotherapy only among Black women, and Black women were also more likely to have longer mean times to chemotherapy initiation than whites, but this effect was moderated by trust in providers. In a review of the correlates and rates of adherence to adjuvant hormonal therapy (Murphy, Bartholomew, Carpentier, Bluethmann, & Vernon, 2012), behavioral and cognitive factors, such as lower perceived necessity of treatment, perception of less than optimal role in the treatment decision-making process, low social and/or material support, and lower decisional balance scores were negatively associated with adherence. Perception of disease severity is also an important predictor of adherence to medical treatment (DiMatteo, Haskard, & Williams, 2007). Further, family support, social support, and specifically practical social support, also have a significant impact on adherence to medical regimens (DiMatteo, 2004).

Studies focusing on psychosocial determinants of adherence have generally only included non-Latino white samples, not ethnic minority patients who are at even greater risk for poor outcomes (Barron et al., 2007; Gilbar & De-Nour, 1989; Lebovits et al., 1990; Manning & Bettencourt, 2011). However, studies conducted with ethnically diverse patients have shown that there are different rates of depression and overall health-related quality of life (HR-QoL) among cancer patients from different ethnic backgrounds. Depression and HR-QoL are significantly worse in ethnic minority groups compared to non-Latino whites (Lockett et

al., 2011). It is important to understand the association between depression, quality of life and medical adherence in immigrant and ethnic minority cancer patients. The purpose of this study is to examine the association between somatic and non-somatic depressive symptoms, quality of life, and self-reported adherence to cancer-related medical appointments and treatment delays or interruptions among a cohort of underserved, immigrant minority cancer patients. This area of research is especially compelling given the strong relationship between treatment adherence and long-term survival (Lyman, 2009), and the lower rates of survival among some racial minority groups, such as Black cancer patients (American Cancer Society, 2013; Siegel, Naishadham, & Jemal, 2013).

## Methods

### Participants

The current study is a nested cohort of patients from the Cancer Portal Project (Portal), which provides services to immigrant and ethnic minority and other underserved cancer patients to help them through their cancer treatment. Data were obtained from 622 consecutive foreign-born adult cancer patients who underwent outpatient treatment at 10 hospital-based cancer clinics in New York City, who participated in Portal between March 2011 and October 2012. Eligibility criteria for inclusion were a minimum age of 18, a diagnosis of cancer, and having ever received cancer treatment. Patients with all types of cancer diagnoses and cancer stages were invited to participate. Zabora and colleagues (2001), in their study to determine the prevalence of psychological distress among a large sample of cancer patients, found that lung, followed by brain and pancreatic cancer, were the diagnoses with higher rates of psychological distress. All other cancer diagnoses had similar rates of psychosocial distress. These cancer types are less prevalent in our sample: lung (n=53), brain (n=5), and pancreatic (n=12). The study was approved by the institutional review board of Memorial Sloan-Kettering Cancer Center.

### Procedure and Measures

Patients were approached in the waiting room before their provider visits and were administered, in their preferred languages (Spanish, English), an intake needs assessment survey, which included sociodemographic questions, cancer history, and a set of standardized scales measuring psychosocial outcomes. A detailed description of the study methodology and recruitment procedures has been published previously (Gany et al., 2011). Sociodemographic questions included participants' age, marital status, income, education, employment status, health insurance coverage, ethnicity, language, country of birth, and years in the U.S. Cancer-related factors included cancer type, stage, time since diagnosis, treatments received, and comorbidities. Patients' self-report of non-adherence to treatment appointments was obtained by asking respondents if they had ever missed cancer-related appointment, how often, why, and for what type of treatment (chemotherapy, radiation). A variable that included missed appointments for chemotherapy and, radiation was used to measure treatment non-adherence. Delays and interruptions were assessed by asking participants if their treatment for their most recent cancer diagnosis was ever interrupted or delayed.

Depressive symptoms were measured with the Patient Health Questionnaire- 9 (PHQ-9). The PHQ-9 is based directly on the diagnostic criteria for major depressive disorder (MDD) and includes questions about somatic and non-somatic depressive symptoms, deriving a severity score (Kroenke, Spitzer, & Williams, 2001). For MDD, the threshold score for PHQ-9 is 10 or greater. However, Thekkumpurath and colleagues (2011) measured the accuracy of the PHQ-9 as a screening tool for MDD in a cancer population, and observed that a cutoff score of 8 offered a high sensitivity of 93%, while maintaining an adequate specificity of 81%, for identifying clinically significant symptoms of depression, when compared to the Structured Clinical Interview. For this study we used the threshold score of 8 suggested by Thekkumpurath (2011). In this study, we were interested in examining the association of the somatic and cognitive/emotional symptoms of depression with patient's self-reported adherence and treatment delays and interruptions. We followed prior work by De Jonge, Mangano, & Whooley (2007) to categorize PHQ-9 items as somatic or cognitive/emotional. Four PHQ-9 items (problems with sleep, fatigability, appetite, and psychomotor agitation/retardation) were classified as somatic depressive symptoms, whereas five items (lack of interest, depressed mood, negative feelings about self, concentration problems and suicidal ideation) were classified as cognitive/emotional depressive symptoms. The PHQ-9 has been validated for use in Spanish (Merz, Malcarne, Roesch, Riley, & Sadler, 2011; Somoza, 2002). We found adequate reliability for the PHQ-9 total scale (.81), somatic symptoms (.68), and the cognitive/emotional symptoms (.67).

Quality of life was assessed with the Functional Assessment of Cancer Therapy-General (FACT-G) and the European Quality of Life-5 Dimensions (EQ-5D). The FACT-G is a standardized instrument consisting of 27 items rated from 0 (not at all) to 4 (very much), with higher scores indicating better HRQOL (Cella et al., 1993). Subscale scores on four dimensions (physical, social/family, emotional, and functional well-being) are generated and an overall HRQOL score is obtained. High reliability and good validity have been reported for the English (Brady et al., 1997) and Spanish (Cella et al., 1998; Dapuetto et al., 2001; Dapuetto et al., 2003) versions. We found adequate reliability for the quality of life total scale (.85), and the subscales physical (.86), social/family (.70), emotional (.70), and functional well-being (.86). The EQ-5D (Pickard, Wilke, Lin, & Lloyd, 2007) is a short quality of life instrument that assesses five dimensions with five questions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension is subdivided into three levels of severity (no complaints, some complaints, severe complaints), and the respondent is asked to indicate the most appropriate answer for her/his health state. The Spanish (Rebollo, Moris, Ortega, Valdes, & Ortega, 2007; Zarate, Kind, & Chuang, 2008) version has shown good psychometric properties.

### Statistical Analysis

Statistical analyses were performed using the IBM SPSS software, version 20 (IBM North America, New York, NY, USA). Comparisons between patients by sociodemographic and cancer history variables, and depression and QOL scales, were made using independent samples *t*-tests for continuous and chi-squares for categorical variables. The outcomes variables were missed appointments for cancer treatment and treatment interruptions or delays. Binary logistic regressions established significant associations between depressive

symptoms and quality of life and patient's non-adherence to medical appointments and treatment delays and interruptions, after controlling for sociodemographic characteristics (gender, income, marital status, insurance status, race/ethnicity, language and years in USA) and cancer stage.

## Results

Six hundred twenty-two immigrant cancer patients were included in the study. Characteristics of the patients are displayed in Table 1. The mean age of patients was 55.5. Most patients (58%) were single, divorced, separated or widowed, women (63%), unemployed (65%), and half had completed less than a high school degree (50%). About half of the sample reported having no income (47%) and 20% were uninsured.

Slightly less than half of the sample reported English as their preferred language for receipt of medical care (46%), while 49% reported having limited or no proficiency in English. The most common birthplace regions were the Hispanic Caribbean (Dominican Republic, Puerto Rico, 36%), West Indies and Haiti (30%), and Central America (Mexico, Panama, Guatemala and Nicaragua, 12%). Forty-three percent of patients had resided in the mainland United States for more than 20 years.

Sixteen percent had a recurrent tumor. The most common diagnosis was breast cancer (42%), followed by gastrointestinal (16%) and prostate cancer (15%). On average, our sample of patients had been diagnosed with cancer for nine and a half months ( $SD=1.2$  years). Forty two percent were receiving intravenous chemotherapy at the time of the survey and 37% were receiving radiation therapy. Forty-seven patients (8%) reported ever missing appointments for their cancer treatment (chemotherapy or radiation) and 52 (8%) reported having treatment delays or interruptions. Only three patients reported both missed appointments and having a treatment delay or interruption.

Sociodemographic and medical factors associated with total depression levels were younger age ( $r=-.10$ ,  $p=.007$ ), female gender ( $t=-3.55$ ,  $p<.001$ ), unemployment status ( $t=7.09$ ,  $p<.001$ ), and lower income ( $F=4.10$ ,  $p=.02$ ). Black patients born in the Caribbean had lower depression levels ( $F=2.99$ ,  $p<.01$ ). Overall, lower quality of life was associated with younger age ( $r=.17$ ,  $p<.001$ ), female gender ( $t=2.26$ ,  $p=.02$ ), unemployment status ( $t=6.55$ ,  $p<.001$ ), lower income ( $F=21.90$ ,  $p<.001$ ), and advanced stage ( $t=2.18$ ,  $p=.03$ ). Latinos ( $t=3.83$ ,  $p=.01$ ) and patients who prefer Spanish ( $t=2.01$ ,  $p=.05$ ) showed lower quality of life than their counterparts. Marital status, education level, insurance status, years of residence in United States and type of cancer diagnoses were not associated with overall depression and/or quality of life levels. Demographic correlates of a self-report of missed appointments were unmarried marital status ( $X^2=8.44$ ,  $p=.004$ ), Black race ( $X^2=14.09$ ,  $p<.001$ ), preference for English language ( $X^2=14.33$ ,  $p<.001$ ), and longer stay in the United States ( $X^2=6.00$ ,  $p=.02$ ). Self-reported treatment delays or interruptions were more frequent in unmarried patients ( $X^2=4.20$ ,  $p=.04$ ) and patients who prefer English ( $X^2=8.58$ ,  $p=.003$ ). Age, gender, education level, income level, and stage of disease were not associated with a self-report of missed appointment or delays/interruptions.

## Missed Appointments and Delays/Interruptions

After controlling for socio-demographic and medical characteristics, having a positive screen for depression (OR=5.29, CI=2.75–10.15), somatic (OR=1.32, CI=1.20–1.45) and cognitive/emotional depressive symptoms (OR=1.24, CI=1.14–1.36), physical (OR=0.87, CI=0.83–0.91) and emotional well-being (OR=0.91, CI=0.85–0.97), mobility problems (OR=2.40, CI=1.27–4.54), problems with usual activities (OR=3.13, CI=1.63–6.00), and pain or discomfort (OR=4.01, CI=1.80–8.90) were significantly associated with a self-report of missed appointments for cancer care. Furthermore, having a positive screen for depression (OR=4.00, CI=2.16–7.41), somatic (OR=1.26, CI=1.15–1.38) and cognitive/emotional depressive symptoms (OR=1.20, CI=1.10–1.31), and physical (OR=0.91, CI=0.87–0.95), emotional (OR=0.93, CI=0.87–0.99) and functional well-being (OR=1.05, CI=1.00–1.09) were associated with reports of delays and interruptions of cancer treatment, after adjusting for socio-demographic characteristics.

## Discussion

This study is the first to look at the contribution of psychosocial dimensions to immigrant patients' adherence with cancer treatment. Ethnic minority cancer patients have significantly worse distress, depression, and overall HRQOL than non-minority groups. Although the general medical adherence literature has found an association between psychosocial functioning and treatment adherence (Andersen, 2002; Ayres et al., 1994; Barron et al., 2007; DiMatteo, 2004; DiMatteo et al., 2000; Gilbar & De-Nour, 1989; Lebovits et al., 1990; Manning & Bettencourt, 2011; Richardson et al., 2007), the research examining this relationship in the cancer literature is limited. This study now extends the findings observed in the general population to ethnic minority cancer patients. In this study, patients with a positive screen for depression were five times more likely to report that they had missed treatment appointments and four times more likely to have treatment interruptions or delays. As suggested by DiMatteo and colleagues (2000), depressive symptoms can impact adherence for a variety of reasons. Depression is usually accompanied by feelings of hopelessness and despair, which can negatively impact the patients' belief that adherence with their treatment regimen will have a positive impact on their health outcomes and survival. In addition, an immigrant depressed patient may have poorer social support and a smaller support network to encourage him or her to be adherent (DiMatteo, 2004). Finally, cognitive changes, and fatigue associated with both depression and the side effects of cancer treatment, may affect the patient's adherence (DiMatteo et al., 2000). Patients with problems performing their usual activities, mobility problems, and pain were significantly more non-adherent with their cancer treatment than patients without such problems. Several studies have reported that patients who face more side effects are more likely to discontinue their cancer treatment (Dittmer et al., 2011; Richardson, Marks, & Levine, 1988). There are numerous potential explanations for our findings about the relationship of pain, mobility and functioning problems to missed appointments. We hypothesize that these patients may feel too sick to come to their treatment appointment or prioritize the treatment session less than pain relief or rest. It is possible that this sample of immigrant patients is not receiving adequate care for their pain, as well. However, the EQ5D questionnaire assessed pain, problems with mobility and usual activities "today" and did not distinguish between acute

pain, such as pain related to their cancer or treatment, and chronic pain, which is defined as persistent pain that lasts longer than 3 months (Adler, 2000). Future prospective studies should capture data to differentiate and specifically evaluate the role of chronic pain in adherence behaviors.

As expected, patients with higher physical and emotional well-being were more likely to report keeping their appointments. But contrary to expectations, patients with higher functional well-being reported missing appointments and delays or interruptions more frequently than their counterparts. Functional well-being pertains to the ability to perform daily activities at work or home; on the other hand, physical well-being describes the lack of presence of physical symptoms related to therapy, such as fatigue, nausea, pain, or treatment side effects. We speculate that, in the face of many competing priorities, when patients perceive that they are functioning well, can work, and have fewer problems with their daily functioning, they might deprioritize their medical care and engage more in work-related activities.

In this sample, Black cancer patients were at higher risk of being non-adherent to their treatment appointment, a finding that has been supported by prior research (Hershman et al., 2005; Hershman et al., 2009). There has been insufficient research conducted to explain the reasons for more frequent delays and lower adherence in Black cancer patients. However, previous research has documented that better patient–physician communication is associated with increased odds of chemotherapy initiation in Black breast cancer patients (Sheppard et al., 2013). More experiences of racial discrimination is also associated with delays in seeking medical care, and poor adherence with medical care recommendations in Black patients (Casagrande, Gary, Laveist, Gaskin, & Cooper, 2007). Future studies should explore and determine the key determinants of increased risk for delays and interruptions in Black cancer patients.

Several patient navigation and psychosocial interventions and programs have been developed to address known barriers to obtaining cancer care (Paskett, Harrop, & Wells, 2011; Wells et al., 2008). Most of these interventions have been designed to improve cancer screening; few of them address improving outcomes in cancer patients (Paskett et al., 2011). Ell et al. (2009) found, with a sample of predominantly Latina patients, that adherence across the navigated and non-navigated treatment groups was notably higher than reported in previous studies, suggesting that both active telephone patient navigation or written resource informational materials may facilitate adherence. Petereit et al. (2008), in their intervention study with American Indian cancer patients, found that navigated patients who received financial, logistical, informational, and practical assistance and emotional support were less likely to experience delays during their radiotherapy treatment than non-navigated patients. Other patient navigation studies have found null results in improving treatment adherence, and in decreasing delays in treatment initiation, length of treatment and/or frequency of missed appointments (Fiscella et al., 2012; Schwaderer, Proctor, Martz, Slack, & Ricci, 2008; Simon et al., 2013; Wells et al., 2012).

This study showed that patients with lower quality of life and more depression are at increased risk of being non-adherent with cancer treatment. Patient navigation programs,

aimed at improving care and adherence, might benefit from including strategies designed to improve psychosocial outcomes (i.e. cognitive behavioral strategies, problem-solving, skill building, etc.). Further, psychosocial interventions are even more efficacious for patients with elevated distress levels (Schneider et al., 2010). Patients at risk of being non-adherent (i.e. low QOL, high distress, higher unmet needs) might benefit even more from patient navigation programs with a strong focus on improving quality of life outcomes. Intervention development for the improvement of patient adherence has heretofore been neglected in the research literature. Extensive research needs to be conducted to identify possible mediators, and/or explanatory mechanisms of adherence.

Two main limitations of this research are that 1) it is based on retrospective self-reports, and thus may be subject to recall accuracy, and 2) the measurement of adherence is based on only two questions. Nonetheless, this study represents one of the first attempts to understand the role of quality of life and depressive symptomatology on adherence to treatment among immigrant ethnic minority cancer patients with disadvantaged backgrounds. This has important implications for the care of this vulnerable population of cancer patients. The relationship between depressive symptoms, pain, mobility, and functional well-being, and appointment keeping and potential mediators should be further investigated, as it has the potential to inform adherence interventions. Such interventions would likely require multidisciplinary and multifaceted components to comprehensively address these issues.

Future studies, focusing on the relationship between psychosocial adjustment and adherence, should compare patients' self-report of adherence to other sources of information, such as medical chart review; should compare adherence across different types of treatments, such as chemotherapy, radiation and endocrine therapy; should use other measures of adherence, such as relative dose intensity for chemotherapy; and should study the influence of ethnic, cultural, social, economic, and structural determinants of treatment access, adherence and completion. Further, in future studies it would be important to measure and study the impact of psychosocial factors on clinically significant delays, such as a delay of 90 days in the initiation of chemotherapy and/or radiation, which have an impact on survival (Hershman et al., 2006a, 2006b). It would also be important to determine the impact of other psychosocial and cognitive factors, such as patient-provider communication, social support and illness beliefs and perceptions, on adherence to medical treatment (DiMatteo, 2004; DiMatteo et al., 2007; Sheppard et al., 2013).

An additional study limitation is the lack of clarity about patients' understanding about adherence, delays, and interruptions. Patients with limited understanding of the importance of timely appointment-keeping, with lower health literacy and limited knowledge and understanding about their cancer care, might misinterpret, or over-report, their adherence to their cancer treatment. Future studies should include measures of health literacy and assess patients' understanding and knowledge of their medical regimen, and should explore if limited understanding of their medical regimen and/or health literacy are key determinants of adherence with medical treatment.

Another limitation of this study is that the sample could not be disaggregated by ethnic subgroups or birthplace because of small samples and the low frequency of the outcomes.



Future studies will permit more fine-grained analyses of ethnicity and nativity. Finally, the present correlational study does not address issues of causality, the mechanisms by which depression, quality of life pain, mobility and functioning problems affect outcomes and moderators of these relationships. Future studies using quantitative and qualitative means, and using moderation analyses should explore the pathways of these associations.

This study provides insight into potential targets, such as quality of life dimensions of interventions to improve adherence to cancer treatment among immigrant and minority underserved cancer patients. Our findings indicate that non-adherence to cancer treatment is a complex outcome related to several important modifiable or treatable factors; namely depression, lower quality of life, pain, and problems with mobility and functioning. Because pain, depressive symptoms, mobility and functioning problems are prevalent in cancer patients, our findings have important implications for cancer treatment completion. The results speak to the need to expand our conceptualizations of risk factors from strictly medical variables to a broader biopsychosocial model and emphasize the importance of assessing patient barriers to adherence. Our findings suggest that interventions to incorporate a biopsychosocial approach should be investigated, as they may be important for improving health outcomes in immigrant patients being treated for cancer.

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**Table 1**

Patients Characteristics (n=622)

	n (%)
Age <sup>1</sup>	55.50 (12.58)
Gender	
Female	393 (63.2)
Male	229 (36.8)
Marital Status	
Married/With partner	255 (41.6)
Single/separated/widowed	358 (58.4)
Educational Level	
< 6 <sup>th</sup> grade	96 (16.0)
6 <sup>th</sup> –11 <sup>th</sup> grade	202 (33.6)
High School Diploma or more	303 (50.4)
Employment Status	
Unemployed	400 (64.9)
Employed	71 (11.5)
Retired	142 (23.1)
Current Income	
\$0	289 (47.3)
\$1 – \$900	219 (35.8)
>\$900	103 (16.9)
Insurance Status	
Uninsured	122 (19.9)
Emergency Medicaid	154 (25.2)
Medicaid, Medicare or other insurance	336 (54.9)
Ethnicity/Race	
Hispanic or Latino	31.9 (53.5)
Black or African-American <sup>2</sup>	179 (30.0)
Asian or P.I.	32 (5.4)
White	30 (5.0)
Other	36 (6.0)
Language Preferred for Health Care	
English	288 (46.3)
Spanish	275 (44.2)
English and other language/s <sup>3</sup>	59 (9.5)
English Proficiency	
None	131 (21.3)
Limited	168 (27.3)
Well/Fluent	316 (51.4)
Birth Place	
Hispanic Caribbean	226 (36.3)

	n (%)
Non-Hispanic Caribbean	187 (30.1)
Central America	72 (11.6)
South America	57 (9.2)
Central Asia & PI	27 (4.3)
Africa	23 (3.7)
Europe	14 (2.3)
Middle East	11 (1.8)
South Asia	5 (0.8)
Years in Mainland	
< 5 years	141 (23.5)
6–20 years	202 (33.7)
> 20 years	256 (42.7)
Type of Cancer	
Breast	262 (42.1)
Gastrointestinal	102 (16.4)
Prostate	94 (15.1)
Gynecological	30 (4.8)
Time since Diagnosis <sup>1</sup>	0.80 (1.40)
Cancer Recurrence	102 (16.4)
Stage of Cancer	
I	58 (9.3)
II	62 (10.0)
III	62 (10.0)
IV	57 (9.2)
Don't know	362 (58.2)
Metastasis	103 (16.6)
Comorbidities	
0	201 (32.4)
1	139 (22.4)
2 or more	281 (45.2)

<sup>1</sup>Mean and Standard Deviation for years;

<sup>2</sup>Patients born in the Caribbean or Africa;

<sup>3</sup>English and/or Spanish, Mandarin, Cantonese, Arabic, Portuguese, French/Creole, Russian, Hindi, Greek, Fujianese, Telugu

Odds ratios (OR) and 95% confidence intervals (CI) of psychosocial measures predicting missed appointments and treatment delays and/or interruptions

**Table 2**

	Missed Appointments				Treatment Interruptions and/or Delays			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
	OR	CI	OR	CI	OR	CI	OR	CI
PHQ-9	1.15 (1.09–1.20)***	1.13 (1.08–1.18)***	1.12 (1.07–1.17)***	1.10 (1.06–1.15)***				
Non-somatic symptoms	1.23 (1.13–1.34)***	1.18 (1.09–1.28)***	1.20 (1.10–1.30)***	1.16 (1.07–1.25)***				
Somatic symptoms	1.30 (1.19–1.42)***	1.27 (1.17–1.37)***	1.25 (1.15–1.36)***	1.20 (1.11–1.29)***				
PHQ9- Positive Screen	1.86 (1.49–2.32)***	3.9 (2.29–6.65)***	3.77(2.11–6.75)***	2.82 (1.72–4.64)***				
FACT-G	.98 (.96–1.00)*	.98 (.97–.99)*	.99(.97–1.01)	.99				
Physical Well-Being	.88 (.84–.92)***	.89 (.85–.92)***	.92(.88–.96)***	.93 (.90–.97)***				
Social Well-Being	1.03	1.02	1.00	1.02				
Emotional Well-Being	.93 (.87–.99)*	.93 (.88–.99)*	.95	.93 (.87–.99)*				
Functional Well-Being	1.05 (1.00–1.09)*	1.03	1.04(1.00–1.08)*	1.05 (1.00–1.09)*				
EQ5-D								
Mobility	2.54 (1.39–4.64)**	2.26(1.32–3.86)**	1.58	1.16				
Self-Care	1.41	1.22	1.79	1.38				
Usual Activities	2.85 (1.53–5.29)***	2.00(1.17–5.10)***	1.40	.95				
Pain or Discomfort	4.12 (1.89–8.97)***	2.80(1.54–5.10)***	1.71	1.96				
Anxiety or Depression	.81	.94	.62	.71				

Note: Models were adjusted for gender, income, marital status, insurance status, race/ethnicity, language, years in USA, and cancer stage

EQ5-D: Higher scores indicate lower functioning.

PHQ9- Positive Screen indicates a score equal or higher than 8