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Millon Behavioral Medicine Diagnostic (MBMD) predicts health-related quality of life (HrQoL) over time among men treated for localized prostate cancer

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Abstract

Prostate cancer treatment presents multiple challenges that can negatively affect health-related quality of life (HrQoL), and which may be further compromised by maladaptive personality styles and psychological adjustment difficulties. This study examined the utility of a comprehensive psychosocial screening tool to identify psychosocial traits that prospectively predict HrQoL status among men treated for localized prostate cancer. The Millon Behavioral Medicine Diagnostic (MBMD) was administered to 66 men (mean age 68 years, 59% Caucasian) treated by either radical prostatectomy or radiotherapy along with standard measures of general and prostate cancer-specific quality of life assessed at a 12-month follow-up. Higher scores on both summary MBMD Management Guides (Adjustment Difficulties and Psych Referral) and higher scores on personality styles characterized by avoidance, dependency, depression, passive aggressiveness and self-denigration predicted lower HrQoL (β range = $-.21$ to $-.50$). Additionally, higher scores on the MBMD Depression, Tension-Anxiety and Future Pessimism scales predicted lower HrQoL. Finally, higher scores on the MBMD Intervention Fragility and Utilization Excess scale, also consistently predicted poorer mental and physical health functioning over time. These results point to the utility of the MBMD to help screen for potential impairments in mental and physical health functioning in men undergoing treatment for prostate cancer.

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Keywords

Quality of life; prostate cancer; MBMD

Introduction

Psychosocial factors can impact mental and physical health outcomes among numerous cancer patient populations, including men diagnosed with and treated for prostate cancer (Krupski & Litwin, 2007). Prostate cancer treatments cause acute and chronic side effects including urinary, bowel and erectile dysfunction, fatigue and impaired physical functioning (Potosky et al., 2007; Stanford et al., 2000). Compromises in health-related quality of life (HrQoL) and impairments in mental health functioning are also a persistent source of concern and bother (Penson et al., 2003; Schover et al., 2002; Cooperberg et al., 2003; Wei et al., 2002). Treatment for PC often results in a number of disease- and treatment-related side effects that challenge HrQOL across multiple domains, including physical health, psychological and emotional well-being, sexual and social functioning (Althof et al., 2003; Dahn et al., 2004; Perez et al., 2002; Schover et al., 2002, Weber & Sherwill-Navarro, 2005). While not all men treated for prostate cancer report extended periods of compromised HrQoL this may be the case in a substantial subgroup of cases and may persist for years after treatment.

Individual difference factors related to psychological adjustment have been shown to predict HrQoL over time in persons with cancer, and in men with PC in particular (e.g., levels of depression and anxiety; Howlett et al., 2010; Nelson, Choi, Mulhall, & Roth, 2007). However, less is known about the predictive role of longer-standing personality styles in HrQoL in men treated with PC (Siegel et al., 2007). Given that optimal adjustment after treatment may require the ability to communicate sexual and other health concerns with partners and health care professionals (Badr & Taylor, 2009; Kershaw et al., 2008; Manne et al., 2010; Northouse et al., 2007) it is plausible that personality styles characterized by dejection, avoidance, passivity, dependency, poor communication skills (passive-aggressiveness) or low self-regard, may be associated with the poorest HrQoL outcomes. However, no prior work has examined such associations in the context of men treated for PC. Assessing psychosocial factors may help identify men at risk for poorer mental and physical health outcomes after PC treatment and promote more adaptive health outcomes and optimize patient management.

Although measures have been developed to tap many of the psychosocial variables that could individually predict the course of HrQoL in men with PC, a comprehensive set of independent assessments of psychosocial functioning that involves multiple mood, stress, personality and interpersonal measures may overburden patients. The Millon Behavioral Medicine Diagnostic (MBMD) is a broadband measure developed specifically for medical patients and provides two global summary scales and a thorough assessment of psychosocial factors (e.g., personality/coping styles and treatment-related behaviors) that may influence adjustment (Millon et al., 2001). The MBMD was shown to predict adjustment and health behaviors in numerous medical patient populations including patients with HIV/AIDS

(Cruess et al., 2007; Burbridge et al., 2011) and cardiovascular disease (Cruess et al., 2010; Farrell et al., 2011). However, no studies have tested the predictive validity of the MBMD in the context of men with PC.

This study tests the utility of the MBMD to predict HrQoL across a one-year study period among men treated for localized PC participating in a larger study examining adjustment to treatment in this population. The MBMD was added to the test battery on a post-hoc basis midway through the study. However, because this larger study collected data from several commonly used and well-validated HrQoL measures along with comprehensive sociodemographic and medical information, we had a unique opportunity to examine the predictive utility of the MBMD in this population. In our main analyses, we examined the two global summary MBMD Management Guides (Adjustment Difficulties, Psych Referral), designed to identify patients at greater risk of adjustment to illness and those needing adjuvant psychosocial services, as predictors of commonly employed HrQoL measures for PC patients. We hypothesized that higher scores on the two MBMD Management Guides would predict poorer HrQoL over a one year period. We also examined whether different MBMD personality style scales predicted HrQoL. Because men recovering from treatment for prostate cancer must deal with physical limitations (Howlett et al., 2010; Katz, 2007; Litwin, Nied, & Dhanani, 1998; Penson, Litwin, & Aaronson, 2003; Potowsky et al., 2000; Wei et al., 2002), personality characteristics associated with interpersonal difficulties (communication and intimacy) and negative self-image may exacerbate emotional as well as physical aspects of HRQoL. We hypothesized that personality styles characterized by inhibition/avoidance, dejection, dependency, passive-aggressiveness and low self-regard as measured on the MBMD would predict poorer HrQoL over the follow-up period. These personality characteristics have been theorized to be associated with greater difficulties in adjusting to illness and treatments for chronic medical conditions (Felton, Revenson & Hinrichsen, 1984; Taylor & Aspinwall, 1990; Weaver et al., 2005). Additionally, in exploratory analyses, we also examined whether anxiety, depression, pessimism and specific MBMD health behavior-related indices predicted different domains of HrQoL.

Methods

Participants

Participants were men aged 45 years or older diagnosed with localized prostate cancer (stage T1a–T2b), and who had undergone either radical prostatectomy or radiotherapy within the past 18 months. Participants were included if they reported no prior history of cancer (excluding skin cancer) and no current adjuvant treatments. All participants were required to have at least a 9th grade education in order to understand the consent form and questionnaires. Individuals with cognitive impairment, e.g., < 23 on the Mini- Mental Status Examination (Folstein et al., 1975) were excluded. We also used the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, version IV (DSM-IV)/ Non-Patient edition (SCID-I/NP) to exclude individuals with active suicidal ideation, panic attacks, post-traumatic stress disorder, psychosis, or alcohol/drug dependence (First et al., 2002).

Procedures

Participants were recruited using flyers, community presentations, and urologist referral. Initial eligibility screening was conducted by telephone. Eligible men then completed an informed consent form approved by the University of Miami institutional review board. After enrollment, participants completed a battery of demographic, medical and psychosocial questionnaires. Participants were then reassessed at a 3-, 6- and 12-month follow-up and were compensated \$50 at each visit.

Measures

Demographic/Medical Information—We assessed all relevant demographic/medical information including months since PC diagnosis and treatment and type of treatment (radical prostatectomy or radiation therapy) via self-report.

Millon Behavioral Medicine Diagnostic (MBMD)—The MBMD (Millon et al, 2001) is a self-report inventory designed to assess a comprehensive collection of psychosocial and behavioral factors that impact adjustment to illness and medical treatment outcomes. The test contains 165 true/false items and takes approximately 20–30 minutes to complete. The MBMD was validated on a heterogeneous sample of over 700 medical patients, ages 18 to 85, with a variety of conditions, including heart disease, cancer, diabetes, chronic pain, and HIV/AIDS (Millon et al., 2001). The normative study found that the MBMD was both internally reliable (internal consistency coefficients mean α for all scales = 0.79), stable (test–retest reliability mean for all scales = 0.83) and demonstrated very good construct and convergent validity. The MBMD was completed at the baseline visit.

To test the utility of the MBMD as a screening tool in the context of treatment for localized PC, we focused on the two summary MBMD Management Guides. The Adjustment Difficulties scale assesses the risk of treatment complications due to the patient's coping style, current psychological issues, personal resources, and health-related behaviors. The Psych Referral scale indicates the patient has sufficient difficulties that might benefit from psychosocial intervention. Separately, we also examined associations between MBMD Personality/Coping Styles and HrQoL over time. The MBMD Personality/Coping Style scales are designed to identify nonpsychiatric dimensions of DSM-IV Axis II personality issues that are particularly relevant to medical settings. (Millon et al., 2001).

In exploratory analyses, we examined the Depression and Tension-Anxiety Scales from the Psychiatric Indicators section and the Future Pessimism Scale from the Stress Moderators section of the MBMD. The Depression scale assesses the patient's vegetative mood state and the tendency to view one's life as misfortunate and to intensify the discomfort of problems while the Tension-Anxiety scale assesses the patient's current levels of stress. The Future Pessimism Scale assesses the patient's tendency to have a bleak outlook on life (Millon et al., 2001). Depression, anxiety and pessimism have been shown in prior work to be associated with poorer quality of life and negative health outcomes in persons recovering from surgery or dealing with chronic medical conditions (Antoni & Goodkin, 1988; Bremer, 1995; Byrne et al., 1998; Scheier, Mathews, Owens et al., 1999; Taylor & Aspinwall, 1990). Finally we examined the two scales from the MBMD Treatment Prognostics section,

designed to identify health behavior factors that may influence medical treatment efficacy. The Interventional Fragility scale assesses whether patients will adjust emotionally to medical protocols and the Utilization Excess scale assesses the likelihood that patients will overuse medical services. We hypothesized that patients who have difficulties dealing with medical interventions and those who tend to be less satisfied with healthcare services would report poorer HrQoL over time.

HrQoL Measures—The main measure of HRQoL employed in this study was the Functional Assessment of Cancer Therapy (FACT), one of the most widely researched measures for assessing HrQoL in the field of psycho-oncology (Cella et al., 1993). The 27-item instrument assesses well-being across several domains, and yields a total score that quantifies a cumulative HrQoL index and subscale scores based on the past 7 days. For the present study, the FACT total score and the physical and emotional well-being subscores were analyzed. The FACT has been used extensively with PC patients and has demonstrated excellent reliability and validity (Cella et al., 1993). We found that the FACT scores for the present sample were reliable ($\alpha = 0.77 - 0.89$). The SF-36 (Ware & Sherbourne, 1992) was used to compliment the FACT in the present study. The measure consists of 36 items measuring mental and physical health functioning over the past month. We focused on the SF-36 Role Limitations due to Emotional Problems and Role Limitations due to Physical Problems subscales. The SF-36 has been used extensively with numerous medical populations including PC patients and has demonstrated excellent reliability and validity (Ware & Sherbourne, 1992). We found the SF-36 Role Limitations due to Emotional Problems ($\alpha = 0.89$) and due to Physical Limitations ($\alpha = .87$) subscales to have good reliability in this sample.

Statistical Analyses—We utilized multiple regression to test the main associations under investigation. All variable distributions were examined for outliers to assure normality. For regression analyses mean FACT and SF-36 scores at 12-month follow-up served as the HrQoL dependent measures. Baseline MBMD raw scores on the two Management Guides (Adjustment Difficulties, Psych Referral) served as our primary predictor variables and scores on the 11 Personality Style scales served as secondary variables. Finally, raw scores on the Treatment Prognostic scales Interventional Fragility and Utilization Excess, the Stress Moderator Pessimism scale, and Psychiatric Indicator scales Depression and Tension-Anxiety served as our exploratory predictors. Based upon on prior work, raw scores were used rather than Prevalence Scores because raw scores are interval-scaled and may render more straightforward interpretations of analyses regarding the magnitude of associations with outcomes than do ordinal-scaled norm-based PS scores (Cruess et al., 2007, 2010; Farrell et al., 2011). Age, months since diagnosis, and baseline scores on each of the HrQoL measures as covariates were included in each of the regression analyses.

Results

Demographic and Medical Characteristics

A total of 66 men completed the MBMD at baseline (T1)¹. Demographic and medical characteristics of the initial study sample of 66 men are presented in Table 1. The average

age was 68.18 (SD = 7.07) years. The majority was Caucasian (59%) and married (78%). The mean level of education was 13.83 (SD = 3.01) years. The majority was currently retired (64%) or employed full-time (20%). The mean time since PC diagnosis was 18.03 (SD = 6.49) months, and the mean time since treatment (prostatectomy: 82%; radiotherapy: 18%) was 12.18 (SD = 4.11) months.

Millon Behavioral Medicine Diagnostic (MBMD) Scores

Descriptive statistics for the MBMD are presented in Table 2. Within the sections of the MBMD, the scales with the greatest proportion of prevalence scores within the clinical range (> 75) were Respectful personality style (36%), Problematic Compliance (26%) and Adjustment Difficulties (29%). Overall, there was considerable variability in the MBMD raw scores and prevalence scores.

HrQoL Measures

Descriptive statistics for the HrQoL dependent measures are presented in Table 3. Of the 66 participants completing the MBMD at T1, we were able to obtain matched HrQoL data on 50 (76%) at T4. There were no significant differences between those with and without matched HrQoL data on any major demographic/medical variable (p 's > .10).

Regression Analyses Predicting HrQoL

Management Guides and HrQoL—The results of all regression analyses are presented in Table 4. There were significant inverse associations between both MBMD Management Guides (Adjustment Difficulties: $\beta = -.43$, $p < .002$; Psych Referral: $\beta = -.48$, $p = .001$) and FACT Total score at 12 month follow-up. Higher scores on the MBMD Adjustment Difficulties scale also predicted lower FACT Physical Well-being ($\beta = -.37$, $p = .022$), FACT Emotional Well-being ($\beta = -.44$, $p = .002$), SF-36 Role Limitations-Emotional ($\beta = -.44$, $p = .002$), and SF-36 Role Limitations-Physical ($\beta = -.42$, $p = .001$) scores. Higher scores on the MBMD Psych Referral scale also predicted lower FACT Emotional Well-being ($\beta = -.47$, $p = .001$), SF-36 Role Limitations-Emotional ($\beta = -.44$, $p = .002$) and SF-36 Role Limitations-Physical ($\beta = -.37$, $p = .003$) scores.

Personality Styles and HrQoL—Of the Personality/Coping Style scales, higher scores on the Introversive Style scale predicted lower FACT Emotional Well-being ($\beta = -.28$, $p = .048$) and SF-36 Role Limitations-Emotional ($\beta = -.34$, $p = .018$) scores. Similarly, higher scores on the Inhibited Style scale predicted lower FACT Emotional Well-being ($\beta = -.41$, $p = .005$) and SF-36 Role Limitations-Emotional ($\beta = -.38$, $p = .012$) scores. Higher Dejected Style scores predicted lower FACT Emotional Well-being ($\beta = -.37$, $p = .016$) scores. Higher Cooperative Style scores predicted lower FACT total ($\beta = -.36$, $p = .002$), FACT Physical Well-being ($\beta = -.33$, $p = .012$), FACT Emotional Well-being ($\beta = -.50$, $p < .001$) and SF-36 Role Limitations-Emotional ($\beta = -.50$, $p < .001$) scores. Higher Oppositional Style scores predicted lower FACT Emotional Well-being ($\beta = -.36$, $p = .018$) and SF-36 Role Limitations-Emotional ($\beta = -.35$, $p = .020$) scores. Additionally, higher Denigrated Style scores predicted lower FACT total ($\beta = -.33$, $p = .018$), FACT Physical Well-being ($\beta = -.34$, $p = .029$), FACT Emotional Well-being ($\beta = -.35$, $p = .029$) and SF-36 Role Limitations-Emotional ($\beta = -.50$, $p = .002$) scores. In contrast Sociable, Confident, Forceful,

Non-conforming and Respectful scales did not predict HrQoL scores in this sample (see Table 4).

Psychiatric Indicators, Stress Moderators and HrQoL—Higher scores on the Depression scale predicted lower FACT Emotional Well-being ($\beta = -.42, p = .013$) and lower SF-36 Role Limitations-Emotional ($\beta = -.38, p = .011$) scores. Higher Tension-Anxiety scales predicted lower FACT Total ($\beta = -.29, p = .029$), FACT Emotional Well-being ($\beta = -.39, p = .010$) and SF-36 Role Limitations-Emotional ($\beta = -.39, p = .006$) scores. Greater Future Pessimism scores were not associated with FACT scores but were associated with lower SF-36 Role Limitations due to Emotional Problems ($\beta = -.30, p = .044$) and lower SF-36 Role Limitations due to Physical Problems ($\beta = -.29, p = .029$) scores.

Treatment Prognostics scales and HrQoL—Higher scores on the Interventional Fragility scale predicted lower FACT total ($\beta = -.38, p = .003$), FACT Physical Well-being ($\beta = -.41, p = .002$), FACT Emotional Well-being ($\beta = -.53, p < .001$) and SF-36 Role Limitations-Emotional ($\beta = -.38, p = .007$) scores. Higher scores on the Utilization Excess scale predicted lower FACT total ($\beta = -.34, p = .008$), FACT Emotional Well-being ($\beta = -.44, p = .002$) and SF-36 Role Limitations-Emotional ($\beta = -.45, p = .001$) scores.

Discussion

The major results of this study indicate that the MBMD may be a valuable predictor of multiple domains of HrQoL over time in men treated for PC and may serve as a screening tool for determining those men most likely to benefit from adjunctive psychosocial interventions. While remarkable strides have been made in curative treatments for PC, these treatments, typically involving surgery or radiation, can cause acute and chronic side effects including urinary, bowel and erectile dysfunction, fatigue and impaired physical functioning (Potosky et al., 2007; Stanford et al., 2000). Declines in functioning have been seen to persist for years following primary treatment (Penson et al., 2003; Potosky et al., 2000) and have been shown to be more severe than that which would be expected due to age-related morbidity alone (Hoffman et al., 2004; Wei et al., 2002). In some men these side effects compromise health-related quality of life (HrQoL) and may be a persistent source of concern and bother over an extended period after treatment completion (Penson et al., 2003; Schover et al., 2002; Cooperberg et al., 2003; Wei et al., 2002). Interestingly, despite differences in trajectories of disease-specific side effects, prostate cancer surgery and radiation patients often report similar levels of more general domains of HrQoL (Penson et al., 2003; Potosky et al., 2000), suggesting that other factors may be involved in predicting long-term changes in HrQoL following PC treatment.

Less is known about the role of individual differences in mental functioning and personality as predictors of how well men maintain their HrQoL over the year after PC treatment. In the context of a larger prospective study the present analyses tested whether the MBMD (Millon et al, 2001), predicted indicators of HrQoL in men who had undergone treatment for PC and been followed for a 12-month period. This is the first study to evaluate the utility of this test in men treated for PC. We specifically tested the utility of the MBMD Management Guides

and Personality/Coping Styles, as well as select Treatment Prognostic, Stress Moderator, and Psychiatric Indicator scales in predicting commonly used HrQoL indicators at 12 month follow-up in men who had been treated with either surgery (radical prostatectomy) or radiation therapy for localized disease.

While scores on the HrQoL measures were within the normative range for the general U.S. adult population, adult male cancer samples, and men diagnosed with PC (Brucker et al., 1990; Schlenk et al., 1998), the MBMD Management Guides (reflecting psychosocial adjustment difficulties and need for mental health referral) were strongly associated with poorer overall HrQoL and emotional and physical HRQoL across the follow-up period. Predictive relationships were observed after controlling for relevant demographic and medical variables and baseline HrQoL scores. The results point to the utility of these MBMD Management Guides in screening those cancer patients most likely to suffer emotional and physical HrQoL deficits over time.

It is known that cancer patients may be at increased risk for experiencing post-treatment decrements in quality of life depending on pre-treatment psychological comorbidity (e.g., Trentham-Dietza, Remington, Moinpour, Hampton, Sappa, & Newcomba, 2003). Endorsement of psychological difficulties (e.g., anxiety, depression) have been associated with worse long-term quality of life (Harrison et al., 2011; Reich, Lesur, & Perdrizet-Chevallier, 2008; Schag, Ganz, Wing, Sim, & Lee, 1994), suggesting that those patients with premorbid difficulties may be in greater need for psychosocial intervention efforts (Burton, Parker, Farrell, Conneely, Booth, & Elcombe, 2007; Jacobsen & Jim, 2008). Results of the present study support this notion, as we found that the Depression and Tension-Anxiety scales of the MBMD, were also associated with lower HrQoL scores at follow-up. These findings suggest that the MBMD Psychiatric Indicators may be useful in identifying those PC patients in greatest need of such services.

We also found evidence that personality styles characterized by inhibition or avoidance, dependency, passive-aggressiveness or low self-regard (self-denigration) predicted poorer HrQoL over time in these men. These scales seemed to almost exclusively predict emotionally related HrQoL scales. There were no associations between MBMD Sociable, Confident, Forceful, Non-Conforming, and Respectful personality style scores and HrQoL outcomes. Research suggests that personality traits and coping strategies may be linked to global HrQoL outcomes among men with PC. Previously, avoidance, behavioral disengagement, blaming oneself, and engaging in wishful thinking have all been associated with negative physical and psychological adjustment in men with PC (Perczek, 1999; Ptacek et al., 1999; Roesch et al., 2005). Additionally, Helgeson & Lepore (1997) reported that men treated for PC who were characterized by independence, activeness, self-confidence and competitiveness (i.e., "agency") reported better post-treatment physical and mental adjustment, whereas those characterized by arrogance, cynicism, and hostility (i.e., "unmitigated agency") reported poorer mental adjustment. Although results indicate that individuals who employ avoidant coping strategies may be at increased risk for greater decrements in HrQoL, some studies show that avoidant strategies immediately after diagnosis may prevent an individual from becoming overwhelmed if their coping resources are limited (see Roesch et al., 2005). The key may be in whether the use of avoidant

strategies persists well after treatment is completed. In sum, while preliminary support for the role of personality processes in overall mental adjustment to PC has accrued, evidence for whether personality traits predict HrQoL outcomes has been lacking. The present prospective study contributes to this body of literature by clarifying some of these relationships in men who were followed systematically over a 12-month observation period.

Of the MBMD Treatment Prognostics scales, higher scores on Interventional Fragility and Utilization Excess, indicative of having more difficulty with invasive medical procedures and over-utilizing health services, respectively, were also consistently related to poorer HrQoL over time. These results suggest that men who have initial difficulties recovering from procedures such as surgery or radiation may also have greater problems over an extended follow-up period. It is plausible that elevations in Interventional Fragility scores in the period shortly after treatment may provide a screening tool for identifying those men who might benefit from psychological interventions to facilitate longer-term adjustment. In terms of the association between the Utilization Excess scale and HrQoL outcomes, several recent studies have shown that improper utilization of cancer services may have a detrimental impact on morbidity and mortality (Hanchate et al., 2010; Alemayehu et al., 2010), and identifying patients with such issues may assist in enhancing HrQoL outcomes. Scales referring to information discomfort, medication adherence and compliance with lifestyle changes did not appear relevant in predicting HrQoL over time. This is not surprising in that this sample is not dealing with newly emerging medical information, or complex medication or self-care regimens.

Finally we found greater Future Pessimism scores predicted lower SF-36 Role Limitations due to Emotional Problems scale at 12 month follow-up. This is consistent with the construct of Future Pessimism. Patients with elevations on this scale are seen as more prone to disengaging and giving up when faced with challenges and are therefore likely to view continued emotional problems as insurmountable and role-limiting (Millon et al., 2001).

There were several limitations in the study. The results of analyses presented here are based on a post-hoc study of a sub-sample of men drawn from a larger study of psychosocial adjustment after treatment for prostate cancer treatment. Because the MBMD was added to the test battery midway through the larger study, our sample size was somewhat limited for predictive analyses. Although we had sufficient power to discern moderate to strong effect sizes, future research should employ the MBMD in a larger sample of PC patients. Another limitation was the timing of the MBMD assessment since the point of entry into the study was on average about one year after the completion of treatment; future work should consider an MBMD assessment soon after diagnosis and then follow men for HrQoL assessments throughout treatment and beyond. The sample of men studied here were predominantly non-Hispanic white middle class men, who presumably had received the standard of care for PC and who had optimal access to post-treatment resources. The results therefore may not generalize to ethnic minority men or those of lower socioeconomic status who may not enjoy such access (Krupski, Sonn, Kwan, Maliski, Fink & Litwin, 2005). Future work will need to explore the role of personality factors in HRQoL outcomes in these groups of men dealing with PC. Since this cohort of men was treated with either prostatectomy or radiation, the present results suggest that these scales may have predictive

validity in types of treatment for early stage PC that were practiced in the past few decades (Stanford et al., 1999). However, whether these psychosocial characteristics will predict HrQoL in men experiencing newer, less invasive approaches to treating this disease (i.e., active surveillance, (Albertson, Hanley, & Fine, 2005; Bill-Axelsson et al., 2008) is yet to be seen. Finally, we cannot generalize these findings to populations diagnosed with other cancer types or those at later stages of disease, and future work should utilize the MBMD with other cancer patient groups dealing with treatment-related quality of life issues.

In conclusion, the MBMD Management Guide summary indicators significantly predicted poorer total, emotional and physical domains of HrQoL over time among men recently treated for PC. Scores on the Depression, and Tension-Anxiety Psychiatric Indicator scales mirrored these findings. Furthermore, men revealing higher scores in personality styles characterized by inhibition/avoidance, dependency, depression, passive-aggressiveness or self-denigration showed poorer HrQoL over time. Exploratory analyses revealed that higher scores on Interventional Fragility, Utilization Excess, and Future Pessimism scales also predicted poorer HrQoL in this sample. Clinicians and researchers might consider utilizing the MBMD to help screen for patients treated for PC who are most likely to report poorer HrQoL over time and provide psychosocial support earlier to enhance their physical and mental health functioning over time. A better understanding of psychosocial factors that impact PC patients may help identify those patients in need of counseling to facilitate adjustment to the persisting sequelae of treatment.

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Table 1

Demographic and medical characteristics of the participants (N=66)

Baseline characteristic	Descriptive/Group	Value
Age in years	Mean (SD)	68.18 (7.07)
Education in years	Mean (SD)	13.83 (3.01)
Income in \$1,000	Mean (SD)	53.44 (45.20)
Marital Status: <i>n</i> (%)	Single, never married	5 (7.57%)
	Married or in an equivalent relationship	52 (78.78%)
	Separated	3 (4.54%)
	Divorced	5 (7.57%)
	Widowed	1 (1.51%)
Ethnic Group: <i>n</i> (%)	Anglo/Caucasian/European American (not Hispanic)	39 (59.09%)
	Black/African-American	4 (6.06%)
	Caribbean Islander	4 (6.06%)
	Black, of origin other than those above	1 (1.52%)
	Asian/Asian-American	0 (0.0%)
	Cuban/Cuban-American	9 (13.64%)
	Other Hispanic	9 (13.64%)
Employment status: <i>n</i> (%)	Employed full-time	13 (19.70%)
	Employed part-time	4 (6.06%)
	On disability	1 (1.52%)
	Retired	42 (63.64%)
	Otherwise not employed	6 (9.09%)
Time since diagnosis in months	Mean (SD)	18.03 (6.49)
Time since treatment in months	Mean (SD)	12.18 (4.11)
Treatment type: <i>n</i> (%)	Radical prostatectomy	12 (18.18%)
	Radiation therapy	54 (81.82%)

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Table 2

Descriptive statistics for the Millon Behavioral Medicine Diagnostic (N=66)

MBMD domain	MBMD subscale	Raw score	Prevalence score	Prevalence score 75
		Mean (SD)	Mean (SD)	n (%)
Psychiatric indications	Anxiety–tension	5.47 (7.18)	45.92 (26.86)	10 (15.15%)
	Depression	5.92 (7.01)	46.70 (28.91)	15 (22.72%)
	Cognitive dysfunction	4.38 (4.98)	34.48 (19.79)	1 (1.51%)
	Emotional lability	6.41 (5.81)	46.45 (20.37)	4 (6.06%)
	Guardedness	10.24 (6.01)	54.70 (19.12)	9 (13.63%)
Coping styles	Introversion	6.74 (5.67)	52.29 (26.70)	14 (21.21%)
	Inhibited	4.18 (5.64)	48.11 (26.34)	5 (7.57%)
	Dejected	2.33 (4.33)	27.80 (31.14)	6 (9.09%)
	Cooperative	7.24 (5.10)	51.18 (21.71)	9 (13.63%)
	Sociable	11.45 (4.28)	57.17 (16.22)	9 (13.63%)
	Confident	11.98 (4.37)	59.05 (16.93)	9 (13.63%)
	Nonconforming	9.23 (5.39)	48.11 (17.74)	3 (4.54%)
	Forceful	8.98 (5.59)	41.53 (19.51)	2 (3.03%)
	Respectful	20.71 (6.17)	60.00 (23.57)	24 (36.36%)
	Oppositional	8.67 (7.02)	52.53 (21.77)	3 (4.54%)
Denigrated	4.68 (5.26)	47.17 (24.80)	5 (7.57%)	
Stress moderators	Illness apprehension	8.67 (8.73)	49.50 (25.37)	13 (19.69%)
	Functional deficits	8.98 (7.47)	59.09 (24.26)	15 (22.72%)
	Pain sensitivity	9.83 (9.27)	53.86 (26.53)	16 (24.24%)
	Social isolation	5.09 (6.01)	49.35 (26.12)	8 (12.12%)
	Future pessimism	7.08 (6.62)	53.53 (22.80)	13 (19.69%)
	Spiritual absence	7.45 (8.54)	46.98 (37.10)	20 (30.30%)
Treatment prognostics	Interventional fragility	4.73 (6.07)	38.42 (23.85)	4 (6.06%)
	Medication abuse	2.35 (2.87)	41.39 (23.81)	4 (6.06%)
	Information discomfort	1.47 (2.00)	32.29 (29.06)	8 (12.12%)
	Utilization excess	6.39 (5.26)	55.26 (21.36)	9 (13.63%)
	Problematic compliance	7.86 (6.27)	54.24 (27.52)	17 (25.75%)
Management guides	Adjustment difficulties	4.67 (4.01)	66.89 (19.96)	19 (28.78%)
	Psych referral	3.12 (3.17)	44.03 (21.79)	10 (15.15%)

Table 3

Descriptive statistics for the SF-36 and FACT-P outcomes measures

		T4
Measure	Subscale	Mean (SD)
SF-36	Role Limitations Physical	71.50 (38.14)
	Role Limitations Emotional	83.33 (33.84)
FACT-P	Physical Well-being	24.23 (4.93)
	Emotional Well-being	20.78 (4.36)
	Total Well-being score	87.96 (16.09)

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Regression beta weights (and p-values) of associations between MBMD raw subscale scores at baseline and HrQoL outcomes averaged at 12 months

Table 4

MBMD Subscale	FACT-P Total Score	FACT-P Physical Well-being	FACT-P Emotional Well-being	SF-36 Role Emotional	SF-36 Role Physical
Coping Styles					
Introversive Style	-.230 (.067)	-.175 (.211)	-.279 (.048)	-.339 (.018)	.025 (.861)
Inhibited Style	-.268 (.062)	-.205 (.163)	-.414 (.005)	-.380 (.012)	-.090 (.541)
Dejected Style	-.153 (.287)	-.228 (.116)	-.371 (.016)	-.287 (.053)	-.073 (.599)
Cooperative Style	-.363 (.002)	-.333 (.012)	-.503 (.000)	-.503 (.000)	-.116 (.384)
Sociable Style	-.025 (.818)	.000 (.998)	-.011 (.931)	.038 (.787)	.009 (.944)
Confident Style	-.079 (.460)	-.141 (.268)	-.028 (.826)	.027 (.848)	-.020 (.878)
Nonconforming Style	-.112 (.335)	-.125 (.344)	-.090 (.502)	-.234 (.111)	.105 (.433)
Forceful Style	-.094 (.410)	-.084 (.516)	-.121 (.352)	-.076 (.589)	-.032 (.805)
Respectful Style	-.141 (.182)	-.092 (.468)	-.244 (.047)	-.176 (.207)	.021 (.869)
Oppositional Style	-.219 (.151)	-.173 (.291)	-.363 (.018)	-.347 (.020)	-.109 (.451)
Denigrated Style	-.327 (.018)	-.338 (.029)	-.350 (.029)	-.502 (.002)	-.094 (.526)
Treatment Prognostics					
Interventional Fragility	-.380 (.003)	-.415 (.002)	-.526 (.000)	-.384 (.007)	-.112 (.401)
Utilization Excess	-.337 (.008)	-.243 (.102)	-.440 (.002)	-.450 (.001)	-.162 (.257)
Psychiatric Indicators					
Depression	-.327 (.075)	-.232 (.182)	-.420 (.013)	-.384 (.011)	-.162 (.257)
Tension-Anxiety	-.294 (.029)	-.273 (.055)	-.393 (.010)	-.395 (.006)	-.091 (.484)
Stress Moderators					
Pessimism	-.259 (.086)	-.208 (.205)	-.266 (.077)	-.300 (.044)	-.288 (.029)
Management Guides					
Adjustment Difficulties	-.426 (.002)	-.373 (.022)	-.442 (.002)	-.440 (.002)	-.424 (.001)
Psych Referral	-.475 (.001)	-.309 (.055)	-.472 (.001)	-.415 (.005)	-.374 (.003)