Psychosocial Factors Related to Functional Restoration Treatment Completion and Return-to-Function for Patients With Chronic Disabling Occupational Musculoskeletal Disorders

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Objective: The aim of this study was to identify demographic and psychosocial variables associated with successful completion of a functional restoration program and return-to-function within 3 months of treatment completion. **Methods:** Three hundred seven patients admitted to the functional restoration program were evaluated for completion status and 200 patients with valid data were assessed for 3-month return-to-function status following completion. Psychosocial and functional status was assessed at baseline. **Results:** Key factors associated with program completion included lower perceived disability, lower pain, lower functional impairment, and lower fear avoidance. Factors associated with 3-month return-to-function included lower perceived disability, lower depression, greater belief that pain is not associated with impairment, and higher quality of life. **Conclusions:** Psychosocial and functional factors contribute to both functional restoration completion and 3-month return-to-function outcomes.

Disability from chronic pain has profound implications that lead to a myriad of socioeconomic and health-related consequences. In the United States in 2008, approximately $100 billion was associated with health care costs and work productivity losses because of chronic disabling occupational musculoskeletal disorders (CDOMDs).[1] In addition to the economic and physical health concerns, chronic pain is also linked with mental health issues and clinical abnormalities. Psychiatric disturbance is often associated with the prevalence of chronic pain.[2] Polatin et al[3] assessed 200 patients with chronic low back pain (CLBP) and found psychiatric disturbance to be highly prevalent compared with healthy populations, such that of the chronic low-back pain patients in their study, 59% met the criteria for at least one psychiatric diagnosis and 77% met criteria for a lifetime psychiatric diagnosis. Within a chronic pain population, there is a higher prevalence rate of generalized anxiety disorder, somatization disorder, and major depressive disorder.[4] Furthermore, this population also presents with a higher rate of psychiatric abnormalities in patients with chronic pain in more than one region of the body, such as a having chronic lower back pain and comorbid fibromyalgia.[4] There is a stronger association of psychiatric symptoms with CLBP than the association of these disorders with acute low back pain.[2] Gerrits et al[5] showed that a higher number of pain locations, joint pain, duration of pain longer than 90 days, daily use of medication, along with a higher chronic pain grade score, which measured pain location, number of pain locations, and duration of pain and pain severity, were all associated with depressive and anxiety disorders. The need to understand depression and other mental health issues is of great importance due to the cognitive and behavioral deficits that seem to exacerbate the onset and maintenance of chronic pain.[6]

FUNCTIONAL RESTORATION PROGRAMS

Functional restoration is a multidisciplinary treatment program for chronic pain patients that uses a biopsychosocial approach. The positive outcomes that are associated with successful completion of functional restoration programs demonstrate a clinical necessity for patients to adhere to the multidisciplinary treatment.[7] A large study of 1440 patients with CDOMD was conducted to assess treatment outcomes of completers and noncompleters in functional restoration programs.[8] The study found a very large difference between completers and noncompleters, noting 90.4% and 48.7%, respectively, returning to work within 1-year post-treatment. Furthermore, 84% of the completion group, but only 40.6% of the noncompletion group were able to retain their work status after 1-year post-treatment. Proctor et al[8] also found that the noncompletion group reported higher levels of depression, pain, and disability. This study accounted for a substantial number of variables associated with return to work; however, the psychosocial variables assessed were limited to depression and pain intensity. A follow-up study on functional restoration treatment completion identified additional psychosocial factors related to noncompletion, including opioid dependency and Cluster B personality disorders.[9] Results from these previous studies indicate the importance of identifying the risk factors involved in chronic pain progression in order to thwart pain-related disability and improve functional restoration outcomes.[5,7–9]

WORK RETURN AND RETENTION

The ability to return to work has thus far been the primary outcome for successful rehabilitation of chronic pain patients following functional restoration. Previous research indicates that between 82% and 87% of patients who complete functional restoration programs will successfully return to work, [7,10,11] but despite successful completion of a functional restoration program, while many return to work, a percentage of this population maintains poor work retention outcomes 1 year following treatment.[12] Variables such as age,[13] psychological disturbance, and misuse of opiate medications have all been associated with poor work retention outcomes.[14,15] Because psychological disturbance has been found to be associated with poor work retention, assessing factors that affect work return and retention provides an objective outcome measure in identifying populations who's lives may be disrupted by an inability to perform at their workplace (ie, having a means to financial income, self-fulfillment, holding a sense of purpose, etc.).

PURPOSE

The aim of this study is to identify the demographic and psychosocial variables associated with two main outcomes: successful completion of a functional restoration program and return to function within 3 months of treatment completion. Psychosocial variables to be evaluated in this study are quality of life (QOL), perceived pain and functional impairment, pain acceptance, anxiety,

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depression, and perceived opioid misuse. Given the high degree of comorbidity of psychosocial variables in the development of chronic pain as well as poor outcomes, this study predicts that variables influencing outcomes will be highly correlated at baseline.

METHODS

Participants

This study consisted of 303 patients admitted to an outpatient functional restoration program in Austin, Texas, between the years 2009 through 2014. All patients enrolled in the program had CDOMDs resulting in functional limitations that interfered with their ability to work or function. The goal of the program is to restore function and increase work return outcomes. Patients were excluded from the program for illicit drug use. The Institutional Review Board at Texas State University approved this study. For the Treatment Completion part of this study, 253 patients successfully completed the treatment program, while 50 patients were classified as noncompleters. For the Return-To-Function part of the study, only program completers with valid post-treatment data were included in the analyses ($N = 200$). There were 129 patients who successfully returned-to-function following treatment and there were 71 patients who did not report return-to-function.

Procedure

This functional restoration program is a 4-week program that treats patients with CDOMDs. The primary treatment goals are to restore function and reduce pain. In some cases, patients extend their treatment if they have not yet met their rehabilitation goals within 4 weeks. The primary outcome after successfully completing this program is to restore function. Return to function is a return to daily activities, including, but not limited to, paid employment, school, or other volunteer work. This functional restoration program is a multidisciplinary program with a team of specialists (medical physician, psychologist, physical and occupational therapists, social worker, and additional support) who work together to treat each patient holistically. The program includes medication management, physical and occupational therapy, individual, group and family counseling, yoga, Pilates, and information sessions on topics such as sleep, nutrition, and stress reduction. The functional restoration program is structured like a typical 8 AM to 5 PM job in order to get patients back into a routine.

All demographic data, psychosocial measures, and pain scales are provided at baseline and administered weekly until completion of the program. Patients receive continuous medical evaluation with continuous medication management. Successful completion of the program, also known as standard discharge, involves the achievement of various treatment goals with the aim of returning to work or function. The outcome measures for this study are the participants' successful completion of the functional restoration program and successfully returning to function within 3 months of program completion. The 3-month follow-up time frame was chosen, as opposed to the traditional 1-year follow-up time frame, to examine how these demographic, physical, and psychosocial factors affect the immediate return-to-function following treatment completion. This study defines Return-to-Function as the ability of an individual with chronic pain to return to work, school, internship, or other daily activities without pain-related disability. Upon completion of the program, the functional restoration program provides follow-up calls for which all psychosocial measures are administered again and return-to-function is assessed. In the case of retired patients, return-to-function was assessed by the return to activity levels similar to levels at program enrollment. Of this sample, there were four retired patients collecting disability who were placed in the nonreturn-to-function group after discharge. Of all the patients, three were discharged "against medical advice" and were included in the analyses as noncompleters of the functional restoration program.

Measures

A battery of assessments was used to evaluate psychosocial factors before treatment. As there are robust findings in the literature associating psychological disturbance and chronic pain, the following measurements were administered at baseline.

Demographic data were collected on all patients participating in the functional restoration program, including age, ethnicity, and gender.

QOL was assessed using the QOL Scale developed by the American Chronic Pain Association.[16] This one-item scale measures the QOL specifically in pain populations and is designed to measure function for people with pain. Essentially, this scale is used so that patients can succinctly describe their ability to complete activities of daily living. The scale measures from 0 (nonfunctioning) to 10 (normal daily functioning).

The Oswestry Disability Index (ODI) is an assessment that measures the amount of functional impairment experienced in activities of daily living.[17] The ODI is a 10-item questionnaire with each item scaled from 0 to 5. The patient's total score is converted into a percentage. The overall percentage ranges from minimal (0% to 20%), to moderate (21% to 40%), severe (41% to 60%), to crippled (61% to 80%). Scores between 81% and 100% are interpreted as either bed-bound or exaggerating symptoms.

A Visual Analog Scale (VAS) is a simple, unidimensional pain assessment that was used to measure subjective pain intensity. For this study, the VAS is taken from the Short-Form McGill pain questionnaire (SF-MPQ).[18] Although subjective, research has supported use of the VAS as both reliable and valid with respect to measuring a patient's experience of pain, depression, and anxiety.[19] At baseline, patients are instructed to place a point on a line that measures 0 to 100 mm. A score of 0 mm represents the absence of pain and 100 mm represents the maximum pain that one could experience. The patient's score is equal to the distance from 0, measured in millimeters.[20]

The Beck Anxiety Inventory (BAI) is a 21-item inventory used to measure aspects of anxiety.[21] The BAI uses a 21-item survey to record the presence and magnitude of anxious symptoms within the past week. This assessment uses a scale of 0 to 3 for each item, with 0 corresponding to the absence of the anxious symptom and 3 with a severe presence of the anxious symptom. The total BAI score measures minimal to no anxiety (score of 0 to 7), mild anxiety (8 to 15), moderate anxiety (16 to 25), and severe anxiety (>26). The BAI has shown a high level of internal consistency (Cronbach alpha = .94) and shows a reliability score of $r = 0.67$.[22]

The Pain and Impairment Relationship Scale (PAIRS) is a 15-item assessment used to evaluate the relationship of one's pain to their disability or functional impairment.[23] In other words, the PAIRS measures how much a person believes their functional impairment is the result of their pain. The PAIRS uses a 7-point Likert scale that assesses implicit and explicit beliefs about the pain and impairment relationship.

The Tampa Scale for Kinesiophobia (TSK) is a 17-item self-report questionnaire using a Likert scale to measure one's fear of reinjury due to movement. Items 4, 8, 12, and 16 are reverse scored and the scale is measured from 1 (strongly disagree) to 4 (strongly agree).[24] The total score will range from 17 to 68. A test–retest design for the TSK revealed a high internal consistency ($\alpha = 0.70$ for test 1, $\alpha = 0.76$ for test 2) and a high test–retest reliability of $r = 0.78$ in a sample with acute low back pain.

The Beck Depression Inventory (BDI) is a 21-item questionnaire that is designed to measure cognitive, behavioral, somatic, and affective components of clinical depression.[25] Each item on the BDI rates from 0 to 3, with 0 indicating absence of the depressive

symptom and 3 being the most severe. The sum of the items represents the severity of the depressive episode from no depression (score of 0 to 9), mild depression (10 to 18), moderate depression (19 to 29), and severe depression (>29). The BDI has shown significant predictive validity for populations with chronic pain and can distinguish depressive symptoms between persons with and without a diagnosis of major depressive disorder.[26]

The Current Opioid Misuse Measure (COMM) is an assessment used to measure the reported misuse of opioid medications in patients with pain.[27] It is a 17-item questionnaire that uses a Likert scale to measure the frequency of thoughts and behaviors over the last 30 days before the assessment. Scores of 9 or above indicate a likelihood of opiate misuse. A 1-week test–retest for reliability showed an intraclass correlation of 0.86 with a 95% confidence interval between 0.77 and 0.92 and an internal consistency of 0.86.[27]

The Chronic Pain Acceptance Questionnaire (CPAQ) is a 20-item assessment that requires participants to rate the relevance of each item to his or her life.[28] The CPAQ evaluates a person's acceptance of pain across two subscales: activities engagement (AE) and pain willingness (PW). The ratings range from 0 (never true) to 6 (always true). The sum of all items (after reverse scoring) provides the participant's final score. For this study, each subscale was assessed separately to differentiate the patients' ability to engage in activities regardless of pain (CPAQ-AE) or if patients are limiting painful behaviors (CPAQ-PW). These subscales are both reliable and valid as confirmed by factor analysis.[29]

Statistical Analysis

Univariate tests were used to determine which baseline demographic and psychosocial variables were significant in predicting treatment outcomes defined by 1) successful completion of a functional restoration program and 2) ability to return-to-function within 3 months of completion. Chi-square tests were used for categorical variables and independent *t* tests were used for continuous variables. A Pearson correlation was conducted using all significant variables at the univariate levels to assess the degree of multicollinearity between these variables. Participants with missing data on a particular measure were not included in the specific univariate comparison for that measure. The significance level was set at $P = 0.05$. All analyses were conducted using SPSS version 22 (IBM Corp, Armonk, NY).

RESULTS

This study examined two outcome measures to demonstrate the predictive value of various psychosocial variables for patients with CDOMD undergoing treatment at a functional restoration program. This study specifically looked at which psychosocial variables at baseline were associated with 1) successful completion of a functional restoration program and 2) the ability to return-to-function within 3 months of program discharge.

Functional Restoration Program Completion Versus Noncompletion

For this outcome, psychosocial variables were evaluated for the respective influence of each on completion status. Each measure was taken at baseline before the beginning of the program. For the demographic comparisons, there were no significant differences in age, gender, or ethnicity for completion status (see Table 1). Psychosocial variables demonstrating significance were the ODI, VAS, PAIRS, and TSK (see Table 2). Results from the ODI showed that patients experiencing a lower level of disability were more likely to complete the program, with a moderate effect, Cohen $d = 0.53$ ($P = 0.002$). On the VAS, patients who reported lower pain intensity at baseline were also more likely to complete, Cohen $d = 0.60$, showing a moderate-to-strong effect ($P = 0.001$). Lower scores on the PAIRS, which indicated that the person believed their dysfunction was less likely the result of their pain, were also associated with completion, Cohen $d = 0.45$, indicating a moderate effect ($P = 0.005$). Similarly, the less a person feared reinjury due to movement, as measured by the TSK, the more likely they were to successfully complete the functional restoration program, with a moderate effect, Cohen $d = 0.45$ ($P = 0.012$). The comparisons of the variables ODI, VAS, PAIRS, and TSK each showed moderate effect sizes, showing that they each provide an important contribution in understanding program noncompletion.

Return-to-Function Within 3 Months of Discharge

The second outcome utilized the same psychosocial variables at baseline. For return-to-function within 3 months of discharge, there were no significant differences in age, gender, or ethnicity (see Table 3). Univariate analyses showed that QOL, ODI, BDI, and the AE subscale of the CPAQ were all associated with the ability to return-to-function within 3 months of discharge. Statistical comparisons are shown in Table 4. The results showed higher reported QOL at baseline was associated with a higher likelihood of return-to-function within 3 months of discharge, with a small-to-moderate effect size, Cohen $d = 0.37$ ($P = 0.017$). Lower baseline disability scores on the ODI showed that in addition to being significantly associated with program completion, a lower level of disability was significantly associated with successful return-to-function within 3 months, with a moderate effect size, Cohen $d = 0.45$ ($P = 0.004$). Lower depression scores on the BDI also showed a higher likelihood

TABLE 1. Demographics of Functional Restoration Completers Versus Noncompleters

Variables	Completion ($n = 253$)	Noncompletion ($n = 50$)	Statistical Comparison *P*
Age			
	M = 46.56 SD = 10.05	M = 45.70 SD = 9.98	0.582
Gender			
% (*n*)			
Male	59.3% (150)	64.0% (32)	0.347
Female	40.7% (103)	36.0% (18)	
Ethnicity			
% (n)			
Asian	0.4% (1)	0% (0)	
Black	11.1% (28)	14.0% (7)	0.850
Hispanic	37.9% (96)	42.0% (21)	
Native American	0.8% (2)	0% (0)	
White	49.8% (126)	44.0% (22)	

TABLE 2. Univariate Comparison of Functional Restoration Completers Versus Noncompleters

	Completion ($n = 253$)	Noncompletion ($n = 50$)	*t*-statistic	Effect Size	*P*
QOL	M = 4.95 SD = 2.15	M = 4.56 SD = 1.94	1.14		0.266
ODI	M = 22.53 SD = 7.63	M = 26.20 SD = 6.05	−3.18	Cohen $d = 0.53$	0.002
VAS	M = 60 SD = 20.68	M = 71.76 SD = 18.33	−3.42	Cohen $d = 0.60$	0.001
BAI	M = 16.61 SD = 12.067	M = 18.67 SD = 13.23	−0.98		0.330
PAIRS	M = 70.76 SD = 11.75	M = 76.13 SD = 12.08	−2.83	Cohen $d = 0.45$	0.005
TSK	M = 43.16 SD = 7.28	M = 46.37 SD = 6.97	−2.53	Cohen $d = 0.45$	0.012
BDI	M = 19.21 SD = 11.69	M = 21.55 SD = 12.40	−1.16		0.246
COMM	M = 10.61 SD = 8.18	M = 11.19 SD = 8.16	−0.45		0.654
CPAQ-AE	M = 28.70 SD = 12.73	M = 26.57 SD = 12.50	0.86		0.395
CPAQ-PW	M = 22.42 SD = 11.36	M = 19.60 SD = 9.06	1.29		0.197

BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; COMM, Current Opioid Misuse Measure; CPAQ, Chronic Pain Acceptance Questionnaire (subscales: AE—activities engagement; PW—pain willingness.); ODI, Oswestry Disability Index; PAIRS, Pain and Impairment Relationship Scale; QOL, Quality of Life Scale; TSK, Tampa Scale for Kinesiophobia; VAS, Visual Analogue Scale (subscale of the Short-Form McGill Pain Questionnaire).

of return-to-function, Cohen $d = 0.30$, indicating a small effect ($P = 0.043$). In addition, higher scores on the AE subscale of the CPAQ, which shows a higher likelihood of a patient to engage in activities that otherwise caused pain, were indicative of successfully restoring function within 3 months of discharge, with a moderate effect size, Cohen $d = 0.40$ ($P = 0.016$). The comparisons of the variables QOL, ODI, BDI, and CPAQ-AE showed small-to-moderate effect sizes, indicating the strength of their contributions to return-to-function within 3 months of program completion.

Baseline Variable Correlations

A Pearson *r* correlation matrix was conducted on all baseline variables included in these analyses. For the first dependent variable, program completion, there were significant positive correlations between levels of pain disability (ODI), pain intensity (VAS), perceived impairment (PAIRS), and fear of movement (TSK). The results of the correlation matrix are summarized in Table 5. For our second outcome, ability to return-to-function within 3 months, higher scores of pain intensity (VAS) and depression (BDI) were significantly correlated with lower QOL and less likelihood of engaging in activities (CPAQ-AE). A full correlation matrix was run for all variables and showed that with the exception of the CPAQ-PW correlation with the BAI and the CPAQ-AE measures, baseline variables used for both outcomes were significantly correlated at baseline ($P < 0.01$), with correlation coefficients ranging from $r = 0.057$ to $r = 0.628$.

DISCUSSION

Functional restoration programs are a form of tertiary care implemented in order to reduce pain related disability and to help restore function to patients with CDOMDs.[10] Functional restoration programs have demonstrated a high success rate for return to work and work retention outcomes in patients with back injuries, upper extremity injuries, and lower extremity injuries who completed the treatment program.[7,30,31] Past research in this area demonstrates the influence of psychosocial variables on both the successful

TABLE 3. Demographics of Return-to-Function Within 3 Months

Variables	Return-to-Function Within 3 Months ($n = 129$)	Nonreturn-to-Function Within 3 Months ($n = 71$)	Statistical Comparison *P*
Age	M = 46.38 SD = 9.75	M = 46.82 SD = 9.72	0.761
Gender % (*n*)			
Male	56.6% (73)	56.3% (40)	0.973
Female	43.4% (56)	43.7% (31)	
Ethnicity % (*n*)			
Asian	0.8% (1)	0.0% (0)	0.484
Black	12.4% (16)	0.7% (5)	
Hispanic	41.1% (53)	39.4% (28)	
Native American	0.0% (0)	1.4% (1)	
White	45.7% (59)	52.1% (37)	

TABLE 4. Univariate Comparison for RTF Within 3 Months Versus Non-RTF

	Return-to-Function Within 3 Months ($n = 129$)	Nonreturn-to-Function Within 3 Months ($n = 71$)	*t*-statistic	Effect Size	*P*
QOL	M = 5.16 SD = 2.18	M = 4.38 SD = 2.06	2.40	Cohen $d = 0.37$	0.017
ODI	M = 21.83 SD = 7.67	M = 25.07 SD = 6.82	−2.95	Cohen $d = 0.45$	0.004
VAS	M = 59.75 SD = 22.27	M = 63.85 SD = 16.44	−1.30		0.197
BAI	M = 16.16 SD = 13.06	M = 16.69 SD = 10.93	−0.28		0.777
PAIRS	M = 70.21 SD = 11.17	M = 72.30 SD = 12.24	−1.21		0.227
TSK	M = 42.80 SD = 7.05	M = 43.89 SD = 8.21	−0.95		0.344
BDI	M = 18.17 SD = 11.71	M = 21.68 SD = 11.40	−2.04	Cohen $d = 0.30$	0.043
COMM	M = 10.35 SD = 8.80	M = 9.70 SD = 6.11	0.55		0.585
CPAQ-AE	M = 30.10 SD = 12.74	M = 25.02 SD = 12.52	2.43	Cohen $d = 0.40$	0.016
CPAQ-PW	M = 22.74 SD = 11.09	M = 21.84 SD = 12.32	0.47		0.637

BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; COMM, Current Opioid Misuse Measure; CPAQ, Chronic Pain Acceptance Questionnaire (subscales: AE—activities engagement; PW—pain willingness.); ODI, Oswestry Disability Index; PAIRS, Pain and Impairment Relationship Scale; QOL, Quality of Life Scale; RTF, return to function; TSK, Tampa Scale for Kinesiophobia; VAS, Visual Analogue Scale (subscale of the Short-Form McGill Pain Questionnaire).

TABLE 5. Correlation Matrix for All Baseline Variables

	QOL	ODI	VAS	BAI	PAIRS	TSK	BDI	COMM	CPAQ-AE	CPAQ-PW
QOL										
Pearson correlation	1	−0.464	−0.187	−0.331	−0.322	−0.246	−0.400	−0.222	0.418	−0.057
P		0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ODI										
Pearson correlation		1	0.448	0.494	0.436	0.359	0.455	0.295	−0.385	−0.149
P			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
VAS										
Pearson correlation			1	0.318	0.363	0.288	0.241	0.164	−0.190	−0.151
P				0.000	0.000	0.000	0.000	0.004	0.002	0.016
BAI										
Pearson correlation				1	0.356	0.315	0.628	0.518	−0.272	−0.098
P					0.000	0.000	0.000	0.000	0.000	0.091
PAIRS										
Pearson correlation					1	0.518	0.336	0.245	−0.432	−0.264
P						0.000	0.000	0.000	0.000	0.000
TSK										
Pearson correlation						1	0.301	−0.222	−0.347	−0.263
P							0.000	0.000	0.000	0.000
BDI										
Pearson correlation							1	0.620	−0.419	−0.199
P								0.000	0.000	0.001
COMM										
Pearson correlation								1	−0.242	−0.221
P									0.000	0.000
CPAQ-AE										
Pearson correlation									1	0.066
P										0.248

BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; COMM, Current Opioid Misuse Measure; CPAQ, Chronic Pain Acceptance Questionnaire (subscales: AE—activities engagement; PW—pain willingness.); ODI, Oswestry Disability Index; PAIRS, Pain and Impairment Relationship Scale; QOL, Quality of Life Scale; TSK, Tampa Scale for Kinesiophobia; VAS, Visual Analogue Scale (subscale of the Short-Form McGill Pain Questionnaire).

completion of a functional restoration program and on the ability to return-to-function following treatment. The current study adds to the literature to show that factors related to perception of pain and function are predictive of program completion, and factors related to QOL, depression, and acceptance of pain are associated with return-to-function within 3 months following treatment completion.

The current study found that factors significantly related to program completion include low levels of kinesiophobia and lower perceived pain intensity before treatment, which supports the findings in previous literature on both fear avoidance[24] and pain intensity for chronic pain patients.[12] Perception of pain and disability are important indicators to address during a multidisciplinary treatment, such that if clinicians can help the patient to change their cognitions regarding movement capabilities and pain perception, this could improve program completion status for those with higher levels of kinesiophobia and pain intensity. On the basis of the results of this study, as well as its congruency with results from prior studies, physicians and clinicians can justify administering pre-treatment psychological assessments to predict post-treatment outcomes. Doing so may help preemptively identify factors that could prevent optimum recovery and ability to maintain adequate functioning for a workplace environment.

Baseline predictors associated with post-treatment return-to-function within 3 months included better QOL, less pain, lower depressive symptoms, and higher acceptance of pain with respect to AE. Oftentimes in chronic pain research, QOL is used as an outcome measure. For example, in a study examining the efficacy of functional restoration for CLBP patients, Huge et al[32] found that successful completion of the treatment program resulted in improvement in three of the eight SF-36 health-related QOL domains. In a study by Gatchel et al,[33] pre-treatment QOL indices were significantly related to work return and work retention at 1-year following successful functional restoration treatment. The current study supports these findings showing that higher QOL scores at baseline were significantly associated with successful return-to-function following treatment completion.[33] Conversely, it may be important for clinicians to assess patients' QOL before treatment, rather than as simply an outcome measure, to not only predict work retention but also to implement interventions that could possibly increase the number of people who do retain. In a study comparing patients' outcomes between those who underwent a multidisciplinary rehabilitation program (MRP) versus standard after-care, patients who underwent standard after-care had poorer QOL scores at 6-month follow-up than those who participated in the MRP.[34] Further research is needed to confirm the relationship between pre-treatment QOL and post-treatment work retention.

For the current study, baseline depression was found to be related to noncompletion and failure to return-to-function following successful completion of functional restoration. And while increased depression symptoms were not a significant determinant of completion status, depression was significantly linked to return-to-function for those who completed the treatment program. A study by Howard et al[9] showed that increased depression symptoms, as measured by the BDI, were significantly different on the basis of completion status; however, there was no difference in rates of pre-treatment Major Depressive Disorder, as measured by the Structured Clinical Interview for the DSM-IV. In that study, more than 50% of the patients who completed the program were diagnosed with major depressive disorder before entering the functional restoration treatment program. This may indicate that if the biopsychosocial nature of the functional restoration approach can sufficiently address depression symptoms during treatment, those who complete the program may have better post-treatment outcomes.

The current study showed that the likelihood for opioid misuse at baseline, which was measured by the COMM, was not a risk factor for completion or return-to-function following completion. Many prior studies have indicated that opioid dependency is related to poor outcomes for patients with CDOMDs.[9,14] The discrepancy in the findings between the prior studies and the current study is likely because the current study did not evaluate the actual opioid dosages prescribed to patients, nor the diagnosis of opioid dependency as a psychological disorder. The current study utilized the COMM, which is focused on cognitions and behaviors related to the likelihood of opioid misuse.[27] Although the findings from this study do not support the associate between likelihood of misuse with noncompletion, there may still be a relationship between actual opioid usage and dependency with treatment noncompletion and failure to return-to-function following treatment.

Limitations

Due to the retrospective nature of this study, there were several limitations. One limitation of this study was related to missing data. Due to the clinical focus of the functional restoration program, follow-up data were not strictly pursued for research purposes. Another limitation of this study is that it only assessed short-term, 3-month outcomes. The data included whether patients had restored function within the 3 months after discharge, but did not include whether patients were still functioning long term.

Future Directions

Future studies should include return-to-function outcomes at 1 year. Outcomes at 1 year will provide a better assessment of the long-term benefits of functional restoration programs as demonstrated by past research. Studies in the future should also evaluate the ability to retain function as opposed to just a return to function. This is pivotal knowledge because the ability to retain or continue work for a long period may be a better indicator of one's restored physical and mental health with respect to occupational disability.

Despite its limitations, this study does provide a glimpse of how psychosocial variables influence treatment outcomes in addition to showing moderate effects of the variables that were assessed. Furthermore, the high degree of correlation further supports the hypotheses that a variety of psychosocial factors and pain experiences are related to one another to the point of statistically significant correlation. It is important to note, however, that although there is a significant association of psychosocial variables with treatment outcomes and high degree of correlation between those variables, treatment still must be tailored to the individual, which the functional restoration program aims to do. Understanding which variables are associated with each patient's pain experience is perhaps the first step in providing effective individualized interventions.

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