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Effects of Patient Characteristics on Outpatient Rehabilitation Outcomes in Patients with Lumbar Impairments

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EFFECTS OF PATIENT CHARACTERISTICS ON OUTPATIENT REHABILITATION OUTCOMES IN PATIENTS WITH LUMBAR IMPAIRMENTS

by

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ABSTRACT

EFFECTS OF PATIENT CHARACTERISTICS ON OUTPATIENT REHABILITATION OUTCOMES IN PATIENTS WITH LUMBAR IMPAIRMENTS

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Lumbar spine impairments affect an individual's ability to perform activities of daily living, making it pertinent to understand the importance of rehabilitation and variables influencing clinical outcomes. The purpose of this study was to examine variables (demographics, health conditions, and biopsychosocial) that contribute to larger functional status (FS) improvement for patients with lumbar spine impairments seeking outpatient rehabilitation therapy. This study was a secondary data analysis of data collected by FOTO Inc. (Knoxville, TN, USA). A sample of 221,168 participants with lumbar spine impairments were analyzed. Correlations were performed to examine the strength of the linear relationship between variables of interest and functional status change (FSCH) at discharge. Multi-linear regression was used to create regression equations that predict FSCH at discharge. Results revealed that patients who were younger, had more acute conditions, fewer comorbidities, fewer surgeries, lower FS at admission, a lower pain rating at worst and within 24 hours, lower Modified Oswestry Low Back Pain Disability Questionnaire (MOS) score at admission and higher pain rating at best experienced greater improvement at discharge. A final linear regression model equation was identified, with

symptom acuity, FS admission score and MOS admission score being the three factors that explain the most variance.

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I. Introduction

The lumbar region is a common site for spine impairments. These impairments include, but are not limited to sprains, strains, disc herniation and vertebral fractures. Injury to any of these structures in the lumbar spine can lead to low back pain. It has been reported that one-quarter of adults experience low back pain per year, while eighty percent will experience it at some point in their lifetime (Hoy et al, 2014; National Center for Complementary and Integrative Health, 2017; National Institute of Neurological Disorders and Stroke, 2017).

Lumbar spine impairments, specifically back pain, has been reported to be one of the most expensive diseases in terms of indirect costs due to sickness absence and work disability (Hoy et al, 2014; Ma, Chan, & Carruthers, 2014). Besides negatively impacting an individual's occupational performance, or the ability to carry out daily routines, tasks and subtasks, individuals with lumbar impairments may have difficulties in basic tasks of daily living such as, bending to reach items off a low shelf, lifting items from the floor and carrying items throughout the home— difficulties that develop secondary to low back discomfort.

To overcome these difficulties and reduce pain, many individuals seek rehabilitation. Therefore, it is important to understand what factors contribute to better clinical outcomes. Variables that have been reported to predict better clinical outcomes are: shorter pain duration, younger age, lower intake pain, history of spine surgery, non-elevated somatization and fear-avoidance beliefs, fewer comorbidities, no depression, higher levels of physical activity and higher functional status at intake (Gregg, McIntosh, Hall, & Hoffman, 2014; Karstens, Hermann, Froböse, & Weiler, 2013; Deutscher et al., 2009; Hart, Werneke, Wang, Stratford, & Mioduski, 2010; Jette & Jette, 1996). On the other hand, variables that predict poorer clinical outcomes are: elevated somatization and fear-avoidance beliefs, depression, older age, longer pain duration, lack of physical activity, more comorbidities, having a mental disorder and a greater number of surgeries associated with the injury (Deutscher et al., 2009; Hart, et al., 2010; Jette & Jette, 1996; Athiviraham, Wali, & Yen, 2011; George, Bialosky, Donald, 2005; Keeley et al, 2008). While the impact of age is generally agreed upon, Antiviraham et al (2011) found that age is not a good predictor of clinical outcome. Gender is also another variable that has mixed results. Jette and Jette (1996) concluded that being female predicts better clinical outcomes, while Selhorst et al (2016) concluded that being female predicts poorer outcomes. Alternatively, Antiviraham et al (2016) concluded that gender is not a good predictor of clinical outcomes at all. Table 1 lists factors associated with clinical outcomes in patients with lumbar spine impairments identified in previous studies.

While previous studies have examined factors that impact clinical outcomes in an outpatient setting for lumbar impairments, few analyze the results by particular diagnoses, but rather collectively as lower back pain. Analyzing results by particular diagnoses would provide stronger evidence for factors that influence clinical outcomes, as the pathophysiology of the particular diagnoses could be acting as a confounding factor, resulting in inaccurate results. Additionally, other studies have not addressed the impact of the individual's self-efficacy (ability to cope with symptoms) on clinical outcomes.

The purpose of this study was to examine factors that contribute to better clinical outcome for patients with lumbar impairments seeking outpatient rehabilitation therapy. In other words, what patient demographics characteristics or health conditions at admission would contribute to a larger functional status change at discharge? Specifically, the objectives of our research were to determine:

(1) The relationship amongst demographic variables, health conditions, and biopsychosocial factors on (lumbar) functional status change at discharge.

(2) Which demographic variables are the best predictors of (lumbar) functional status change at discharge.

(3) Which health conditions at admission are the best predictors of (lumbar) functional status change at discharge.

(4) Which biopsychosocial variables are the best predictors of (lumbar) functional status change at discharge.

(5) The best combination of predictors of (lumbar) functional status change at discharge.

(6) A prediction model using the entire sample with mixed diagnostic groups, as well as its performance within each of the four major diagnostic groups.

II. Literature Review

A comprehensive literature review (Table 1) was completed to identify factors that have been proposed to influence the clinical outcome for patients receiving outpatient rehabilitation for lumbar impairments. Based on the literature, the factors that have been identified include age, gender, fear-avoidance beliefs, functional status at admission, comorbidities, severity of condition, physical activity before admission, depression, and centralization of symptoms.

Age

Age as a predictor of clinical outcomes has been studied extensively. Many studies have found that a younger age is a predictor of better clinical outcome, while older age has been found to be a predictor of poorer clinical outcome (Gregg et al, 2014; Jette & Jette, 1996; Deustcher et al, 2009; Hart et al, 2010; Karstens et al, 2013). However, Athiviraham et al (2011), found that age is not a good predictor of clinical outcome at all; a conclusion based on regression analysis finding no association between age and outcome measures scores.

Gender

Review of the literature has suggested that the influence of gender on clinical outcomes for patients with lumbar impairments is inconclusive. Jette & Jette (1996) proposed that being female was a predictor of better clinical outcomes, while Selhorst et al (2016) proposed that being female was predictive of poorer clinical outcomes. In contrast to both of these studies, Athiviraham et al (2011) proposed that gender is not a good predictor of clinical outcome at all. The impact of gender on clinical outcomes in lumbar impairments needs to be further studied to allow for a consensus to be reached.

Fear-Avoidance Beliefs

Fear-avoidance beliefs are the tendency for an individual to avoid certain activities because they believe/fear they will injure themselves in the process. Activities that are often the focus of fear-avoidance are physical and work-related (Bishop, Lentz & George, 2015). Across the literature, it has generally been agreed upon that elevated fear-avoidance beliefs are a predictor of poorer outcomes (Hart et al, 2011; Keeley et al, 2008; George et al, 2005; Werneke et al, 2009).

Functional Status (FS) at Admission

Functional status is the ability of an individual to perform activities that they need to perform on a daily basis. Lower FS means the individual is able to perform fewer tasks than “normal”. Functional status is often assessed through patient report and assessment tools (i.e., Functional Independence Measure, Lumbar CAT, etc.). Since FS is important for occupational participation, its influence on clinical outcomes has been studied. Based on the literature, it been found that higher level of FS at admission predicts better outcomes at discharge (Hart et al, 2011; Deustscher et al, 2009).

Comorbidities

Comorbidities are two or more chronic conditions or diseases that occur simultaneously. The impact of the number of comorbidities on rehabilitation has been of interest because, generally a higher number correlates to a worse health status, which often impacts an individual’s outcome (Valderas, Starfield, Sibbald, Salisbury & Roland, 2009). Overall, the literature has concluded that a higher number of comorbidities are indicative of poorer clinical outcomes (Hart et al, 2011; Hart et al, 2010; Jette & Jette, 1996).

Severity of Condition

Severity of condition refers to time since condition onset and is usually categorized as acute or chronic. Acute onset is when the condition is newly developed, has a sudden onset, or has a relatively short duration of symptoms (often less than 3-6 months). In contrast, chronic conditions are those that have been ongoing for a long duration of time (generally longer than 6 months). The influence of condition severity on clinical outcomes has been of interest because often chronic conditions are harder to remedy and have long-lasting impacts. Due to this debilitation, chronic conditions have been associated with poorer clinical outcomes, while acute conditions have been predictive of better outcomes (Deustscher et al, 2009; Hart et al, 2010; Karstens et al, 2013). Interestingly, Athiviraham et al (2011) concluded that duration of symptoms longer than one year are not a good predictor of clinical outcome at all, therefore, further studies on the maximum length of symptom duration that influence outcomes may be required.

Physical Activity Before Admission

Physical activity before admission refers to the amount of exercise an individual participated in prior to receiving treatment. Higher level of physical activity before admission was found to predict better outcomes at discharge (Deustscher, 2009; Hart et al, 2010; Karstens et al, 2013). This is likely due to higher level of exercises often representing a better health status and higher level of FS, increasing the ability of the individual to participate in therapy.

Depression

Depression is a psychosocial factor that is known to decrease an individual’s motivation for and engagement in daily activities. Due to its known impacts, the influence of depression on clinical outcomes for lumbar impairments has been studied. Previous studies have almost exclusively concluded that higher levels of depression are associated with poorer clinical outcomes (Hart et al, 2011; Deustscher et al, 2009; Keeley et al, 2008; Athiviraham et al, 2011; Jette & Jette, 1996; Karstens et al, 2013).

Centralization

Centralization is a phenomenon where pain in an extremity (arm or leg) is relieved when the spine is manipulated in a particular manner; however, the pain has relocated near the spinal cord during this manipulation. Due to its relationship with the spine, the influence of centralization of symptoms on clinical outcomes for lumbar impairment patients has been studied. The findings of the literature have found that centralization of pain is a predictor of better clinical outcomes, as it typically results in appropriate interventions being implemented (Werneke, 2008; George et al, 2005; Werneke et al, 2009).

III. Methods

Data Collection

Patients seeking outpatient rehabilitation provided demographic data and completed self-report surveys using a Patient Inquiry® computer software developed by FOTO (Knoxville, TN, USA) prior to initial evaluation and therapy. The computer-based surveys were administered at admission and again at discharge. Demographic data was entered by clinical staff.

Data were selected from the FOTO database if patients a) were 18 years old or older; b) were managed for an orthopedic impairment of the lumbar spine; c) received outpatient physical therapy; d) had impairments in spine pathology, muscle, tendon and soft tissues, fractures and sprains and strains; and e) completed the Lumbar Survey between January 2015 and June 2016. The lumbar survey was designed to assess functional status (FS) of patients in lumbar spine impairments and is the primary outcome measure of this study. Functional status change score (FSCH) was defined as the discharge FS score minus the admission FS score (i.e., FSCH = discharge FS score – admission FS score).

Institutional Review Board approval was waived as this was a secondary data analysis free of personal identifiers.

Setting and Participants

Table 2 presents the demographic characteristics of the patients. A sample of 221,168 participants in 377 outpatient clinics in 30 states (United States) were analyzed, forty-percent of which (88,787) were male. Patient age ranged from 18 to 84 years, with the patient mean (SD) age of 56.8 (16.3). Approximately 77% reported their symptoms as either chronic (onset more than 90 days) or subacute (onset 22-90 days), with 128,022 (57.9%) and 40,963 (18.5%) participants, respectively; the remaining 52,185 participants reported their symptoms as acute (onset 0-21 days). Number of comorbid conditions ranged from 0 to 29, 7.6% of participants reported having zero comorbidities and 67% reported having 3 or more. Identification of medical or surgical diagnosis was optional in the data collection, but of the patients with medical/surgical codes, the most common lumbar impairment diagnoses were associated with spinal pathology

(ICD-9 codes 720-724)(29%), muscle, tendon and soft tissue disorders (ICD-9 codes 725-729)(18%) and sprains and strains (ICD-9 codes 846-848)(4%).

Demographic Variables

Demographic variables included age, gender and symptom acuity. Age (in years) was a continuous variable. Gender was categorized as male and female. Symptom acuity, which we operationally defined as the number of calendar days from the date of onset of the condition being treated in therapy to the date of initial therapy evaluation, was categorized as acute (< 22 days), subacute (22-90 days) and chronic (>90 days).

Health Condition Variables at Admission

Comorbidities

Comorbidities was defined as number of health problems present in the patient, occurring simultaneously with their lumbar impairment. Number of comorbidities was represented by the summation of a total of 30 health problems. Example of conditions included were arthritis, osteoporosis, asthma, chronic obstructive pulmonary disease, stroke, seizures, diabetes, and cancer.

Lumbar Survey

The lumbar survey is a 28-item, lumbar specific, computerized adaptive test that was designed to evaluate a patient’s functional status in a more efficient manner. The computerized adaptive testing administration is more efficient than a fixed-length questionnaire because it administers select items, one at a time, from the item bank based on a preprogrammed algorithm, in turn only administering relevant questions while providing maximum information related to the patient's functional abilities (Hart, Mioduski, Werneke & Stratford, 2006; Hart et al, 2010). The lumbar survey administration begins with the most informative, median level difficulty item first (i.e., 'do you or would you have any difficulty at all with *any of your usual work, housework, or school activities'*). Based on the patient's response to each item, the computer estimates the patient's FS score with associated standard errors. Administration of items continue until a stopping rule is satisfied. The final FS score, on a scale of 0-100, is determined for the patient. This score represents an estimate of the patient's functional abilities; higher level of functioning is represented by higher scores. Based on these scores, clinical outcomes can be quantified by the FS score change (FSCH). FSCH was defined by subtracting the FS score at admission from the FS score at discharge (FSCH = discharge FS score – admission FS score). The lumbar survey's FS score represents the World Health Organization's International (WHO) Classification of Functioning, Disability and Health dimension "activity". The WHO defines activity as "the execution of a task or action by an individual" (World Health Organization, 2007, p. 129).

Development, simulation, validation, use and clinical interpretation of the lumbar survey have been described. Questions for the item bank were taken from the Back Pain Functional Scale, the physical functioning section of the Short Form-36, and other select scales with physical functioning items (Hart et al, 2006). Some examples of functional items extracted from these assessments and used to create the lumbar survey are 1.) Does or would your back-problem limit bathing?; and 2.) Does or would your back-problem limit walking on block? Previous studies have provided evidence that the lumbar survey meets assumptions of unidimensionality and local independence, and that FS measures were precise, valid, responsive and sensitive to change, efficient and practical (Hart et al., 2010).

11-point Numeric Pain Rating Scale (NPRS)

The NPRS was used to assess the participant's pain. The scores range from 1 (Pain as bad as it can be) to 11 (No pain). The lower the score, the worse pain the participant is experiencing. Pain ratings were obtained for the following statements: 'Over the past month, how would you rate your pain when it was the best?'; 'Over the past month, how would you rate your pain when it was the worst?'; 'Rate the level of pain you have had in the past 24 hours'. The NPRS has be found to be valid and reliable (Ferreira-Valenta, Pais-Ribeiro & Jensen, 2011).

Modified Oswestry Low Back Pain Disability Questionnaire (MOS)

The MOS is a questionnaire that assesses how an individual's back pain affects their ability to manage everyday activities. Activities of interest are: pain intensity, personal cares (e.g., Washing, Dressing), lifting, walking, sitting, standing, sleeping, social life, traveling and employment/homemaking. For each activity, the patient is presented with six responses and asked to select only one that best describes their condition. Example responses are 'I can tolerate the pain I have without having to use pain medication' and 'I need help, but I am able to manage most of my personal cares'. Each response corresponds to a point value ranging from 0 (pain not impacting activity) to 5 (pain preventing activity). A percentage of disability is calculated by summing the scores for each section, dividing the sum by the total possible score and multiplying by 100. A higher percentage corresponds to a higher level of disability. The validity of the MOS has been discussed (Fairbank, 2014; Fritz & Irrgang, 2001).

Biopsychosocial Variables

Self-efficacy for Coping Survey (SEC)

The SEC is 22-item instrument that assesses an individual's confidence in coping with three subscales: self-efficacy for coping with symptoms (SECS), self-efficacy for pain management (SEPM), and self-efficacy for physical function (SEPF). Sample questions include "when things aren't going well for you, how certain are you that you can: 1.) 'do something to help yourself feel better if you are feeling blue?'; 2.) 'deal with the frustration of your medical problems?'; and 3.) 'manage your physical symptoms, so you can do the things you enjoy doing?' An 11-point numeric rating scale with anchor points at 1 (not certain at all) and 10 (certain) is used to answer the questions; the 11th point is defined as "non-applicable". A final score for each subscale is calculated by summing the ratings for each item pertaining to that section. A higher score represents higher confidence in coping with symptoms. The SEC was a tool created by FOTO, Inc. to assess patient's perspectives, therefore, the psychometric properties have not been examined.

Pain Disability Index (PDI) Survey

The PDI is a 7-item instrument that measures the impact of pain on the following areas of daily living: family and home responsibilities, recreation, social activity, occupation, sexual behavior, self-care and life-support activity. The patient rates each activity on an 11-point numeric rating scale, with anchor points at 0 (no disability) and 10 (worst disability); the higher the score, the higher the disability. Validity and reliability have been described (Tait, Chibnall & Krause, 1990; Tait, Pollard, Margolis & Duckro, 1987; Gronblad, 1993; Jerome & Gross, 1991; Pollard, 1984)

Fear of Avoidance Physical Subscale

The Fear of Avoidance Physical subscale is a 3-item tool that was created to assess the patient's avoidance of physical activities that they believe may cause back injury. The tool is a rating scale ranging from 1 (Completely disagree) to 5 (Completely agree). Questions are those asking about their belief that specific tasks may harm them (i.e., "Physical activity might harm me", "I cannot do activities that may harm me, and "I should not do activities that may harm me"). A higher score indicates a higher level of avoidance of physical activities due to fear of injury. The Fear of Avoidance Physical subscale was a tool created by FOTO, Inc., therefore psychometric properties have not been evaluated.

Data Analysis

Prior to data analysis, data was checked for missing values among all demographic variables and assumptions of multiple linear regression model. Two participants were removed due to data entry error, specifically number entry that was not within the appropriate range. Scatter plots between the outcome variables (i.e., FSCH) and independent variables were inspected to examine the linear relationships. Correlation coefficients were used to quantify the strength of the linear relationships.

Data was analyzed using the multiple regression analysis – enter selection. Using the entire sample, three multiple regression analyses were performed using (1) demographic variables (age, gender, symptom acuity), (2) health conditions (i.e., comorbidities, number of surgeries, etc.), and (3) biopsychosocial variables (i.e., self-efficacy for coping with symptoms, fear avoidance behaviors, etc.) as independent variables to predict FSCH at discharge. Multiple linear regression is a statistical method that is used to estimate a relationship between independent and dependent variables. Multiple regression analysis is a type of linear regression that is used when examining the influence of two or more independent variables on a dependent variable. Based on the results of the regression analysis an equation is formed. The format of the multiple regression equation is $Y = a+b_1X_1+b_2X_2+\ldots+b_nX_n$. The 'Y' represents the dependent variable of interest (i.e., clinical outcomes, systolic blood pressure, etc.). The independent variables are represented by the X_n, while the intercept is represented by 'a'. The regression coefficients are represented by b_n. After an equation is created, the values of independent variables (X_n) can be inserted into the equation and provide an estimated value for the dependent variable (Y).

Based on the analysis results in step two, the most relevant variables were moved forward to develop the regression model for predicting FSCH at discharge. Results were examined and the most parsimonious model (with fewest variables as possible) explaining the most variance (with the largest R^2 as possible) was selected.

Last, while the developed regression model was developed using the entire sample with mixed diagnostic groups, the regression model was applied to the four major diagnostic groups to examine whether there were variations by diagnosis. Table 3 summarizes the data analytical procedures performed for each research question accordingly. All significance levels were set at 0.05.

IV. Results

Correlations between Identified Variables and FSCH

Lumbar Survey

Table 4 presents the correlations between the scores of lumbar survey at admission, at discharge, and FSCH. Overall, patients who had higher FS at admission also had higher FS at discharge ($r = 0.508$). Patients with larger FSCH were associated with lower FS at admission ($r = -0.294$) and higher FS at discharge ($r = 0.674$). This larger improvement is likely due to higher levels of FS at admission having a ceiling effect, resulting in it being harder to detect FSCH. All correlations were significant at 0.01 level.

Demographic Variables

Table 5 shows the correlations between the dependent variable (i.e., FSCH) and demographic variables. Age and acuity were found to have low, negative correlations ($r = -0.103$, $p \leq 0.001$; $r = -0.279$, $p \leq 0.001$, respectively) with FSCH, indicating that younger age and more acute symptoms are associated with larger improvement of functional status at discharge. Gender was found to have a weak, positive correlation ($r = 0.014$, $p \leq 0.001$).

Health Condition Variables

Table 6 shows the correlations between dependent variable and health condition variables. A weak, negative correlation was found between FSCH and FS at admission ($r = -0.294$, $p \leq 0.001$), number of comorbidities ($r = -0.113$, $p \leq 0.001$), number of surgeries ($r = -0.078$, $p \leq 0.001$), pain at worst ($r = -0.072$, $p \leq 0.001$) and pain within the last 24 hours ($r = -0.076$, $p \leq 0.001$). These results support that having higher FS at admission, more comorbidities and surgeries, greater pain at its worst and within the last 24 hours are associated with less improvement of functional status at discharge. A weak, positive correlation was found between FSCH and pain at best ($r = 0.028$, $p \leq 0.001$) and MOS admission score ($r = 0.063$, $p \leq 0.001$) indicating that lower pain at best and higher level of disability as measured by the MOS are associated with more improvement of functional status at discharge.

Biopsychosocial Variables

Table 7 shows the correlations between dependent variable and biopsychosocial variables. Weak, positive correlations were found between FSCH and SECS ($r = 0.124$, $p \leq 0.001$), SEPM ($r = 0.082$, $p \leq 0.001$), PDI ($r = 0.141$, $p \leq 0.001$), and the fear avoidance physical subscale ($p \leq 0.001$). These results imply that better ability to cope with symptoms and pain management, higher disability as measured by the PDI and more fear avoidance behaviors are associated with larger improvement of functional status at discharge. A weak, negative, non-statistically significant correlation was found between FSCH and SEPF ($r = -0.058$), indicating that SEPF is not a reliable predictor for FSCH at discharge.

Multiple Linear Regression

Demographic Variables

Table 8 lists the linear regression results with demographic variables as predictors and FSCH as the response variable. When utilizing the entire sample, age, gender and acuity were found to be good predictors of FSCH ($p \leq 0.05$). When examining by the four diagnostic groups, age and acuity remained good predictors within each ($p \leq 0.05$), while gender was not as consistent. Gender was found to remain a good predictor for spine pathology ($p = 0.012$) and muscle, tendon, soft tissue injures ($p = 0.045$), but was no longer a good predictor for fractures ($p = 0.492$) and sprains/strains ($p = 0.731$).

Health Condition Variables

Table 9 lists the linear regression results with health condition variables as predictors and FSCH as the response variable. All identified health condition variables were found to be good predictors of FSCH when utilizing the entire sample ($p \leq 0.05$). Admission FS was the only health condition variable found to remain a good predictor in all four major diagnostic groups ($p \leq 0.05$). Comorbidities remained a good predictor in spine pathology ($p < 0.001$), muscle, tendon and soft tissue injuries ($p < 0.001$), and sprains/strains ($p = 0.028$). Number of surgeries related to condition was a good predictor in spine pathology ($p < 0.001$) and muscle, tendon and soft tissue injuries ($p = 0.006$), while it was no longer a good predictor in fractures ($p = 0.842$) and sprains/strains ($p = 0.155$). Interestingly, when examining the three pain rating variables, pain at its best (over the past month) was the only variable found to be a good predictor of FSCH in any of the four diagnostic groups. Specifically, pain rating at its best over the past month was found to be a good predictor in muscle, tendon and soft tissue injuries ($p < 0.001$) and sprains/strains ($p = 0.009$), while it was no longer a good predictor in spine pathology ($p = 0.251$) and fractures ($p = 0.288$). Admission score for the MOS remained a good predictor in spine pathology ($p < 0.001$) and muscle, tendon, and soft tissue injuries ($p = 0.005$), while it was no longer a good predictor in fractures ($p = 0.355$) and sprains/strains ($p = 0.243$).

Biopsychosocial Variables

Table 10 lists the linear regression results with biopsychosocial condition variables as predictors and FSCH as the response variable. When utilizing the entire sample, none of the biopsychosocial variables were found to be a good predictor of FSCH ($p > 0.05$). This is believed to be due to the small sample size for many of the variables. Additionally, due to the small sample size, linear regression could not be performed by the four major diagnostic groups.

Multiple Linear Regression Model Summaries

Based on results from Tables 4-10, potential predictors of FSCH were compiled to create model equations to identify one that is the most parsimonious and would explain the greatest variance (Table 11). In the first model FSCH was adjusted for FS, acuity and MOS at admission. In the second model, FSCH was adjusted for FS, acuity, MOS and number of comorbidities. In the third model, FSCH was adjusted for FS, acuity, MOS, number of comorbidities and age. In the fourth model, FSCH was adjusted for FS, acuity, MOS, number of comorbidities, age and pain rating within 24 hours. In the fifth model FSCH was adjusted for FS, acuity, MOS, number of comorbidities, age, pain rating within 24 hours, pain at best, pain at worst, number of surgeries and gender. The multiple linear regression models revealed that FS at admission, acuity and MOS at admission are the most important variables for predicting FSCH ($p < 0.001$).

Based on these findings Model 1 was selected as the most parsimonious equation while explaining a majority of the variance. Model 1 was then applied to each of the four major diagnostic groups to determine its power of predictability (Table 12). Results found that the selected model was still statistically significant in predicting FSCH ($p \leq 0.05$) in all four diagnostic groups, however its explanation of variance varied by diagnoses.

V. Discussion

The purpose of this study was to determine patient characteristics that contribute to larger functional status improvement at discharge for patients with lumbar impairments seeking outpatient rehabilitation therapy, with a focus on demographic, health condition and biopsychosocial variables. Results found that age, acuity and FS at admission are good predictors of clinical outcomes in patients with lumbar impairments, regardless of diagnosis.

Similar to previous studies (Gregg et al, 2014; Jette & Jette, 1996; Deustcher et al, 2009; Hart et al, 2010; Karstens et al, 2013), results of this study found that a younger age and less chronic conditions are associated with better clinical outcomes. Results of this study also found that more comorbidities are associated with poorer clinical outcomes, supporting previous research (Hart et al, 2011; Hart et al, 2010; Jette & Jette, 1996). Similar to the literature, gender was a variable whose impact on clinical outcomes is questionable (Athiviraham et al, 2011; Selhorst et al, 2016; Jette & Jette, 1996).

Contrary to results shown in previous studies, our results found that having elevated fear-avoidance beliefs are associated with better clinical outcomes (Hart et al, 2011; Keeley et al, 2008; George et al, 2005; Werneke et al, 2009). However, the correlation was minimal ($r \leq 0.025$), therefore these results may not be reliable. This study also found that while several of these variables can be predictive of clinical outcomes, many of them are diagnosis dependent, requiring that diagnosis is considered when applying these findings. Also different from the literature, we chose to use FSCH as our outcome variable instead of FS scores at discharge. Our decision to use FSCH in place of FS scores at discharge was based on the fact clinical outcomes are often measured through minimally clinically important difference (MCID), or the amount of change required for a patient to notice a change, making us feel that the amount of change required to experience change was more relevant than just the participants overall score.

The main challenge of this study was the limited sample size in some biopsychosocial variables (e.g., only 719 patient reported SECS in this data set). Due to these small sample sizes resulting in these variables being found not significant in predicting clinical outcomes, it is possible that these results are not applicable to the clinical setting. This lack of generalizability is due to these variables being clinically important and relevant to patient outcomes, as they influence motivation and engagement in daily activities and therapy, therefore negating them would be negligent (Schwarzer, 2014).

Results of this study can be used in occupational therapy practice to educate clinicians on factors that could be limiting their patient's outcomes, providing more understanding and client-centered care. Practitioners can also use the derived equation to estimate how much FSCH the client should be expected to have, allowing them to use it as a guide for their treatment plan to achieve or exceed this value, as needed. Lastly, clinicians can use the items identified as difficult on the lumbar survey and MOS as goals for their patients.

The main limitation of this study is that it was a secondary data analysis, meaning the researchers had no control over data entry. This lack of control allowed opportunity for data entry error and missing variables. This study is also limited in generalizability as it is only applicable to clinics participating in FOTO. Additionally, insufficient responses to the biopsychosocial variables limited the ability to fully examine and understand their impact on clinical outcomes. Recall bias is also another limitation of this study as the data collection methods asked participants to recall and report relevant information (e.g., how the pain has limited their function in particular activities). Another limitation of this study is the use of

Spearman's correlation for nominal variables (e.g., gender), as this type of correlation is inappropriate for these variable types and may have skewed the results for these variables. Lastly, some of the data collection tools used by FOTO lack evidence supporting validity and reliability, consequently limiting the validity and reliability of the data collected from these tools.

To increase generalizability, future studies should complete this study outside of the FOTO clinics. These results should be further examined by more lumbar impairment diagnostic groups than those identified here. Future research should also include a larger sample size for biopsychosocial variables to examine their influence on clinical outcome. Additionally, future studies should continue to examine the impact of gender of clinical outcomes to allow for a consensus to be reached. Lastly, future research should examine the reliability and validity of the tools created by FOTO to strengthen the findings of this study.

TABLES AND FIGURES

Table 1. Literature Review Summary of Factors that Influence Clinical Outcome for Lumbar Impairments

Author	Sample Diagnosis	Outcome Assessment	Positively associated with outcome Statistically Significant	Negatively associated with outcome Statistically Significant	Not good predictor of outcome
Fritz et al (2010)	Adolescence with LBP n = 58	m-ODQ NPR		LBP injury sustained as a result of sport participation	
Gregg et al (2014)	Consecutive LBP n = 1076	NPR m-LBOS Patient report of work status	Shorter pain duration Younger age Lower baseline pain Directional preference for extension activities History of spine Surgery		Baseline function
Selhorst et al (2016)	Adolescence athletes with Acute spondylosis injury n = 198	Medical chart review at discharge MFS Modified Odom Criteria		Female Gender Multilevel injury Adverse reaction during care	Bracing Laterality of injury Duration of symptoms Previous episodes of LBP Compliance
Hart et al (2011)	Adults with lumbar spine syndromes n = 323	Patient self-report of FS CAT Single item instrument for fear avoidance, somatization and depression	Not elevated FAB of work activities Not elevated somatization Higher FS intake Improvement in pain intensity Fewer comorbidities	Elevated level of FAB, somatization and depression	

Deustscher et al (2009)	Adult with lumbar spine impairments n = 22,019	FS at discharge	Higher FS intake Acute condition Payer More compliance	Older age Chronic condition Greater use of antidepressants Lack of physical activity before onset	High BMI
Hart et al (2010)	Adults with lumbar impairments n = 17,439	Lumbar CAT		Older age More chronic symptoms More surgeries More comorbidities Lack of exercise prior to rehabilitation	
Keeley et al (2008)	Patients with LBP ≥ 6 months n = 180	HADS FAQB LEDS SF-36		Higher levels of social stresses related to back pain (r = -0.64) Higher level of depression (r = -.35) Higher levels of anxiety (r = -0.38) More FAB relating to work (r = -0.43)	Social stresses independent of back pain
Werneke (2008)	Adults with low back syndromes n = 316	CAT		Non-centralization	
George at al (2005)	Adults with duration of LBP for present episode less than 60 days n = 28	ODQ FABQ-W		Non-centralization (β= -10.0) Elevated fear-avoidance beliefs (β= 0.34)	

Athiviraham et al (2011)	Patients with symptomatic lumbar stenosis n = 94	Roland-Morris Questionnaire	More pre-operative disability	Higher BMI History of psychiatric disorders	Age Gender Cardiovascular or musculoskeletal comorbidities Duration of symptoms for more than 1 year Multiple-level decompression Spinal fusion History of neurogenic claudication Symptomatic lumbrosacral extension Subjective numbness or weakness Objective decrease in sensation or reflex abnormalities
Jette & Jette (1996)	Patients with lumbar impairments n = 739	SF-36 ODQ NDI	Younger age Less comorbidities No depression Not off work Female Gender	An income in the range of $15,000 – 25,000 Depressed	
Werneke et al (2009)	Patients with low back syndrome n = 238	CAT Patient report of pain intensity	Centralization, regardless of level of fear	Non-centralization High fear-avoidance	
Karjalainen et al (2003)	Patients with subacute daily LBP n = 164	Patient report 15D ODQ		Older age Higher pain intensity	

Karstens at al (2013)	Patients with thoracic or LBP n = 792	m-MFA	Being a white-collar worked (β= -0.141) Physically active (β= -0.107)	Higher impairment in daily life before therapy (β= 0.213) Older age (β= 0.111) At least one mental disorder (β= 0.202) Longer duration of complaints (β= 0.192) Having RA (β= 0.141) Poor self-prognosis on work abilities in 2 years (β= -0.116)	BMI

LBP= Low Back Pain; m-ODQ= Modified Oswestry Low Back Pain Disability Questionnaire; NPR= Numeric Pain Rating; m-LBOS= Modified Low Back Outcome Score Functional Questionnaire; MFS= Micheli Functional Scale; FAB= Fear-avoidance Beliefs; CAT= Computerized Adaptive Test; FS= Functional Status; HADS= Hospital Anxiety and Depression Scale; FABQ= Fear-Avoidance Beliefs Questionnaire; LEDS= Life Events and Difficulties Schedule; SF-36 PCS= Short-Form Health Survey Physical Component Score; 15D= health related quality of life; ODQ= Oswestry Disability Questionnaire; m-MFA= modified Musculoskeletal Functional Assessment; RA= Rheumatoid Arthritis

Table 2: Patient Characteristics

Variable	N	Mean (SD), Min, Max
N Total	221,168	
Age (years)	221,168	56.8 (16.3), 18, 84
FSCH	221,168	14.3 (14.8), - 71.2, 97.2
	N	%
Age Groups		
18-44 years old	53,044	24.0
45-64 years old	80,739	36.5
≥ 65 years old	87,387	39.5
Symptom Acuity		
Acute (< 22 days)	40,963	18.5
Subacute (22 – 90 days)	51,971	23.5
Chronic (> 90 days)	128,002	57.9
Missing	214	0.1
Gender		
Male	88,786	40.1
Female	132,382	59.9
Comorbidities		
None	16,877	7.6
1 to 3	86,175	39.0
4 to 6	70,181	31.7
7 or more	47,935	21.7
Surgeries		
1 to 3	214,331	96.9
4 or more	6,686	3.0
Missing	155	0.1
Impairments		
Spine Pathology	65,793	29.7
Muscle, tendon + soft tissue disorders	39,965	18.1
Fractures	572	0.3
Sprains and Strains	10,245	4.6
Others	18,981	8.6
Missing	85,612	38.7

SD=standard deviation; min=minimum; max=maximum; FSCH= Functional status change (FSCH) at discharge

Table 3. Summary of Data Analytical Procedures

	All variables	Research Q1	Research Q2	Research Q3	Research Q4	Research Q5	Research Q6
Lumbar Survey Scores	1. Score at admission	Correlation analysis	1. Score at admission	1. Score at admission	1. Score at admission	1. Score at admission	ML*
	2. Score at discharge		2. Score at discharge	2. Score at discharge	2. Score at discharge	2. Score at discharge	
	3. FSCH (dependent variable)		3. FSCH (dependent variable)	3. FSCH (dependent variable)	3. FSCH (dependent variable)	3. FSCH (dependent variable)	
Demographic Variables	1. Age		1. Age			1. Age	
	2. Gender		2. Gender			2. Gender	
	3. Symptom Acuity		3. Symptom Acuity			3. Symptom Acuity	
Health Condition Variables	1. Comorbidities			1. Comorbidities		1. Comorbidities	
	2. # of Surgeries			2. # of Surgeries		2. # of Surgeries	
	3. Lumbar Survey FS scores at admission			3. Lumbar Survey FS scores at admission		3. Lumbar Survey FS scores at admission	
	4. 11-pt Pain Scale			4. 11-pt Pain Scale		4. 11-pt Pain Scale	

S	5. Modified Oswestry Low Back Pain Disability Questionnaire at admission			5. Modified Oswestry Low Back Pain Disability Questionnaire at admission		5. Modified Oswestry Low Back Pain Disability Questionnaire at admission	
Biopsychosocial Variables	1. Self-efficacy for Coping with Symptoms				1. Self-efficacy for Coping with Symptoms	1. Self-efficacy for Coping with Symptoms	
	2. Pain Disability Index Survey				2. Pain Disability Index Survey	2. Pain Disability Index Survey	
	3. Fear of Avoidance Physical Subscale				3. Fear of Avoidance Physical Subscale	3. Fear of Avoidance Physical Subscale	

* Research Question 6: We will apply the final selected independent variables to predict the dependent variables (i.e., FSCH) for each diagnostic group: (1) spine pathology, (2) muscle, tendon and soft tissues, (3) fractures and (4) sprains and strains.

Table 4: Correlations between FSCH and Lumbar Survey Scores.

Variables	FSCH (Dependent Variable)	FS at Admission	FS at Discharge
FSCH (Dependent Variable) n = 221,168	1	-	-
FS at Admission n = 221,168	- 0.294	1	-
FS at Discharge n = 221,168	0.674	0.508	1

FSCH= Functional status (FS) change score (FS score at discharge – FS at admission); FS score at admission= Lumbar Survey score at admission 0-100; FS at Discharge= Lumbar Survey score at discharge 0-100. All correlations are significant at the 0.01 level (2-tailed).

Table 5: Correlations between FSCH and Demographic Variables

Variables	FSCH (Dependent Variable)	Age	Gender	Acuity
FSCH (Dependent Variable) n = 221,168	1	-	-	-
Age (years) n = 221,168	- 0.103	1	-	-
Gender n = 221,168	0.014	- 0.023	1	-
Acuity (Days since condition onset) n = 220,954	- 0.279	0.075	- 0.029	1

FSCH= Functional status (FS) change score (FS score at discharge – FS at admission); All correlations are significant at the 0.01 level (2-tailed).

Table 6: Correlations between FSCH and Health Condition Variables

Variables	FSCH (Dependent Variable)	FS at Admission	# Comorbidities	# Surgeries related to condition	Pain at Best	Pain at its Worst	Pain within last 24 hours	Admission MOS
FSCH (Dependent Variable) n = 221,168	1	-	-	-	-	-	-	-
FS at Admission n = 221,168	- 0.294	1	-	-	-	-	-	
# Comorbidities n = 221,168	- 0.113	- 0.251	1	-	-	-	-	-
# Surgeries related to condition n = 221,014	- 0.078	- 0.156	0.152	1	-	-	-	-
Pain at Best n = 36,779	0.028	0.315	- 0.079	- 0.040	1		-	-
Pain at Worst n = 36,779	- 0.072	0.366	- 0.153	- 0.025	0.349	1	-	-
Pain within last 24 hours n = 36,780	- 0.076	0.534	- 0.178	- 0.035	0.446	0.495	1	-
Admission MOS n = 14,908	0.063	- 0.748	0.327	0.156	- 0.354	- 0.394	- 0.511	1

FSCH= Functional status (FS) change score (FS score at discharge – FS at admission); FS score at admission= Lumbar Survey score at admission 0-100; # Comorbidities = the number of simultaneous health conditions; Pain at Best= Pain rating for the best the pain has been, over the past month, on a scale of 1-11; Pain at Worst= Pain rating for the worst the pain has been, over the past month, on a scale of 1-11; Pain within last 24 hours= Pain rating for the pain experience over the last 24 hours, on a scale of 0-11; Admission MOS= Admission score for the Modified Oswestry Low Back Pain Disability Questionnaire, 0-100. All correlations are significant at the 0.01 level (2-tailed).

Table 7: Correlations between FSCH and Biopsychosocial Variables

Variables	FSCH (Dependent Variable)	SECS	SEPM	SEPF	PDI	Fear Physical: Physical activity may harm me	Fear Physical: I cannot do physical activities which (might) make my pain worse	Fear Physical: I should not do physical activities which (might) make my pain worse
FSCH (Dependent Variable) n = 221,168	1	-	-	-	-	-	-	-
SECS n = 719	0.124*	1	-	-	-	-	-	-
SEPM n = 2,726	0.082*	0.660*	1	-	-	-	-	-
SEPF n = 1,086	- 0.058	0.684*	0.549*	1	-	-	-	-
PDI n =943	0.141*	0.010	- 0.204	- 0.604	1	-	-	-
Fear Physical: Physical activity may harm me n = 115,398	0.012*	- 0.275*	- 0.202*	- 0.310*	0.244*	1	-	-
Fear Physical: I cannot do physical activities which (might) make my pain worse n = 115,402	0.024*	- 0.175*	- 0.080*	- 0.232*	0.218*	0.392*	1	-
Fear Physical: I should not do physical activities which (might) make my pain worse n = 221,160	0.024*	- 0.099*	- 0.082*	- 0.195*	0.162*	0.246*	0.370*	1

FSCH= Functional status (FS) change score (FS score at discharge – FS at admission); SECS= Self-efficacy for Coping with Symptoms score at admission; SEPM= Self-efficacy for Pain Management at admission; SEPF= Self-efficacy for Physical Function at admission; PDI= Pain Disability Index Survey score at admission. *Correlation is significant at the 0.01 level (2-tailed).

Table 8: Linear Regression of Demographic Variables by Diagnostic Groups, in regard to FSCH

	Entire Sample n = 221,168		Spine Pathology n = 65,793		Muscle, Tendon, Soft Tissue Injuries n = 39,965		Fractures n = 572		Sprains/Strains n = 10,245	
Variable	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.
(Constant)	30.989	< 0.001	31.541	< 0.001	31.160	< 0.001	35.543	< 0.001	31.312	< 0.001
Age (Years) n = 221,168	- 0.075	< 0.001	- 0.075	< 0.001	- 0.082	< 0.001	- 0.106	0.006	- 0.058	< 0.001
Gender n = 221,168	0.121	0.049	0.279	0.012	0.296	0.045	- 0.886	0.492	0.105	0.731
Acuity (Days since condition onset) n = 221,168	- 5.190	< 0.001	- 0.071	< 0.001	- 5.243	< 0.001	- 5.868	< 0.001	- 5.933	< 0.001

Sig.= significance value; set at p = 0.05.

Table 9: Linear Regression of Health Condition Variables by Diagnostic Groups, in regard to FSCH

	Entire Sample n = 221,168		Spine Pathology n = 65,793		Muscle, Tendon, Soft Tissue Injuries n = 39,965		Fractures n = 572		Sprains/Strains n = 10,245	
Variable	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.
(Constant)	52.236	< 0.001	54.771	< 0.001	54.826	< 0.001	109.009	0.031	59.534	< 0.001
FS at Admission n =221,168	- 0.628	< 0.001	- 0.582	< 0.001	- 0.684	< 0.001	- 1.698	0.002	- 0.694	< 0.001
# Comorbidities n = 221,168	- 0.594	< 0.001	- 0.661	< 0.001	- 0.904	< 0.001	- 1.077	0.471	- 1.207	0.028
# Surgeries related to conditions n = 221,014	- 2.134	< 0.001	- 2.193	< 0.001	- 2.570	0.006	- 1.167	0.842	- 8.473	0.155
Pain at Best n = 36,779	0.554	< 0.001	0.251	0.106	1.077	< 0.001	1.917	0.288	1.407	0.009
Pain at Worst n = 36,779	- 0.474	< 0.001	- 0.240	0.256	- 0.494	0.188	- 2.163	0.358	- 1.239	0.063
Pain within last 24 hours n = 36,780	0.361	0.003	0.100	0.591	0.142	0.700	0.801	0.733	0.659	0.404
Admission MOS n = 14,908	- 0.179	< 0.001	- 0.210	< 0.001	- 0.167	0.005	- 0.513	0.355	- 0.143	0.243

Comorbidities = the number of simultaneous health conditions; Pain at Best= Pain rating for the best the pain has been, over the past month, on a scale of 1-11; Pain at Worst= Pain rating for the worst the pain has been, over the past month, on a scale of 1-11; Pain within last 24 hours= Pain rating for the pain experience over the last 24 hours, on a scale of 1-11; Admission MOS= Admission score for the Modified Oswestry Low Back Pain Disability Questionnaire, 0-100. Sig.= significance value; set at p = 0.05.

Table 10: Linear Regression of Biopsychosocial Variables Utilizing Entire Sample, in regard to FSCH

	Entire Sample n = 221,168	
Variable	*B*	Sig.
(Constant)	- 84.039	0.494
SECS n = 719	0.139	0.793
SEPM n = 2,726	0.476	0.458
PDI n =943	0.074	0.943
Fear Physical: Physical activity may harm me n = 115,398	11.178	0.539
Fear Physical: I cannot do physical activities which (might) make my pain worse n = 115,402	1.273	0.937
Fear Physical: I should not do physical activities which (might) make my pain worse n = 221,160	10.911	0.496

SECS= Self-efficacy for Coping with Symptoms score at admission; SEPM= Self-efficacy for Pain Management at admission; SEPF= Self-efficacy for Physical Function at admission; PDI= Pain Disability Index Survey score at admission. Sig.= significance value; set at p = 0.05.

Table 11: Linear Regression Model Summaries Utilizing Entire Sample

	Model 1		Model 2		Model 3		Model 4		Model 5	
Predictor Variable	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.
(Constant)	62.082	< 0.001	63.425	< 0.001	67.083	< 0.001	68.063	< 0.001	66.832	< 0.001
FS at Admission	- 0.562	< 0.001	- 0.577	< 0.001	- 0.576	< 0.001	- 0.598	< 0.001	- 0.611	< 0.001
Acuity (Days since onset)	- 5.047	< 0.001	- 4.719	< 0.001	- 4.680	< 0.001	- 5.267	< 0.001	- 4.976	< 0.001
Admission MOS	- 0.261	< 0.001	- 0.240	< 0.001	- 0.245	< 0.001	- 0.210	< 0.001	- 0.198	< 0.001
# Comorbidities			- 0.481	< 0.001	- 0.366	< 0.001	- 0.247	< 0.001	- 0.259	< 0.001
Age (years)					- 0.073	< 0.001	- 0.089	< 0.001	- 0.078	< 0.001
Pain within 24 Hours							0.362	< 0.001	0.326	0.005
Pain at Best									0.471	< 0.001
Pain at Worst									- 0.301	0.017
# Surgeries									- 1.326	< 0.001
Gender									- 0.775	0.062
R	0.436		0.447		0.454		0.453		0.465	
R2	0.190		0.200		0.206		0.205		0.217	
Adjusted R2	0.190		0.200		0.206		0.204		0.215	
F	1166.605		930.521		773.654		184.049		118.154	
Sig.	< 0.001		< 0.001		< 0.001		< 0.001		< 0.001	

FS score at admission= Lumbar Survey score at admission 0-100; # Comorbidities = the number of simultaneous health conditions; Pain within last 24 hours= Pain rating for the pain experience over the last 24 hours, on a scale of 1-11; Pain at Best= Pain rating for the best the pain has been, over the past month, on a scale of 1-11; Pain at Worst= Pain rating for the worst the pain has been, over the past month, on a scale of 1-11; Admission MOS= Admission score for the Modified Oswestry Low Back Pain Disability Questionnaire, 0-100. Sig.= significance value; set at p = 0.05.

Table 12: Summary of Model 1 by Diagnostic Groups

	Spine Pathology n = 65,793		Muscle, Tendon, Soft Tissue Injuries n = 39,965		Fractures n = 572		Sprains/Strains n = 10,245	
Predictor Variable	*B*	Sig.	*B*	Sig.	*B*	Sig.	*B*	Sig.
(Constant)	61.926	< 0.001	66.050	< 0.001	102.878	< 0.001	70.248	< 0.001
FS at Admission	- 0.524	< 0.001	- 0.616	< 0.001	- 1.412	< 0.001	- 0.616	< 0.001
Acuity (Days since onset)	- 5.625	< 0.001	- 5.605	< 0.001	1.537	0.656	- 5.621	< 0.001
Admission MOS	- 0.257	< 0.001	- 0.234	< 0.001	- 0.632	0.003	- 0.335	< 0.001
R	0.430		0.463		0.742		0.423	
R2	0.185		0.215		0.551		0.179	
Adjusted R2	0.185		0.213		0.516		0.172	
F	394.751		150.235		15.556		24.905	
Sig.	< 0.001		< 0.001		< 0.001		< 0.001	

FS score at admission= Lumbar Survey score at admission 0-100; Admission MOS= Admission score for the Modified Oswestry Low Back Pain Disability Questionnaire, 0-100. Sig.= significance value; set at p = 0.05.

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Appendix
Question Bank for the Lumbar Survey

1. Does or would your back problem limit: BATHING or DRESSING?
2. Does or would your back problem limit: Getting in and out of BED?
3. Today, because of your back problem, do you or would you have any difficulty at all bending or stooping?
4. Does or would your back problem limit: WALKING several BLOCKS?
5. Today, because of your back problem, do you or would you have any difficulty at all lifting a box of groceries from the floor?
6. Because of your back, how much difficulty do you have using a broom?
7. Does or would your back problem limit: Getting in and out of a CHAIR?
8. Does or would your back problem limit: Attending SOCIAL EVENTS?
9. Today, because of your back problem, do you or would you have any difficulty at all driving for 1 hour?
10. Because of your back, how much difficulty do you have getting down to and up from the floor?
11. Does or would your back problem limit: WALKING around a room?
12. Today, because of your back problem, do you or would you have any difficulty at all performing heavy activities around your home?
13. Today, because of your back problem, do you or would you have any difficulty at all performing your usual hobbies, recreational or sporting activities?
14. Does or would your back problem limit: LIFTING or CARRYING items like groceries?
15. Does or would your back problem limit: LIFTING OVERHEAD to a cabinet?

16. Does or would your back problem limit: MODERATE ACTIVITIES like moving a table, pushing a vacuum cleaner, bowling, or playing golf?
17. Does or would your back problem limit: WALKING one BLOCK?
18. Because of your back, how much difficulty do you have changing positions quickly like sitting to standing?
19. Today, because of your back problem, do you or would you have any difficulty at all going up or down 2 flights of stairs (about 20 stairs)?
20. Today, because of your back problem, do you or would you have any difficulty at all putting on your shoes or socks?
21. Does or would your back problem limit: Participating in RECREATION?
22. Does or would your back problem limit: Climbing several flights of STAIRS?
23. Today, because of your back problem, do you or would you have any difficulty at all standing for 1 hour?
24. Does or would your back problem limit: Going on VACATION?
25. Does or would your back problem limit: VIGOROUS ACTIVITIES like running, lifting heavy objects, participating in strenuous sports?
26. Does or would your back problem limit: WALKING more than a Mile?
27. Today, because of your back problem, do you or would you have any difficulty at all performing any of your usual work, housework, or school activities?
28. Does or would your back problem limit: Climbing one flight of STAIRS?