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The Relationship Between Life Purpose with Depression and Disability in Acute Low Back Pain Patients

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Abstract

Background—Life purpose in acute low back pain patients is not well described in published literature.

Methods/Purpose—We used linear regression models to describe the relationship of life purpose with perceived functional disability and depression in persons with acute low back pain ($N=42$) participating in a randomized clinical trial to prevent transition to chronic low-back pain.

Results—In our predominantly female sample (81.8%) with a mean age of 53 years (standard deviation = 11.6 years), 52% worked full-time. Adjusting for age, gender and working status, life purpose was a significant correlate of depression ($p = .007$). For every 10-unit increase in life purpose score, the estimated depression score decreased by almost 2.5 points. A significant relationship between life purpose and perceived functional disability was not identified.

Conclusion—Life purpose likely is a modifiable risk factor for depression in acute low back pain patients.

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Background

Low back pain (LBP) has a widespread impact on industrialized nations, with 67% to 84% of their populations reporting a history of this condition (Fourney et al., 2011). For those affected, LBP can have an immense economic impact as well as an influence on patient function. Specifically, LBP is responsible for more lost workdays and disability claims than any other health condition, with an estimated 2% of the workforce reporting a lower back injury (Dagenais, Caro, & Haldeman, 2008; Luo, Pietrobon, Sun, Liu, & Hey, 2004). A large portion of healthcare industry resources are used to treat LBP as evidenced by reported annual US treatment costs of \$90 billion (Dagenais et al., 2008; Luo et al., 2004). An estimated 24% of persons with acute LBP will transition to chronic LBP, contributing to long-term functional disability and healthcare costs (Chou et al., 2007; Fransen et al., 2002; Hubscher, Moloney, Rebbeck, Traeger, & Refshauge, 2014). Identifying factors impacting the transition from acute to chronic LBP will improve long term negative outcomes, both economically and personally.

Life purpose (also termed *purpose in life* or *meaning in life*) has been defined as “believing one’s actions have a set place in the larger order of things and that one’s behavior fits naturally into the course of a larger, more important social whole” (Hodges, 2009; Krause, 2004). Although we could not identify published articles reporting the relationship between acute LBP and life purpose, the published literature on life purpose in patients with chronic pain suggests that people with increased life purpose had less depression and anxiety, improved self-acceptance, and more social connectedness, among other important health outcomes (Dezutter, Luyckx, & Wachholtz, 2015; Plach, Heidrich, & Waite, 2003; Salt, Segerstrom, & Crofford, 2016; Schleicher et al., 2005; Smith & Zautra, 2004). Research suggests that persons with increased life purpose are better able to habituate or acclimate to heat and cold, which is important because the lack of habituation has been associated with the development of chronic pain (Smith et al., 2009). As such, life purpose may hold particular value in preventing and treating chronic pain conditions; yet currently there is little information on the impact of life purpose in those with acute LBP.

Life purpose is a construct valued by patients (e.g., a Google market-driven search identified 49 million website on the topic). Self-help books on chronic pain often address life purpose, highlighting its importance to patients. Aside from popular interest in the subject, a recent Lancet article reported that people with a heightened sense of life purpose had a 30% improvement in survival compared to those with lower levels (Steptoe, Deaton, & Stone, 2015). Patient-centered care, defined by the Institute of Medicine as “providing care that is respectful of, and responsive to, individual patient preferences, needs and values, and ensuring that patient values guide all clinical decisions”(Institute of Medicine), requires provider and healthcare system attention to constructs such as life purpose because it is highly regarded by patients.

Although the literature is not extensive, associations between depression and perceived functional disability have been identified. Grotle et al. (2005) found that anxiety and depression were significant predictors of the inability of patients to recover from perceived functional disability in a sample of 123 acute LBP patients [pain > 3 months; odds ratio

(OR) = 4.14; $p = .01$]. These findings highlight the important relationship between depression and perceived functional disability in persons with acute LBP.

In efforts to further the understanding of the construct of life purpose in patients with acute LBP, this study will describe the relationship between life purpose and depression and perceived functional disability in this patient population.

Methods

Design

This study used cross sectional, baseline data from a randomized clinical trial.

Sample

We recruited 44 persons who were: 1) 18 years of age or older, 2) being treated for health care provider diagnosed acute LBP (≤ 3 months) and 3) had access to a telephone. Persons who were found to have a cognitive impairment as determined by the MiniCog test (Borson, Scanlan, Brush, Vitaliano, & Dokmak, 2000), intention to harm themselves or another (*Center for Epidemiological Depression Scale* [CES-D])(Radloff, 1977), or a current substance abuse (*Cutdown, Annoyed, Guilty, and Eye-opener* [CAGE] and CAGE - *Adapted to Include Drugs* [CAGE-AID])(Brown & Rounds, 1995; Ewing, 1984) were excluded. Participants were recruited from ambulatory care clinics (Women's Health, Family Medicine, Internal Medicine, and Urgent Treatment) at a large university health care system in Lexington, KY and using health registries (Kentucky Women's Health Registry and ResearchMatch[®]) (University of Kentucky, 2007; Vanderbilt University, 2017).

Measures

Pain Intensity was measured by summing 4 items (12–15) on the *Wisconsin Brief Pain Inventory* (BPI; Cronbach $\alpha = .85$)(Daut, Cleeland, & Flanery, 1983) which uses an 11-point Likert-type scale (pain intensity: 0 = *no pain* – 10 = *pain as bad as you can imagine*; scale score range 0 – 44). There is evidence to support concurrent validity with other pain instruments (Daut et al., 1983). Cronbach's alpha for this sample was 0.90.

Perceived functional disability, defined as an individual's perception of their activity limitations caused by their pain, was measured with the 24-item *Roland-Morris Disability Scale* (Stroud, McKnight, & Jensen, 2004). A strong correlation has been reported between the 11-item and 24-item versions ($r = .93$; Cronbach's $\alpha = .84$; scale score range = 0 – 24) (Stroud et al., 2004). Cronbach's alpha for this sample was 0.86.

Depressive symptoms were measured using the CES-D, a 20-item scale using a 4-point Likert-type scale (0 = *rarely or less than one day* – 3 = *most of the time or 5 – 7 days*; scale score range: 0 – 60; Cronbach's $\alpha = .89$) (Radloff, 1977). More depressive symptoms are associated with higher scores and a score of ≥ 19 identifies a clinically depressed person (Julian et al., 2011; Radloff, 1977; Turk, Okifuji, & Scharff, 1995). Cronbach's alpha for this sample was 0.83.

Life purpose was measured using the *Purpose in Life* subscale (Cronbach's $\alpha = .86$ in study sample) of the 84-item *Scales of Psychological Well-Being (SPWB)* (Ryff & Keyes, 1995) (e.g., *I have a sense of direction and purpose in life*). The SPWB uses a 6-point Likert-type scale (6 = *strong disagree* – 1 = *strongly agree*; Cronbach's $\alpha = .86$ –.93 [6 subscales]) and a total score is calculated; a lower score identifies persons with increased well-being (range = 14 – 84) (Ryff & Keyes, 1995). Cronbach's alpha for this sample was 0.86. Evidence of concurrent validity has been demonstrated with correlations with various measures including life satisfaction (correlation of life purpose subscale with life satisfaction scale .59). (Ryff, 1989)

Demographic Information—We also collected demographic information on age, gender, and work status (working full-time or not working full time).

Data Analysis

Data were summarized using descriptive statistics, including means and standard deviations or frequency distributions, as appropriate. Pearson's correlation coefficients summarized associations between continuous study variables. Two linear regression models were used to test whether life purpose predicted disability or depression. Age, gender and working status (full time versus not full-time) were included as covariates in each model. Variance inflation factors were used to check for multicollinearity. For these data analyses, SAS version 9.3 was used with an alpha level of .05.

Results

Although 44 participants were recruited to the RCT, life purpose data was not available for two patients due to incomplete data; therefore, the sample size for this study was 42. The average age of participants was 53.6 years (SD = 11.2; see Table 1) and the majority were female (81%). Approximately half (55%) reported working full-time. The average score for the life purpose subscale was 69.8 (SD = 10.0; potential range 14 – 84), indicating patients believed their actions played an important role in the social whole (Hodges, 2009; Krause, 2004). Participants reported experiencing limitations due to their pain on an average of 7.5 activities of the 24 presented on the perceived functional disability questionnaire (SD = 4.8). In general, the sample reported fewer depressive symptoms ($M = 8.0$; $SD = 5.5$) in comparison to the potential score range of 0–60.

Table 2 displays correlations among continuous study variables. A significant positive correlation was identified between perceived functional disability and pain intensity, such that persons with more pain also had higher perceived functional disability scores ($r = .73$; $p < .0001$). A significant negative correlation was identified between life purpose and depressive symptoms, suggesting that persons with higher life purpose scores were less likely to have depressive symptoms ($r = -.38$; $p = .01$). Seven percent of the sample had a depression score 19.

The overall linear regression model for perceived functional disability was significant ($F = 3.3$, $p = .022$; $R^2 = 0.26$). Yet, controlling for age, gender and working status, life purpose was not a significant predictor of perceived functional disability level (see Table 3). The only

variable significantly associated with perceived functional disability was gender; females reported significantly lower perceived functional disability scores (on the order of almost 5 points) compared to males ($\beta = -4.58$; $SE = 1.77$; $p = .014$).

The overall linear regression model for depression was significant ($F = 2.6$, $p = .050$; $R^2 = 0.22$). Adjusting for age, gender and working status, life purpose was a significant predictor of depression ($p = .007$). For every 10-unit increase in life purpose score, the estimated depression score decreased by almost 2.5 points ($\beta = -0.24$; $SE = .08$). Age, gender and working status were not related to depression in this sample. For both models, all variance inflation factors were less than 1.1, indicating multicollinearity was not distorting parameter estimates.

Discussion

Findings from this study suggest that patients with acute LBP who had higher life purpose were less likely to be depressed. These findings are supported by prior research in chronic pain patients (Dezutter et al., 2015; Plach et al., 2003; Salt et al., 2016; Schleicher et al., 2005; Smith & Zautra, 2004). Because depression and chronic pain are common concomitant conditions, factors that could modify depression during the acute pain period could impact transition to chronic pain states (National Institute of Mental Health, 2017). Treatments targeting perceptions of life purpose could be novel directions in acute pain management. For example, approaches used to improve life purpose in the acute pain period could decrease depressive symptoms and other negative pain sequela such as sleep disturbance and suicidal risk (National Clearinghouse Guidelines, 2014).

Despite prior research suggesting that depression and perceived functional disability are associated in acute LBP patients (Grotle et al., 2005) and a relationship between depression and life purpose in this sample, our study did not identify a relationship between perceived functional disability and life purpose. A number of factors could have contributed to this finding. First, it is expected that disability would be lessened in a sample of acute LBP patients when compared to chronic LBP patients. The mean disability score was fairly low a 7.5 with a range of 0–18 (scale score range 0–24). Second, we used cross sectional data. Because functional disability likely develops as a result of prolonged pain, longitudinal data during the acute pain period would be a better representation of functional disability and should be an aim of future research. We did identify gender as factor affecting disability. Females were shown to have lower disability scores than males which is congruent with previous research (Rovner et al., 2017). Gender may play a role in differing patient functional outcomes, however, this does not necessarily mean that there is a gender difference in symptomology for acute LBP (Rovner et al., 2017). As previously discussed, when pain levels are equivalent women tended to have higher activity levels than men (Rovner et al., 2017). Therefore, women may be more likely to have lower disability scores when disability is defined by functional capacity. Similarly, gender differences in pain and disability have been described in prior research and thus our rationale for controlling for this variable during analysis. (Walker et al., 2016) Thus, the current study supports that gender may be a valuable modifying variable to consider for both clinical researchers and clinical practitioners in attempts to improve disability in pain populations.

This study has a number of limitations. To begin, cross sectional data from a randomized clinical trial was used during data analysis; thus, causal inferences cannot be made. Second, the sample size was relatively small and homogenous. Specifically, our sample included predominantly female participants from one geographic region. Study findings should be validated in a larger and more diverse sample. This study identifies a relationship undescribed in prior research, thus, providing an innovative direction for future research such. Specifically, clinical trials investigating strategies to improve life purpose and its effect on psychosocial outcomes and function in acute and chronic pain patients are needed.

Conclusion

Findings from this study suggest that life purpose has a significant association with depression in this sample of persons with acute LBP which is previously undescribed in the identified published literature. A furthered understanding of the relationship between life purpose and depression could improve this important health factor in this population.

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Table 1

Descriptive summary of study variables (*N*=42)

	Mean ± SD; range or n (%)	Potential range
Age	53.6 ± 11.2; 30–75	
Gender		
Male	8 (19%)	
Female	34 (81%)	
Work status		
Full-time	23 (55%)	
Not working full-time	19 (45%)	
Life purpose	69.8 ± 10.0; 45–84	14–84
Disability	7.5 ± 4.8; 0–18	0–24
Depression	8.0 ± 5.5; 0 – 22	0–60

Table 2Correlations between variables (N = 42[±]).

	Pain intensity	Disability	Depressive symptoms	Life purpose	Age
Pain intensity	-				
Disability	0.73**	-			
Depressive symptoms	0.12	0.03	-		
Life purpose	-0.30	-0.29	-0.38*	-	
Age	-0.02	0.22	-0.23	-0.08	-

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at < 0.001 level (2-tailed).

[±]Numbers vary due to sporadically missing data.

Linear regression modeling life purpose and disability and depression in patients with acute low back pain. ($N = 42$)

Table 3

	Disability			Depression		
	Estimated beta (SE)	Standardized beta	<i>p</i>	Estimated beta (SE)	Standardized beta	<i>p</i>
Age	0.07 (0.06)	0.17	.26	-0.08 (0.07)	-0.15	.31
Female gender	-4.58 (1.77)	-0.38	.014	3.24 (2.10)	0.23	.13
Working full-time	-1.59 (1.36)	-0.17	.25	-1.31 (1.61)	-0.12	.42
Life purpose	-0.09 (0.07)	-0.18	.23	-0.24 (0.08)	-0.43	.007