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Fear Avoidance Beliefs Predict Disability in Older Adults with Chronic Low Back Pain

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Abstract

Objectives—To determine whether fear avoidance beliefs (FAB) in older adults with chronic low back pain (CLBP) is significantly associated with gait speed and/or self-report (Roland Morris Questionnaire, RMQ)

Design—Cross-sectional analysis

Setting—Academic Medical Center (single site)

Participants—Two-hundred English-speaking participants aged 65 and older with CLBP every day or almost every day of moderate intensity for 3 months.

Measurements—The physical activity portion of the FAB questionnaire assessed fear avoidance beliefs. Disability was measured with gait speed and the RMQ. Covariates measured included age, gender, BMI, chronic disease (Cumulative Illness Rating Scale-CIRS), depression (Geriatric Depression Scale-GDS), and pain (McGill Pain Questionnaire short form-MPQ.)

Results—Fear avoidance beliefs were significantly associated with the RMQ ($p < .0001$) and gait speed ($p = .002$) after controlling for all covariates.

Conclusion—Fear avoidance beliefs related to physical activity in older adults with CLBP were significantly associated with both self-reported and performance-based disability after controlling for known confounders. Previous studies have reported similar associations between self-reported measures of disabling back pain and fear avoidance beliefs. Ours is the first study to examine the relationship between FAB and gait speed, a powerful predictor of morbidity and mortality. Future work should examine whether targeting fear avoidance in addition to other psychosocial measures in older adults with CLBP improves gait speed and functional independence.

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Introduction

With aging, inability to perform activities of daily living (ADLs) and loss of independence in self-care become more prevalent. An aging population presents the healthcare system with many challenges as functional capacity declines and comorbidities increase. In adults greater than 80 years of age, problems associated with mobility disability, measured by walking and climbing stairs, increased the risk of developing difficulty in ADLs and admission to a nursing home [1]. According to the 2000 Census, 29% of adults over 65 years reported some physical disability (e.g., impaired walking, climbing stairs, lifting), while 47% percent of individuals over 85 years reported difficulties in leaving the home as a result of a disability [2].

Neither pathology (e.g., degenerative disc/facet disease) nor impairment (e.g., lumbar flexibility) predicts disability in older adults with chronic low back pain (CLBP) [3, 4]. A number of studies in patients with CLBP of heterogeneous age [5] as well as those specifically in older adults [6] demonstrate that psychological factors such as fear, anxiety, depression and helplessness often contribute to the development and maintenance of chronic pain and associated disability [7].

The fear avoidance model as it relates to chronic pain was first introduced in 1983 by Lethem et al who posited that fear avoidance might explain the development of unfavorable pain experiences and behaviors [8]. Subsequently, the research on fear avoidance has expanded considerably and numerous studies have demonstrated the critical role of fear avoidance in generating disability in younger patients with CLBP [9-11]. In a subset of low back pain patients, the development of fear results in avoidance of actual or perceived pain-generating physical activities leading to worsening performance and recovery after injury. High scores on the fear avoidance beliefs questionnaire (FABQ) [11], a validated 2-part questionnaire examining the role of fear on physical activity and work, have been attributed to the maintenance of both chronic pain and pain-related disability [6].

Fear of physical activity may be an important contributor to disability in older adults. Fear of falling is one example. In a systematic review fear of falling was associated with at least one fall, older age and the female gender [12]. It is estimated that greater than thirty percent of older adults fall each year, with a portion of those individuals experiencing some type of functional decline [12]. Kovacs et al demonstrated in a group of Spanish community dwelling older adults that fear avoidance was associated with disability, though not statistically significant [13]. Another study performed on patients with knee osteoarthritis found that fear avoidance beliefs were related to self-reported measures of function [14]. More recently, Sion and Hicks found the physical activity portion of FAB to be independently associated with self-reported measures of disability and that high FAB scores were associated with increased falls in older adults [15]. Thus there is a precedent for examining the contribution of fear avoidance beliefs to disability in older adults.

Although no uniform measure of mobility disability currently exists in the literature, both self-report measures and physical performance measures have been found to be both valid and reliable [16]. Most studies evaluating disability in CLBP patients have focused primarily on self-reported measures but these measures have not been shown to predict disability, that is, the general ability to live independently. Gait speed, a simple mobility performance measure, is an effective indicator of overall health status and a strong predictor of disability and functional decline [17, 18]. This secondary analysis was designed to examine whether fear avoidance beliefs (FAB) in an older cohort with CLBP are associated with mobility disability as measured by both gait speed and the Roland Morris Questionnaire. We

hypothesized that fear avoidance would be associated with self-reported disability and observed physical performance after controlling for key covariates.

Methods

This study was performed as a secondary analysis of data taken from the baseline assessment of participants in a randomized controlled trial of 200 community dwelling older adults aged 65 and older with CLBP defined as occurring “every day or almost every day for the past 3 months.” The details of the parent study are published elsewhere [19]. Briefly, in the parent study, the efficacy of a 6 week intervention consisting of percutaneous electrical nerve stimulation (PENS) and/or a general conditioning and aerobic exercise program was studied in older adults with CLBP. In this secondary analysis only baseline data were analyzed. The study protocol was approved by the Institutional Review Board and informed consent was obtained from all participants.

Measures

Fear Avoidance Beliefs: The fear avoidance beliefs questionnaire is divided into two parts: the first 24-questions examine fear as it relates to work while the last 5 items second solely focus on fear of physical activity. As the majority of older adults have retired, the previously validated 5-item physical activity portion of the FAB questionnaire was used as the independent variable and scored from 0 to 24 [11].

Disability: Mobility disability was defined as the primary outcome measure. The Roland and Morris questionnaire (RMQ) was used as a self-report measure of functional impairment scored from 0 to 24. The RMQ has been shown to be both valid and reliable in older adults with CLBP [20]. Gait speed was measured over 25 feet (7.62 meters) using comfortable gait speed as per Bohannon et al [21].

Covariates: Age, gender, body mass index and medical comorbidities measured by the Cumulative Illness Rating Scale [22] were collected as these are known contributors to declining function [23]. Depression and pain were measured as they have been shown to contribute to disability [24, 25]. The Geriatric Depression Scale [26] was used to measure depression in these older adults. Pain intensity was measured using the McGill Pain Questionnaire short form [27].

Data analysis—Appropriate descriptive statistics were computed to summarize the characteristics of the participants. We used Pearson product-moment correlation coefficients (r) to quantify association between fear avoidance beliefs and disability measures. A multiple linear regression analysis was used to examine this relationship while adjusting for the covariates age, gender, BMI, medical comorbidities, depression and level of pain. Statistical significance was defined as $p < .05$. SAS® version 9.2 (SAS Institute, Inc., Cary, North Carolina) was used for all statistical analyses.

Results

Baseline characteristics (Table 1) were evaluated in this sample of 200 community dwelling older adults aged 65 and older with CLBP. The mean age of these 200 community dwelling older adults was 73.9 years. Approximately ninety percent of participants were Caucasian with more than half of the subjects having some level of college education or graduate degree. The majority of subjects were either married or widowed. The pain duration on average was 12.6 years and opioids were used uncommonly. Pain intensity on average was 12.1 as measured by the short form MPQ. FAB-PA was significantly negatively correlated with gait speed ($r = -0.25$; $p = .0004$) and positively with RMQ ($r = 0.38$; $p < .0001$). Even after

controlling for age, gender, BMI, comorbidity, depression and level of pain, the significance of the associations remained (Table 2). Each additional point in FAB-PA was associated with an estimated decline of 0.013 meters/second in gait speed ($p=.0022$) and an increase of 0.973 point in RMQ ($p<.0001$), controlling for covariates.

Discussion

This is the first study to examine the relationship between fear avoidance beliefs and objectively measured physical performance. In this cross-sectional analysis of older adults with CLBP, we found that fear avoidance beliefs were significantly associated with both self-reported and observed measures of disability using the Roland Morris Questionnaire and gait speed, respectively. Higher fear avoidance scores corresponded to more severe disability as shown by slower gait speed and higher RMQ scores. This relationship was still evident after controlling for other potential contributors to disability such as age, medical comorbidity, BMI, pain score, and depressive symptoms.

Our study corroborates and extends the work of Kovacs and colleagues who examined a group of community dwelling older adults in Spain with low back pain and found a moderate correlation between disability and the fear avoidance questionnaire [13]; this study also used the RMQ. Fear avoidance beliefs as measured by the physical activity portion of the FABQ were generally lower in our study participants than in the Kovacs study. It should be noted that although the RMQ is commonly accepted as a measure of disability, it specifically addresses self-reported pain with performance of activities. Gait speed, however, is a powerful predictor of functional decline and dependent living status, i.e., disability [17, 18, 28]. Thus our findings add an important dimension to the findings of Kovacs and colleagues.

Although our study had many strengths, its potential limitations also should be highlighted. As noted in the parent study, this sample of community dwelling older adults may not be generally representative of older adults for the following reasons. All subjects were recruited from the same city and most participants were well educated and married. In our study, the mean gait speed was 0.44m/sec. Studies have shown that gait speeds less than 0.6m/sec predict poor functional status with severe limitations in their ability to provide self-care [17]. Gait speeds higher than 1.0 m/sec predict better health outcomes and aging [18]. The majority of our subjects had slower gait speeds indicating relatively high levels of physical frailty. However, levels of fear avoidance beliefs were relatively low in this cohort. As noted in the results, each additional point in fear avoidance was associated with a 0.013 meters/second decrease in gait speed. Studies have estimated a clinically meaningful change in gait speed to represent 0.05 m/s [29, 30]. However, these studies have examined subjects with faster gait speeds than in our study. It is possible that smaller changes in slower gait speeds may have functional significance. Thus, it would be of interest to examine a patient population with a greater range of both gait speed and fear avoidance in older adults to further explore this concept. Future studies should examine individuals with a greater range of gait speeds and fear avoidance beliefs to determine if our study findings can be applied to older adults with a broad spectrum of function and psychological profiles. Additionally, the cross-sectional nature of this analysis only allows us to report an association between fear avoidance beliefs and function.

As the relationship between fear avoidance and pain-related disability in CLBP is explored further, treatment approaches targeting fear avoidance may improve both self-reported and performance-based measures of disability and maximize treatment benefits. In our parent study, general conditioning and aerobic exercise (GCAE) improved fear avoidance beliefs beyond reduction in pain. That is, participants who received GCAE did not experience

greater reductions in pain than those not receiving the intervention, but they had significantly greater reduction in fear avoidance beliefs. The GCAE program consisted of strength, flexibility and aerobic exercises modeled after a program developed for a younger cohort [19]. Godges and colleagues performed a controlled trial in adults with low back pain and high fear avoidance scores; subjects were randomized to one of two groups [31]. Both groups received tailored physical therapy interventions based on their physical impairment. Only the education group received one-on-one counseling that addressed pain related fears and the benefits of exercise in back pain. They found that 100% of the participants in the education group returned to work after 45 days as compared to 67% of the control group. These findings were statistically significant. Whether Godges et al findings can be applied to older adults such as those included in our study is unknown. Additional research is needed to determine whether tailored treatment that includes exercises, gait training and/or cognitive behavioral therapy for fear avoidance beliefs in older adults with CLBP, has any impact on ameliorating functional decline.

Conclusion

The physical activity portion of the fear avoidance beliefs questionnaire was found to be significantly associated with self-report measures of disability and measured gait speed as a measure of disability in a cohort of older adults. Future research should examine whether older adults with CLBP and high levels of fear avoidance as well as diminished functional capacity may benefit from fear avoidance and functional treatment interventions.

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Table 1
Participant Characteristics

<i>Demographics</i>	Mean ± Standard Deviation [Median] or N (%)
Age (Years)	73.9±5.8
Gender (Female)	114 (57.0)
Race (White)	179 (89.5)
<i>Education</i>	
High school or less	65 (32.5)
Trade/technical school	20 (10.0)
Some college	52 (26.0)
College graduate	34 (17.0)
Graduate school	29 (14.5)
<i>Marital status</i>	
Other	35 (17.5)
Married	116 (58.0)
Widowed	49 (24.5)
<i>Medical history</i>	
Pain duration (years)	12.6±14.7 [7.0]
# pain medications	1.6±1.1 [1.5]
# opioids	0.2±0.5 [0.0]
BMI (kg/m ²)	31.7±23.5
<i>Baseline measurements of outcomes</i>	
MPQ total	12.1±7.4
GDS total score	4.5±4.5
FAB physical activities	2.8±1.6
Average pain past week	2.4±0.8
Strongest pain past week	3.2±0.9
Roland questionnaire	10.6±4.7
Gait speed (m/s)	0.44±0.10

Table 2
Regression Analysis of Disability Outcomes Using Fear Avoidance and Covariates as Predictors

Predictor	Gait Speed (Meters/Second)		Roland-Morris Questionnaire	
	Regression Coefficient ± Standard Error	p-Value	Regression Coefficient ± Standard Error	p-Value
FAB-PA	-0.013 ± 0.0004	0.0022	0.973 ± 0.170	<.0001
Age (years)	-0.009 ± 0.001	<.0001	0.054 ± 0.046	0.2500
Female vs Male	-0.078 ± 0.013	<.0001	0.919 ± 0.541	0.0911
BMI (kg/m ²)	-0.003 ± 0.001	0.0031	0.107 ± 0.036	0.0035
GDS	-0.002 ± 0.002	0.3264	0.219 ± 0.064	0.0008
MPQ	-0.001 ± 0.001	0.2537	0.183 ± 0.038	<.0001
CIRS	-0.004 ± 0.002	0.0330	0.136 ± 0.081	0.0957

FAB-PA=Fear Avoidance Beliefs-Physical Activity (range 0-24); BMI=Body Mass Index; GDS=Geriatric Depression Scale (range 0-30); MPQ=McGill Pain Questionnaire (range 0-45); CIRS=Cumulative Illness Rating Scale (range 1-70)