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Pain-Related Disability Among Older Male Veterans Receiving Primary Care

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Background. Pain is common among older persons and is associated with substantial disability, but factors that increase the risk for pain-related disability remain poorly defined. We sought to identify factors associated with disability due to pain in a sample of older veterans receiving primary care.

Methods. Participants (N = 494) in this cross-sectional study included male veterans aged 65 years and older who were enrolled in a Veterans Affairs primary care clinic and who reported pain within the prior 12 months. Candidate factors included demographic, psychological, medical, and pain (e.g., intensity, site, duration) characteristics and were ascertained during face-to-face interviews. We assessed participants' level of pain-related disability by asking them to rate on a 0 to 10 scale the extent to which pain interfered with their ability to do daily activities (0 = no interference at all and 10 = no longer doing daily activities due to pain). Patients with scores of 0, 1–6, and 7–10 (approximate upper quartile) were classified as having no, low/moderate, and high pain-related disability.

Results. The distribution of pain-related disability was none = 149 (30%), low/moderate = 210 (43%), and high = 135 (27%). Factors associated with high (vs no) pain-related disability included the presence of depressive symptoms, defined as a score of 16 or greater on the Center for Epidemiologic Studies–Depression scale (adjusted odds ratio [AOR] = 3.12, 95% confidence interval [CI] = 1.42–6.85), and pain intensity, defined as a one-unit increase on a 0–10 numeric rating scale (AOR = 1.84, 95% CI = 1.61–2.12). Other factors associated with high pain-related disability included the presence of pain on most days of every month (AOR = 3.59, 95% CI = 1.82–7.08) and low back pain (AOR = 2.36, 95% CI = 1.13–4.94). Depressive symptoms, pain intensity, and the presence of pain on most days of every month were also significantly and independently associated with low/moderate (vs no) pain-related disability.

Conclusions. Pain-related disability is common among older male veterans receiving primary care. As modifiable factors, depressive symptoms and pain intensity are associated with pain-related disability and represent appropriate targets for intervention efforts among older persons with pain.

PAIN is common among community-dwelling older persons and is often associated with substantial disability (1–4). Conditions that predispose to pain among older persons frequently coexist in this age group and include degenerative and inflammatory arthropathies, myalgias, and neuralgias, as well as fractures due to trauma and osteoporosis (5).

A key goal of pain management is to reduce, or if possible prevent, pain-related disability (6,7). Factors that increase the risk for pain-related disability among older persons, however, remain poorly defined. Non–pain-related factors that may increase the risk for pain-related disability include the presence of depressive symptoms (8–10), as well as other psychosocial variables such as level of self-efficacy (11,12). Pain-related factors thought to be important determinants of pain-related disability include intensity, frequency, and number of pain locations (13).

We sought to identify factors associated with pain-related disability in a sample of older primary care patients. This population is particularly pertinent for study because of a high prevalence of pain (14,15), as well as factors (such as depressive symptoms) that may increase the risk for pain-related disability (16,17). Identifying modifiable predictors of pain-related disability among older primary care patients could help to focus future intervention efforts. To accomplish our aim, we examined the potential associations between a wide range of health-related characteristics and pain-related disability, using baseline data from a prospective study of older veterans receiving primary care.

Methods

Study Population

Participants were members of an ongoing prospective study of primary care patients at the VA Connecticut Healthcare System (West Haven campus). This investigation enrolled community-dwelling persons who were 65 years of age or older, English speaking, and ambulatory. Of 935 eligible patients approached following a routine clinic visit (7/1/00–8/15/01), 767 (82%) agreed to participate. In the current study, we excluded the small number of women (n = 7), and male participants (n = 52) who did not have information regarding pain status because the pain questions were added to the baseline assessment during the second month of enrollment. Those with (vs those without) pain

data at baseline did not differ significantly in terms of demographic or clinical factors.

Our focus was on identifying factors associated with pain-related disability; we accordingly excluded participants (n = 314) who did not report pain symptoms (as described below), leaving a final sample of 494 male participants. Those with (vs those without) pain did not differ with respect to demographic factors, but participants with pain were significantly more likely to report the presence of depressive symptoms, have a higher mean body mass index (BMI), and report deficits in basic and instrumental activities of daily living. The study was approved by the local Human Investigations Committee.

Ascertainment of Pain-Related Disability

We asked "over the past 12 months, how much has your pain interfered with your ability to do your daily activities on a scale of 0 to 10, where 0 means the pain has not affected it at all, and 10 means you no longer do these activities because of pain?" This question, taken from the Graded Chronic Pain Scale (18), assesses the global impact of pain on participants' function. Participants with scores of 0, 1–6, and 7–10 (approximate upper quartile) were classified as having no, low/moderate, and high pain-related disability, respectively. Our primary analysis coded pain-related disability as a categorical (vs continuous) variable in order to facilitate interpretation of our results and because the variable was not distributed normally. Test-retest reliability of the measure was substantial (intraclass correlation coefficient = .80).

Predictor Variables

Data were collected during an interview-administered, comprehensive assessment that included questions regarding participants' demographic (age, gender, marital status, living alone or with others, etc.) status. We used the 11-item version of the Center for Epidemiologic Studies–Depression (CES-D) scale (19) to assess for the presence of depressive symptoms. Participants with transformed CES-D scores (20) of 16 or higher were considered to have depressive symptoms. Participants' self-reported height and weight were obtained to estimate their BMIs. We reviewed participants' medical records and determined their level of medical comorbidity with the Charlson Comorbidity Index (21). Finally, we obtained information on participants' functional status by inquiring about their independence in seven basic and seven instrumental activities of daily living (BADLs and IADLs) (22).

We assessed for the presence of pain by asking "have you experienced any pain or aching, burning, throbbing sensations in the past 12 months?" (yes/no). A 12-month time frame was selected because many older persons experience pain on an intermittent, as opposed to a chronic, basis and would not be identified using a shorter time period (e.g., in the past month). The test-retest reliability of this measure was substantial as evidenced by an overall percentage agreement of 87% and a kappa (chance-adjusted agreement) of .63.

To determine participants' pain intensity, we asked individuals to "rate the pain/discomfort you experience most of the time on a 0 to 10 scale, where a 0 means no pain and a 10 means extreme pain." The use of numeric rating scales has been shown previously to be a valid and reliable method for assessing pain intensity in older persons (23–26). To assess site(s) of pain, we asked "where have you experienced this pain/discomfort?" Interviewers recorded the specific anatomic location(s) reported by participants. The total number of pain sites reported was summed for each participant. Information regarding duration and persistence of pain was obtained by asking "how long has your pain/discomfort been a problem?" (number of days, months, or years), and "do you experience pain/discomfort on most days of every month?" (yes/no).

Participants who reported experiencing pain at more than two anatomic locations were asked, "Which two sites most limit your daily activities?" Data regarding pain intensity, duration, and persistence were collected for each of these sites. The higher reported value for each variable was used in the analyses. For example, a participant who reported experiencing hip pain for 2 years and low back pain for 5 years was considered to have a pain duration of 5 years in the analyses. To obtain information about patients' perceptions regarding cause(s) of pain, we asked participants, "do you know the cause of your pain/discomfort?" (yes/no).

Analyses

We first examined the bivariate associations between the candidate predictor variables and our trichotomous outcome (no, low/moderate, and high pain-related disability) using chi-square tests or Fisher's exact tests (when appropriate) for categorical variables and analysis of variance for continuous variables. In our primary analyses, we used polytomous logistic regression to examine the independent associations between the predictor variables and pain-related disability, by comparing the groups who reported either low/moderate or high pain-related disability with the group that experienced no pain-related disability. To determine the independent effects of the various factors on pain-related disability, we constructed a model that included demographic (age, race, living alone vs with others, education), psychological (depressive symptoms), medical (BMI, Charlson comorbidity score), and pain (intensity, site, number of sites, duration, persistence, and knowing cause of pain) covariates. We did not adjust for functional status, because BADL or IADL deficits could represent pain-related outcomes. In additional analyses, we examined the individual effect of the pain factors and potential interactions between them, adjusting for all nonpain factors. A p value of less than .05 was considered statistically significant. All analyses were performed using SAS version 8.1 (SAS Institute, Cary, NC).

We conducted two sets of secondary analyses. First, to ensure that our findings were not dependent on the specific method of multivariate analysis used in our study (i.e., polytomous logistic regression), we also coded our outcome as a continuous variable and used multiple linear regression to examine the independent associations between the previously listed factors and pain-related disability. Second, we sought to determine whether the nonpain and pain factors associated with "pain-related disability" identified in our study also predicted disability in self-care tasks. We therefore constructed a logistic regression model using disability

in BADL/IADL function as our outcome (defined as difficulty or dependence in one or more of these self-care tasks) and included the previously listed covariates.

Results

Table 1 shows the characteristics of participants according to their level of pain-related disability. A total of 149 (30%) participants reported no pain-related disability, 210 (43%) reported low/moderate, and 135 (27%) reported high pain-related disability. Participants with pain-related disability were more likely to manifest depressive symptoms and report BADL and IADL deficits, as compared to those with no pain-related disability. Differences in pain factors across the disability categories including average intensity, duration, having pain on most days of every month, location (low back), the number of pain locations, and knowing the cause of pain were also present between the groups (Table 1).

The results of the multivariate analysis are shown in Table 2. The reference group for these analyses consists of those participants ($n = 149$) who reported no pain-related disability. None of the candidate demographic or medical factors was significantly associated with greater pain-related disability. The presence of depressive symptoms was associated with both low/moderate (adjusted odds ratio [AOR] = 2.03, 95% confidence interval [CI] = 1.01–4.07) and high (AOR = 3.12, 95% CI = 1.42–6.85) pain-related disability.

Table 1. Bivariate Associations Between Participant Characteristics and Level of Pain-Related Disability ($N = 494$)

Characteristic	Level of Pain-Related Disability			*p* Value
	None ($n = 149$)	Low/moderate ($n = 210$)	High ($n = 135$)	
Demographic				
Age in years, mean ± *SD*	74.4 ± 5.4	74.7 ± 5.1	74.1 ± 5.2	.574
White, %	91.3	92.9	89.6	.572
Living alone, %	23.5	25.7	31.9	.257
Education in years, mean ± *SD*	12.1 ± 2.7	11.9 ± 2.8	12.2 ± 3.1	.572
Psychological				
Depressive symptoms, %	10.7	19.5	32.6	<.001
Medical				
Body mass index, mean ± *SD*	28.1 ± 4.3	28.3 ± 4.5	29.1 ± 5.1	.130
Charlson comorbidity score, %				.916
0	28.2	28.1	25.2	
1	26.8	26.7	31.1	
2	23.5	25.2	20.7	
≥3	21.5	20.0	23.0	
Functional status				
Help in BADLs, at least one item, %	1.3	3.8	11.1	<.001
Help in IADLs, %				<.001
No	74.5	62.4	40.0	
One item	20.8	23.8	39.3	
Two or more items	4.7	13.8	20.7	
Pain factors				
Intensity,† mean ± *SD*	4.4 ± 2.6	5.6 ± 2.4	7.9 ± 1.9	<.001
Site,‡ %				
Low back	14.1	25.2	29.6	.005
Knee	18.8	18.1	21.5	.728
Leg	9.4	15.2	17.0	.140
Chest	17.4	11.4	12.6	.241
Foot	9.4	12.4	15.6	.289
Shoulder	11.4	13.8	10.4	.601
Hip	9.4	11.4	14.1	.467
Total number of pain sites, %				<.001
1	59.1	47.6	38.5	
2	28.2	30.5	34.1	
3	8.7	10.5	18.5	
4	2.7	8.1	5.9	
5	1.3	3.3	3.0	
Duration, %				<.001
<1 year	34.2	16.7	22.2	
1 to 10 years	40.9	42.4	38.5	
10 years or more	24.8	41.0	39.3	
Pain present on most days of every month, %†	40.9	70.0	75.6	<.001
Cause of pain known, %	64.4	81.9	85.9	<.001

Note: BADL = basic activity of daily living; IADL = instrumental activity of daily living.

†Values were missing for the following variables: pain intensity ($n = 3$) and pain present on most days of every month ($n = 2$).

‡Participants could be counted as having more than one pain site. Only pain sites with a prevalence of more than 10% are shown.

Table 2. Polytomous Logistic Regression for the Association Between Nonpain and Pain Factors and Level of Pain-Related Disability ($N = 494$)

Factors	Adjusted Odds Ratios (95% CI) for Level of Pain-Related Disability	
	Low/Moderate	High
Nonpain		
Age (continuous)	1.00 (0.96–1.05)	1.03 (0.97–1.09)
White (vs nonwhite)	1.41 (0.61–3.27)	1.01 (0.37–2.70)
Living alone (vs with others)	1.10 (0.64–1.88)	1.45 (0.75–2.79)
Education (continuous)	1.04 (0.96–1.13)	1.06 (0.96–1.18)
Depressive symptoms (vs CES-D < 16)	2.03 (1.01–4.07)*	3.12 (1.42–6.85)**
Body mass index (continuous)	1.02 (0.97–1.08)	1.05 (0.99–1.13)
Charlson comorbidity score = 1 (vs 0)	1.21 (0.65–2.27)	1.02 (0.47–2.22)
Charlson comorbidity score = 2 (vs 0)	1.09 (0.57–2.07)	1.58 (0.68–3.65)
Charlson comorbidity score ≥ 3 (vs 0)	1.32 (0.68–2.58)	1.09 (0.47–2.54)
Pain		
Intensity (continuous)	1.17 (1.05–1.29)**	1.84 (1.61–2.12)**
Low back (vs others)	1.75 (0.95–3.25)	2.36 (1.13–4.94)*
Number of pain locations	1.17 (0.89–1.54)	1.33 (0.96–1.84)
Duration 1 to 10 years (vs less than 1)	1.51 (0.81–2.79)	1.30 (0.58–2.90)
Duration >10 years (vs less than 1)	1.81 (0.90–3.65)	1.19 (0.49–2.86)
Pain present on most days of every month (vs not present on most days)	2.64 (1.60–4.38)***	3.59 (1.82–7.08)***
Cause of pain known (vs not known)	1.75 (1.00–3.08)	1.63 (0.75–3.54)

Notes: The reference group consists of participants ($n = 149$) who reported no pain-related disability. The logistic regression model included all factors shown in the table. CI = confidence interval; CES-D = Center for Epidemiologic Studies–Depression scale.

*$p < .05$; **$p < .01$; ***$p < .001$.

When entered into our model as a continuous variable, depressive symptoms remained a statistically significant predictor of both low/moderate (AOR = 1.03, 95% CI = 1.00–1.07, $p = .034$) and high (AOR = 1.08, 95% CI = 1.04–1.12, $p < .001$) pain-related disability. Pain intensity, defined as a one-unit increase on the 0 to 10 numeric rating pain scale, was strongly associated with both low/moderate (AOR = 1.17, 95% CI = 1.05–1.29) and high (AOR = 1.84, 95% CI = 1.61–2.12) pain-related disability. Other factors associated with high pain-related disability included the presence of low back pain (AOR = 2.36, 95% CI = 1.13–4.94) and experiencing pain on most days of every month (AOR = 3.59, 95% CI = 1.82–7.08). Factors associated with low/moderate pain-related disability included depressive symptoms, pain intensity, and experiencing pain on most days of every month (Table 2).

In secondary analyses, we found that the significant predictors of pain-related disability identified in our polytomous regression model were also significant in a multiple linear regression model (data not shown). Finally, depressive symptoms, pain intensity, and pain persistence (as well as age, BMI, and medical comorbidity) also independently predicted disability in BADL/IADL function (data not shown).

Discussion

We identified several factors that were independently associated with pain-related disability in our sample of older male veterans receiving primary care. Some of the identified factors (i.e., depressive symptoms and pain intensity) are modifiable. Identifying modifiable targets for intervention is particularly important, given the high prevalence of pain-related disability observed in our study—70% of participants reported experiencing some degree of pain-related disability in the 12-month period prior to enrollment. Identifying modifiable predictors of pain-related disability among older primary care patients could help to focus future intervention efforts.

The presence of depressive symptoms was associated with a two- to threefold increase in pain-related disability. Pain thresholds are reduced among individuals with (vs those without) depressive symptoms and represents one possible mechanism through which depressive symptoms may act to increase pain-related disability (27). We cannot be certain that depressive symptoms led to greater pain-related disability, or vice versa, given the cross-sectional nature of our findings. It is widely recognized that the relationship between depressive symptoms and disability among persons with painful disorders is highly complex and likely bidirectional (28,29). The substantial coprevalence of depressive symptoms and pain-related disability observed in our study highlights the need to assess routinely for depressive symptoms among older persons who report pain and to intervene when clinically indicated.

By far the strongest factor associated with pain-related disability was pain intensity. For every one-unit increase in the 0 to 10 pain intensity scale, the odds of experiencing low/moderate disability increased by 17%, and the odds of high pain-related disability increased by 84%. Although our findings are cross-sectional in nature, they provide support for the hypothesis that increasing levels of pain intensity increase the risk for disability among older persons. This hypothesis is biologically plausible and perhaps intuitive; it is also possible that our results are partially due to differences in the types (e.g., spinal stenosis vs gout) or stages (e.g., advanced vs early degenerative joint disease) of pain producing disorders in the two comparison groups. Prospective

studies are needed to define the extent to which pain intensity increases the risk for pain-related disability among older persons. Regardless of the outcome of these studies, targeting pain reduction using both pharmacologic and nonpharmacologic approaches will likely provide substantial benefit (5,30).

The presence of pain on most days of every month was associated with an approximately three- to fourfold increase in pain-related disability, as compared to those who did not experience pain on most days of every month. This expected association may reflect differences in the types of pain conditions (e.g., diabetic neuropathy vs headache) that were present between the contrasted groups. Alternatively, differences in other unmeasured factors (e.g., level of self-efficacy) may also have contributed to this finding. In addition, participants with low back pain were more likely to report pain-related disability when compared with participants who had pain at other sites. Our findings suggest that this common chronic condition (31) is an important risk factor for pain-related disability among older men. Finally, an approximate twofold increase in pain-related disability was observed among participants who reportedly knew (vs did not know) the cause of their pain, although this difference achieved only borderline significance.

Pain factors that were found to be associated with greater pain-related disability in bivariate, but not multivariate, analyses included the number of pain locations and duration of pain. The effects of these variables were not substantively altered after the addition of the non–pain-related variables in our model. With the addition of pain intensity and persistence, however, the effects of number of pain locations and pain duration were no longer significant. This finding suggests that pain duration and number of pain locations are not independently associated with pain-related disability. Ascertaining the "independent" effects of certain pain factors may be difficult, however, given the strong interrelationships that are expected between specific characteristics of pain.

Because we used a global pain-related disability measure, we could not identify specific domains of disability affected by participants' pain. Some portion of this disability likely included impairments in higher level physical tasks, such as walking long distances, as well as social and/or recreational activities. We did assess participants' BADL/IADL status, and secondary analyses demonstrated that factors associated with pain-related disability, including depressive symptoms, pain intensity, and pain persistence (as well as age, BMI, and medical comorbidity), were also independently associated with impairments in BADL/IADL function.

Our study has several potential limitations that warrant consideration. First, other potentially important psychological factors, including level of self-efficacy (11,12) and anxiety (8,9), as well as specific coping strategies (32), were not assessed. Future research is needed to determine the extent to which these modifiable factors are associated with pain-related disability among older persons with pain. Second, the temporal nature of the relationships identified could not be confirmed given our cross-sectional study design. Third, our findings may not generalize to older nonveteran populations, including women or minorities. Fourth, we did not assess cognitive impairment in the current study. Although it is possible that individuals with substantial cognitive impairment may have had difficulty providing accurate information regarding their pain and disability status, results of analyses excluding patients with an established diagnosis of dementia (i.e., approximately 1% of the sample) were similar (data not shown).

Although our participation rate was substantial (82%), it is possible that nonparticipants had more pain and pain-related disability as compared with participants. Thus, we may have underestimated the overall prevalence of pain as well as pain-related disability in our study population. In addition, we did not assess whether factors associated with pain-related disability varied according to the etiology of pain. Furthermore, we used a sensitive but nonspecific measure (i.e., presence of any pain or discomfort in the past 12 months) to identify participants with pain problems. The use of a more specific pain measure may have led to different results by excluding those patients with minor or fleeting pain problems; but only 21 (4%) participants reported pain problems of less than 1 month in duration, and five (1%) rated their average pain intensity as 0, indicating that few participants in our study experienced "nonsignificant" pain problems. Finally, because we assessed participants' pain and pain-related disability status over the 12-month period prior to enrollment, it is possible that our results may have been affected by biased recall. We performed test-retest appraisals of the pain and disability measures, however, and found that the reliability of these measures was substantial. Our findings provide additional support for the use of retrospective measures in epidemiologic studies that assess pain and pain-related disability (18).

In conclusion, pain-related disability is common among older male veterans receiving primary care. Efforts to reduce or prevent pain-related disability require the identification of modifiable targets for intervention. Our findings indicate the potential utility of targeting depressive symptoms and pain intensity among older persons affected by pain.

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