Tender Point Count, Pain, and Mobility in the Older Population: The MOBILIZE Boston Study

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Abstract

Prevalence of tender points (TP), widespread pain and fibromyalgia, as well as the relationship between TP, widespread pain and mobility was examined in 585 community-dwelling older adults (mean age 78.2 years, 63.4% female). Pain was based on location (none, single site, multisite, widespread). Mobility was measured by the Short Physical Performance Battery (SPPB), gait speed, and self-reported (S–R) mobility difficulty. Tender point count and health characteristics (i.e. BMI, chronic conditions, analgesic use, number of medications, depression, and blocks walked per week) were assessed.

Results—Several participants had 3 or more TP (22.1%) although prevalence of criteria-based fibromyalgia was low (0.3%). Mobility was more limited in persons with higher tender point counts. After adjustment for pain and other risk factors, higher tender point count was associated with poorer SPPB performance (score<10, aOR=1.09 per TP, 95%CI, 1.01–1.17), and slow gait speed (<0.784m/sec, aOR=1.14 per TP, 95%CI, 1.05–1.24), but not with S–R mobility difficulty. S–R mobility difficulty was associated with more disseminated pain (multisite pain, aOR=2.01, 95%CI, 1.21–3.34; widespread pain, aOR=2.47, 95%CI, 1.09–5.62). These findings portray a significant mobility burden related to tender point count and multisite and widespread pain in the older population. Future studies using longitudinal methods are warranted.

Keywords

Aging; Pain; Fibromyalgia; Mobility limitations

INTRODUCTION

Pain in the older community-dwelling population is a common phenomenon[49]. With advancing age, overall prevalence of chronic pain increases[49], and there is a more marked increase in the extent to which pain interferes with daily activities[51]. Back pain, pain in the lower extremities, and widespread pain are associated with more severe mobility difficulty

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among older women with disabilities[31–33]. In population-based studies of older people, impaired physical performance is associated with pain in the back, knee, and foot[6,32,34].

A very disabling type of pain, widespread pain[35] is a characteristic feature of fibromyalgia[57]. Prevalence of fibromyalgia may vary by using clinical diagnosis, survey criteria, or the widely used classification criteria of the American College of Rheumatology (ACR)[28,58]. In the general population, prevalence of fibromyalgia varies between 0.7%–4.4% of adults[41,55,57]. Most population-based studies have focused on younger and middle aged adults[52,56], with only one study reporting prevalence in older adults of approximately 7% of older women and 1% of older men[57]. Alternatively, in elderly populations, osteoarthritis affecting multiple joints may be an important contributor to the high prevalence of widespread pain[11].

The ACR criteria to classify fibromyalgia include widespread pain and the presence of 11 or more out of 18 tender points on manual exam[58]. Although it has been suggested that tender points are physical findings that are not important as patient symptoms[28], the number of tender points correlated positively with severity of pain in fibromyalgia patients[41]. Fibromyalgia patients often experience limitations in daily physical activities such as walking[23], and frequently show impairments on physical function assessments[36]. In population-based samples, tender point count correlated with specific and non-specific pain[8] and distress (i.e. depression, fatigue, difficulty sleeping)[9]. It is unknown to what degree tender points are associated with mobility problems in the older population. The present study has 2 aims: 1) to determine prevalence of tender points, widespread pain, and fibromyalgia in the older population, and; 2) to determine whether tender point count and widespread pain are associated with poorer mobility performance and S–R mobility difficulty in older community-dwelling adults.

MATERIALS AND METHODS

Participants

The MOBILIZE Boston Study (MBS) is a population-based study of mobility and falls in older individuals living in the community. The sampling frame was the older population living within a 5-mile radius of the Hebrew Rehabilitation Center in Boston which included nearly all of Boston as well as sections of 5 surrounding communities. Further details on the study methods and recruitment were published elsewhere[34,46]. The present study focused on the baseline assessment of the first 600 persons enrolled in this cohort. To be eligible for the study, people had to: 1) be aged 70 years or older; 2) understand and communicate in English; 3) be able to walk 20 feet without personal assistance (may use walker or cane). Exclusion criteria were 1) presence of a terminal disease (e.g. receiving hospice services, metastatic cancer), or 2) severe cognitive impairment (score <18 on the Mini-Mental State Examination (MMSE)[15]. Primary reasons for ineligibility were language and living in a nursing home; fewer than 10% of ineligible persons were excluded because of mobility problems[34]. Spouses of eligible participants could join the study if they were within 6 months of their 65th birthday, or older, and met all other eligibility criteria. However, for purposes of generalizability, we included only those participants aged 70 years or older, which resulted in a sample size of 585. All participants were administered a 2-part baseline assessment that included a home interview by a trained research assistant and a nurse exam at the study clinic at the Hebrew Rehabilitation Center. Participants provided written informed consent for participation. All study procedures were approved by the Institutional Review Board of the Hebrew Rehabilitation Center.

Pain Measurement and Categorization

Presence of musculoskeletal pain was measured by the McGill Pain Map (MPM)[37]. Participants were shown a homunculus of the front and back of a human figure and asked to identify places on the figures "where you have pain today that you have had for more than a week or two". This method was validated previously in an older population[13]. Pain was categorized as 1) no site of pain, 2) single site of pain, 3) multisite pain, not fulfilling criteria for widespread pain, and 4) widespread pain. Using the participants' responses on the MPM (excluding head, face and abdominal sites), we classified widespread pain according to the ACR guideline which states, "Pain is considered widespread when all of the following are present: pain in the left side of the body, pain in the right side of the body, pain above the waist, and pain below the waist. In addition, axial skeletal pain (cervical spine or anterior chest or thoracic spine or low back) must be present[58]." In a second method of pain assessment during the home interview, widespread pain was assessed using a single item in which participants were asked, "during the past year have you had pain, aching, or discomfort all over for 3 months or longer?". Both pain assessments were conducted in all participants during the home interview.

Tender Point Count

Tender points (TP), widely distributed throughout the musculoskeletal system, were identified according to the ACR criteria for fibromyalgia[58]. They were identified by applying pressure with the thumb pad of the tester's dominant hand perpendicular to each survey site (total of 18 sites) according to a designated order. Each site was pressed for a total of 4 seconds, and the force was increased by 1 kg per second until 4 kg of pressure was achieved. The participant was asked whether there was pain when the pressure was applied to each tender point. For the MBS, clinical research nurses were trained by an experienced rheumatologist and used a calibrated digital scale in their training to become familiar with applying 4kg of thumb pressure. Careful quality control methods including training and inter-rater reliability assessments were published previously[34]. Total number of tender points was calculated and persons were classified as having no TP, 1 or 2 TP, or 3 TP. For the fibromyalgia classification, the highest category was further divided by TP>10.

Diagnosis of Fibromyalgia

The presence of fibromyalgia was determined by the ACR criteria[58]: 1) at least 3 months of widespread pain *in combination with* 2) tenderness in 11 of the 18 specific tender point sites. The presence of widespread pain used in our classification of fibromyalgia was determined using either of the following: 1) by the McGill Pain Map; and 2) by the single question during the home interview as described above.

Mobility Measures

Short Physical Performance Battery (SPPB)—Mobility performance was assessed using the SPPB, a battery of 3 tests measuring balance, walking, and chair stands[18]. Balance was assessed in 3, 10-second stands: standing with feet touching side-by-side, semi-tandem stand with the side of one heel touching the side of the big toe of the other foot, and full tandem (heel-to-toe) stand. Standing balance was scored from 1 to 4, based on performance of each test for up to 10 seconds. Walking speed was assessed by the best of 2 trials of a timed 4-meter usual pace walk. The walk was scored from 1–4 using population-based norms: score of 1: <0.46 m/s; score of 2: 0.47–0.64 m/s; score of 3: 0.65–0.83 m/s; score of 4: 0.83 m/s[17]. Chair stand time was determined as the time required to stand up from a chair 5 times as fast as possible with the arms folded in front of the chest. Established scoring cutpoints for the repeat chair stands (in seconds) were as follows: score of 1: >16.7 seconds; score of 2: 16.6–13.7 seconds; score of 3: 13.6–11.2 seconds; score of 4: 11.1

seconds[17]. The SPPB score, the sum of the 3 test scores, predicts disability and hospitalization in older adults[17,39]. In this study, we used a score of 9 or lower on the SPPB to indicate poor overall mobility performance.[17] The second mobility outcome, slow gait, was defined as the lowest quartile (gait speed <0.784 m/s).

Self-reported mobility difficulty—Mobility difficulty, our third mobility outcome, was assessed during the in-home interview. S–R mobility difficulty was a dichotomous variable based on report of any difficulty walking a quarter of a mile (2–3 blocks) or climbing 10 steps without help from another person[19,45]. This measure of mobility difficulty has been used extensively in epidemiologic cohort studies of older adults and has been found to be more predictive of mortality than standard measures of activities of daily living[5].

Demographic and Health Characteristics

Demographic characteristics included age, sex, race, and education (high school education or higher). Body mass index (BMI) was calculated by measured weight in kilograms divided by height in squared meters.

Comorbidity—Chronic diseases were assessed during the home interview, in which participants were asked if a physician had told them they had heart disease (myocardial infarction, atrial fibrillation, pacemaker, angina, or congestive heart failure), diabetes, spinal stenosis/disc disease, gout, asthma/lung disease, and stroke. In addition, people were asked to report any other disease ever reported by a physician. Knee and hand osteoarthritis were assessed during the clinical nurse exam using established clinical criteria[1,2]. In a review of medication containers, interviewers recorded the names, dose, and frequency of use of all medications and supplements taken in the 2 weeks prior to the home visit. Daily use of analgesic medication (including over-the-counter and prescriptions analgesics) and total number of medications were determined from the medication data. Also, presence of moderate or severe depression was ascertained using the Center for Epidemiologic Studies Depression scale (CES-D) to apply DSM-IV criteria[12,42]. *Blocks walked per week.* Participants were asked how many blocks they walked in the previous week, a validated measure of activity in older adults[38].

Statistics

Tender point categories were evaluated according to participant characteristics and health indicators using descriptive statistics and Chi-square tests. Multivariable logistic regression models were performed to separately examine the relationships between tender point count and mobility outcomes, then between pain categories and each of the 3 mobility outcomes, impaired mobility (SPPB<10), slow walking speed (<0.784 m/sec) and S–R mobility difficulty. Models were adjusted for age, sex, and race. Subsequently, to determine whether pain or tender point count had greater impact on mobility, both predictors were included in the same multivariable model. The correlation between tender point count and the pain category variable was Spearman's rho=0.25 and thus they were not collinear according to standard guidelines for epidemiologic analyses[14]. In a final model, we performed additional adjustments, adding education, BMI, self reported chronic conditions (heart disease, diabetes, spinal stenosis/disc disease, gout, asthma, and stroke), daily use of analgesic medication, number of medications, depression, and number of blocks walked per week. Adjusted odds ratios (OR) and 95% confidence intervals (CI) are presented. We did not adjust for osteoarthritis in the main models because it was assessed by clinical criteria that included pain in the definition. Additional analyses were performed using the same covariates as in the fourth model, but instead of the pain categorization variable, number of pain sites was included. Data were analyzed using SPSS version 15 (Chicago, IL, USA).

RESULTS

Average age of the 585 participants was 78.2 years, with a range of 70–97 years. Tender points were present in 47.7% of participants, and 22.1% had 3 or more tender points. There were 11 persons (2%) who had 11 or more tender points. Characteristics of participants according to tender point count categories are presented in Table 1. The majority of participants (61.4%) reported one or more areas of pain on the McGill Pain Map; 14.5% had a single pain site, 37.8% had multisite pain (2 sites) that did not fulfill criteria for widespread pain, 9.1% had widespread pain. From the people that reported pain all over during the home interview, 38.9% also showed widespread pain on the McGill Pain Map. Conversely, persons that did not report pain all over during the home interview, 6.9% had widespread pain according to the McGill Pain Map. Mean tender point count of persons reporting no pain or widespread pain on the McGill Pain Map was 1.0 (SD=2.1) and 2.8 (SD=3.2), respectively. The strong graded relationship between tender point count and more disseminated pain is shown in Figure 1. Over 40% of persons with widespread pain (41.5%) had 3 or more tender points compared to 10.2% of those with no pain. Only 2 women out of 585 participants (0.3%) met the ACR criteria for fibromyalgia based on pain assessed by the McGill Pain Map, and 3 women fulfilled criteria using the single item of self-reported 'pain all over'. Only one woman fulfilled both types of fibromyalgia criteria. No men met criteria for fibromyalgia. Thus, 3.8% of persons with widespread pain according to the McGill Pain Map also met the tender point criteria for fibromyalgia. In addition, 3 participants reported that a physician had told them they had fibromyalgia, even though they did not meet the criteria for the disease during the present clinical assessment. Many more women than men had 3 or more tender points (28.3% and 11.2%, respectively). Women also had significantly higher rates of pain across categories (Table 2).

The prevalence of poorer mobility performance (SPPB<10) was 39.3% and self-reported mobility difficulty was 34.4%. In separate models, both tender point count and pain categories were independently associated with poorer mobility performance and self-reported mobility difficulty (Models 1 and 2, Table 3). When adjusted for one another, tender points remained associated with mobility performance but the relationship between pain categories and performance diminished (Model 3). Adjusted for each other, both tender points and pain were associated with self-reported mobility difficulty. However, after further multivariable adjustment for chronic conditions and medications, depression and amount of walking, the relationship between tender points and mobility performance persisted (adjusted OR=1.09 for each TP, 95%CI, 1.01–1.17; Model 4). In other words, an older person with 6 tender points, would have a 70% greater likelihood of showing poorer mobility performance compared to a person with no tender points even after adjusting for pain and comorbid conditions. Similarly, persons with higher numbers of tender points were more likely to have a slow gait (adjusted OR=1.14, 95%CI, 1.05–1.24). With respect to self-reported mobility difficulty, having more tender points was associated with difficulty walking or climbing stairs, but this association diminished after adjusting for potential confounders (Table 3).

Although after adjusting for tender point count, pain was no longer associated with poorer SPPB performance or with slow gait, multisite and widespread pain were each associated with self-reported mobility difficulty (Table 3). Additional adjustment for knee and hand osteoarthritis (to model 4) did not change the relationships between tender point count and mobility measures. Additional analyses adjusting for total number of pain sites rather than pain categories did not alter the findings.

DISCUSSION

To our knowledge, this is the first study to report on population-based prevalence of tender point counts and fibromyalgia in the older population. The concept of tender point count has been the subject of much controversy throughout the years[21,28]. Criticisms include that assessment of tender points is cumbersome[21,28] and that using a tender point count to diagnose fibromyalgia is arbitrary and exclusionary[21]. Differences in prevalence rates of fibromyalgia in population-based studies may partially be explained by the use of criteria that either do or do not include tender point count[7,9,54,57]. In the present cohort of older individuals, fibromyalgia according to ACR criteria was not common. In contrast, Wolfe and colleagues found a much higher prevalence of fibromyalgia particularly among older women (about 7%)[57]. Of note, although both studies used a pain map approach for pain assessment, the prevalence of widespread pain in the Wolfe study was approximately twice that of our Boston study (20% vs. 9.7% in women, and 12% vs. 7.9% in men, respectively). Nonetheless, it was the low prevalence of the tender point criteria in the MBS population that accounted for the substantial differences in prevalence of fibromyalgia between the 2 studies. As discussed in the Wolfe paper, the detection of tender points may vary depending on the pressure applied by the tester, and this could lead to differences in fibromyalgia prevalence. We employed a series of quality control techniques to promote reliability of the tender point exam[34]. However, it is possible that the pressure applied was not identical to that used in the Wolfe study.

The fibromyalgia criterion of 11 or more tender points was uncommon across pain categories in the MBS cohort. However, the much lower cutpoint of 3 or more tender points showed a strong graded relationship with more disseminated pain. For these reasons, a tender point count of 11 may be too stringent a criterion to determine the presence of fibromyalgia in older people, a statement that has been made before regarding adults in general[21]. In practice, clinicians may diagnose fibromyalgia based on the presence of widespread pain and symptoms such as fatigue, mental difficulties, and muscle weakness[29] even in the absence of 11 tender points. However, others have suggested that older people have lower pressure pain thresholds[33]. This issue could be investigated in future research efforts.

Osteoarthritis is among the leading causes of mobility difficulty in the older population[10,16]. Generalized osteoarthritis is not well understood but may contribute to multisite and widespread pain in older persons[44]. Clinicians may not consider tender point assessment when an elderly patient presents with clinical signs of osteoarthritis. However, when pain presentation is not well correlated with evidence of osteoarthritis, tender point assessment could provide additional clinical information.

In the current study, many participants (especially women) had positive findings on the tender point exam and those participants were not likely to report mobility difficulty. Yet, they were more likely to have poorer mobility performance measured by low SPPB score and slow gait speed. This is an important finding since mobility problems in older adults are predictive of increased dependence and adverse events such as falls, hospitalizations, and nursing home placement[17,18,20,39]. Both gait speed and the Short Physical Performance Battery provide useful clinical information about risks for hospitalization and other adverse consequences in geriatric patients[50]. The relationship between tender point count and poorer mobility performance was independent of pain assessment, suggesting that the tender point exam offers additional information about pain conditions in older adults. It may reflect a level of severity of a pain condition that is not detected by standard pain assessment questions in older persons. Alternatively, tender point pain may be a subclinical indicator of changes in joint and muscle structure and function that are reflected in poorer mobility

performance, possibly due to deconditioning or pathophysiological changes associated with chronic pain conditions[48].

Current findings also show that more disseminated pain is associated with self-reported mobility difficulty and not with SPPB performance or gait speed. When walking or stair-climbing is experienced as painful, it is likely to be reported as difficult. This finding is in concordance with results from a cohort study including well-functioning older community-dwelling adults aged 70–79[53]. In this study, individuals with low back pain reported difficulty in daily physical function (e.g. walking a distance of 1 mile), but did not demonstrate poorer performance on the SPPB. Similar findings have been reported for older women with disabilities[31,35]. Hence, self-reported pain associated with self-reported mobility difficulty, and tender point count associated with physical performance (e.g. gait speed) suggest different pathophysiologic conditions and therefore offer different information on pain and mobility status.

A better understanding of pain characteristics (e.g. tender point count, pain location, pain severity) associated with mobility problems (self-reported or by performance testing) could guide better pain management and the development of programs to address aspects of mobility. A number of pharmacologic approaches are used in treatment of fibromyalgia[30] that have rarely, if ever, been tested in geriatric populations. Clinical trials with fibromyalgia patients have found that physical training leads to enhanced physical function and reduced pain[27]. Therefore, older adults with multiple tender points (3) may benefit from physical training as well. However, reduction in chronic pain and tender point count have not been reported consistently in clinical exercise trials with fibromyalgia patients[4,27]. A discrepancy in findings may be attributed to the variety of exercise interventions; most studies did not apply an intervention that fulfilled the exercise recommendations of the American College of Sports Medicine (ACSM) (i.e. 30 minutes of moderate intensity exercise on most days of the week[3,26]. Future studies can investigate whether an exercise intervention that meets ACSM criteria improves function and reduces pain in older persons with multisite or widespread pain or with an elevated tender point count with or without fibromyalgia.

There are some limitations of this study that should be mentioned. Firstly, the cross-sectional design of the present study is unsuited to establish temporal relationships between tender point count, widespread pain, and mobility. Future longitudinal studies can determine whether increased number of tender points and widespread pain actually lead to new or worsening mobility problems. Secondly, persons with severe mobility problems were excluded from participation. Although they represented a small percent of those who were ineligible, it is possible that there was a disproportionately higher prevalence of pain disorders and possibly fibromyalgia among this group. Thus the prevalence of fibromyalgia may be higher than we report here. Thirdly, potential reversible causes of widespread pain (e.g., vitamin D deficiency and hypercalcemia)[22] were not assessed and therefore cannot be excluded. Finally, although many comorbid medical conditions were taken into account, they were based on self-report which may induce errors and not all pain conditions common in fibromyalgia patients, for instance migraine and irritable bowel syndrome[25,47] were assessed.

In conclusion, presence of fibromyalgia based on the ACR criteria was uncommon in this population of older adults in the Boston area. Nonetheless, multiple tender points and multisite and widespread pain were much more common. Both the manual tender point exam and the McGill Pain Map provide important information about pain conditions with implications for mobility in older individuals. Further research is needed to determine optimal pain evaluation methods and subsequent approaches to manage pain and its functional consequences in older adults.

Acknowledgments

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PERSPECTIVE

Higher tender point count, multisite pain and widespread pain are common in community-dwelling older adults and associated with mobility problems. Both the manual tender point exam and the McGill Pain Map may provide important yet different information about risks for mobility disability in older individuals.
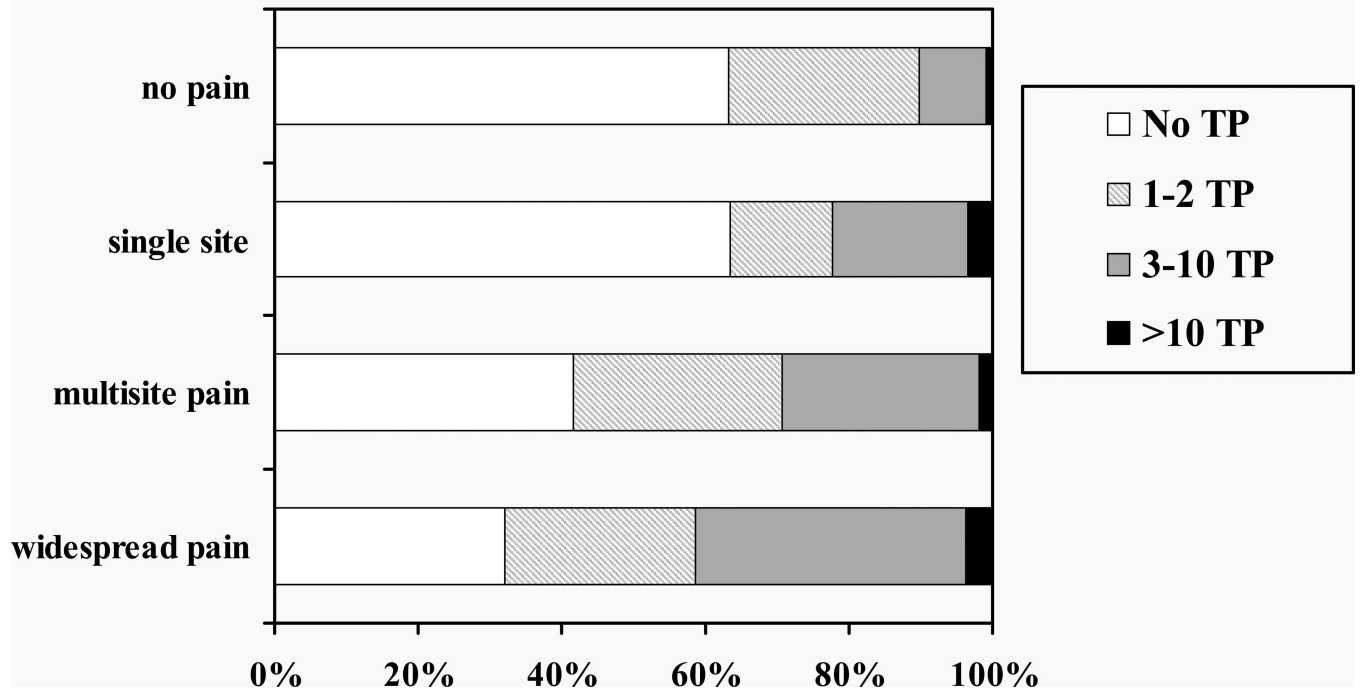
Figure 1.
Prevalence of Tender Points (TP) According to Pain Categories, MOBILIZE Boston Study
2005–2007

Table 1

Participant Characteristics according to Tender Point (TP) Categories, MOBILIZE Boston Study, 2005–2007

	No TP (n=306)	1 or 2 TP (n=150)	3 TP (n=129)	*P* value[*]
	n (%)	n (%)	n (%)	
Age				
70–74 y	95 (31.0)	46 (30.7)	41 (31.8)	
75–84 y	172 (56.2)	87 (58.0)	64 (49.6)	
85 y	39 (12.7)	17 (11.3)	24 (18.6)	.391
Gender				
female	156 (51.0)	110 (73.3)	105 (81.4)	
male	150 (49.0)	40 (26.7)	24 (18.6)	<.001
Race				
white	236 (77.1)	121 (81.2)	98 (76.0)	
black	54 (17.6)	22 (14.8)	23 (17.8)	
other	16 (5.2)	6 (4.0)	8 (6.2)	.825
Body Mass Index				
<25	109 (36.3)	45 (30.6)	37 (29.8)	
25–29	131 (43.7)	59 (40.1)	46 (37.1)	
30	60 (20.0)	43 (29.3)	41 (33.1)	.044
Education				
12 y	98 (32.0)	53 (35.3)	59 (45.7)	
>12 y	208 (68.0)	97 (64.7)	70 (54.3)	.024
Depression	14 (4.6)	16 (10.7)	14 (10.9)	.018
Heart disease	118 (38.6)	68 (45.3)	54 (41.9)	.376
Diabetes	60 (19.6)	21 (14.0)	26 (20.2)	.286
Spinal stenosis/disc disease	47 (15.4)	35 (23.3)	31 (24.0)	.039
Gout	35 (11.4)	20 (13.3)	9 (7.0)	.219
Asthma/lung disease	39 (12.7)	22 (14.7)	34 (26.4)	.002
Stroke	37 (12.1)	12 (8.0)	13 (10.1)	.401
Daily use of analgesic medication	95 (31.0)	45 (30.0)	54 (41.9)	.058
No. of medications				
<7	129 (42.2)	49 (32.7)	38 (29.5)	
7	177 (57.8)	101 (67.3)	91 (70.5)	.020
Blocks walked per week				
2 blocks	44 (14.4)	26 (17.3)	35 (27.1)	
1 mile [†]	86 (28.2)	52 (34.7)	47 (36.4)	
4 miles	76 (24.9)	38 (25.3)	23 (17.8)	
>4 miles	99 (32.5)	34 (22.7)	24 (18.6)	.002

[*] Chi-square test for between-group differences.

[†] 12 blocks per mile, block groups are mutually exclusive.

Table 2

Prevalence of Tender Points, Chronic Pain, Self-reported 'Pain all over', and Fibromyalgia in Women and Men aged 70 and older, MOBILIZE Boston Study.

	Women (n=371)	Men (n=214)	Total (n=585)	
	n (%)	n (%)	n (%)	P value[†]
Tender point categories[‡]				
0	156 (42.0)	150 (70.1)	306 (52.3)	
1–2	110 (29.6)	40 (18.7)	150 (25.6)	
3–10	96 (25.9)	22 (10.3)	118 (20.2)	
11	9 (2.4)	2 (0.9)	11 (1.9)	<.001
Pain groups[‡]				
no pain	131 (35.3)	95 (44.4)	226 (38.6)	
single site	50 (13.5)	35 (16.4)	85 (14.5)	
multisite	154 (41.5)	67 (31.3)	221 (37.8)	
widespread	36 (9.7)	17 (7.9)	53 (9.1)	.049
Self-reported 'pain all over'	26 (7.0)	10 (4.7)	36 (6.2)	.258
Fibromyalgia [*]				
McGill	2 (0.5)	0 (0)	2 (0.3)	n/a
Self-report of "pain all over"	3 (0.8)	0 (0)	3 (0.5)	n/a

[‡]Each set of categories totals to 100% of the cohort.

[*]Fibromyalgia is determined by the presence of 1) 11 or more tender points and 2) widespread pain according to McGill pain map or self-report.

[†]Chi square test of the difference between men and women.

Table 3

Adjusted Odds Ratios for Mobility problems based on SPPB performance, Gait Speed, and Self-reported Mobility Difficulty according to Tender Point Count and Pain Categories (according to the McGill Pain Map) in Older Adults, MOBILIZE Boston Study.

	Model 1		Model 2		Model 3		Model 4	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
SPPB <10								
Tender point count	1.16	1.08–1.24	-	-	1.14	1.06–1.22	1.09	1.01–1.17
McGill pain								
no pain	-		1.0		1.0		1.0	
single site	-		1.13	0.65–1.95	1.09	0.62–1.92	1.25	0.67–2.31
multisite	-		1.56	1.05–2.33	1.39	0.92–2.11	1.07	0.67–1.70
widespread	-		2.27	1.20–4.29	1.85	0.96–3.57	1.23	0.58–2.62
Gait speed								
Tender point count	1.18	1.10–1.26	-	-	1.17	1.09–1.25	1.14	1.05–1.24
McGill pain								
no pain	-		1.0		1.0		1.0	
single site	-		1.00	0.52–1.91	0.94	0.48–1.84	1.14	0.55–2.39
multisite	-		1.36	0.86–2.15	1.19	0.74–1.91	0.86	0.50–1.48
widespread	-		2.07	1.03–4.14	1.67	0.81–3.45	0.99	0.42–2.30
Mobility difficulty								
Tender point count	1.11	1.04–1.18	-	-	1.08	1.01–1.15	1.01	0.94–1.10
McGill pain								
no pain	-		1.0		1.0		1.0	
single site	-		1.12	0.62–2.01	1.08	0.59–1.98	1.53	0.74–3.14
multisite	-		2.43	1.61–3.67	2.34	1.53–3.59	2.01	1.21–3.34
widespread	-		3.77	1.05–7.17	3.52	1.82–6.81	2.47	1.09–5.62

Model 1 includes tender point count, adjusted for age, gender, and race. Model 2 includes pain categories, adjusted for age, gender, and race. Model 3 included both tender point count and pain categories, adjusted for age, gender, and race. Model 4 includes all variables from model 3 and education, Body Mass Index (BMI), self reported chronic conditions: heart disease, diabetes, spinal stenosis/disc disease, gout, asthma, and stroke; daily use of analgesic medication, number of medications, depression, and blocks walked per week.

CI=confidence interval; OR=odds ratio; SPPB=Short Physical Performance Battery