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Management of Persistent Pain in Older Adults: The MOBILIZE Boston Study

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OBJECTIVES: To describe the prevalence of pharmacological (PS) and nonpharmacological (NPS) pain management approaches used by older adults with persistent pain and to identify characteristics associated with use of these approaches.

DESIGN: Population-based cohort.

SETTING: Urban and suburban communities in the Boston, Massachusetts, area.

PARTICIPANTS: Seven hundred sixty-five adults aged 64 and older underwent a home interview and clinic examination. Those reporting any persistent pain were included in this analysis (N = 599).

MEASUREMENTS: All prescription and nonprescription medications were recorded during the home interview. NPS modalities for pain management were assessed using a modification of the Pain Management Inventory. The baseline assessment included extensive measures of pain, health, and functioning.

RESULTS: More than one-third (37.5%) of participants reported using both PS and NPS modalities. Thirty-one percent reported use of NPS modalities alone, and 11.5% used PS modalities alone. NPS modalities (68.4%) were reported more frequently than PS modalities (49%). Women (odds ratio (OR) = 2.2, 95% confidence interval (CI) = 1.26–3.82), individuals with knee osteoarthritis (OR = 3.07, 95% CI = 1.6–5.9), and individuals with moderate to severe pain (OR = 5.02, 95% CI = 2.23–11.28) were more likely to report combined use of PS and NPS modalities. Characteristics associated with individual NPS modalities varied greatly.

CONCLUSION: Only one-third of older adults with persistent pain reported pain management strategies consistent with current guidelines. Further research is required to understand reasons behind choices, barriers to adherence, and the benefits of multiple modalities that older adults with persistent pain use. **J Am Geriatr Soc 60:2081–2086, 2012.**

Key words: persistent pain; chronic pain; pain; pain management; elderly; aged; complementary therapies; analgesics

Pain affects approximately half of community-dwelling older adults[1] and leads to disability,[2] social isolation,[3] depression,[1,2] and falls.[4] Nonetheless, several studies have found that pain management in older adults is often limited and inadequate.[5,6] Few population studies have examined the use of the many available pain management strategies by older adults. Therefore, an understanding of current pain management practices and factors related to choice of pain management strategies is needed to inform clinical care.

Current geriatric recommendations are that pain treatment plans include pharmacological (PS) and nonpharmacological (NPS) strategies.[7] Older adults commonly use prescribed and over-the-counter analgesics as a first-line management strategy.[8] Cautious prescribing practices, resulting from risks of side effects and adverse drug reactions, coupled with competing treatment priorities for comorbidities, means that PS management of pain in older adults is often insufficient.[7] In addition, many older adults have concerns about using analgesics,[9] resulting in underuse of potentially helpful treatments.[6] NPS modalities such as physical therapy, chiropractic care, and many other therapies offer an alternative, or complementary, approach to PS pain management,[10] but limited evidence of efficacy

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has been found to hinder the availability of NPS strategies.[11] Most troubling is that some older adults who have pain use no pain therapies, particularly those who have cognitive impairments and the oldest old.[12]

To better understand the use of pain management strategies by community-dwelling older adults, a cross-sectional study was conducted using data from the baseline visit of the MOBILIZE Boston Study (MBS), a population-based study of persons aged 70 and older living in the Boston area. This article will describe the use of PS and NPS strategies and the characteristics of older adults who use them.

METHODS

Participants

Participants of MBS, a cohort study of fall risk factors, were recruited from 2005 to 2008 using a random sample from town lists covering urban and suburban communities bounded by a 5-mile radius from Hebrew SeniorLife in Boston. The recruitment methods have been described previously.[13] Briefly, after door-to-door recruitment, 1,616 potential participants were screened for participation; with a 53% response rate of eligible adults, 765 people enrolled in the study. Principally, participants were eligible if they were aged 70 and older, although spouses or cohabiting companions aged 64 and older were also eligible to participate (n = 16, aged 64–69). Reasons for ineligibility included non-English speaking, unable to walk 20 feet unaided, terminal illness, severe vision or hearing deficiency, or Mini-Mental State Examination (MMSE) score of less than 18.[14] The baseline assessment included a 3-hour home interview and subsequent 3-hour clinic examination conducted by research nurses.[15] The institutional review boards of Hebrew SeniorLife and collaborating institutions approved MBS.

For this study, all MBS participants who reported any pain on the Brief Pain Inventory (BPI) Severity Subscale (score > 0, n = 599, 78.3% of participants) were included. The BPI Severity Subscale measures pain lasting longer than 2 weeks and has been validated for assessment of nonmalignant pain in older adults.[16,17] Average pain severity scores were calculated from the four numeric rating scale statements assessing pain in the last week (0 = no pain, 10 = most severe) when pain was at its worst and least, on average, and at present. BPI severity scores were grouped approximately into tertiles: very mild (BPI < 2.00), mild (BPI 2.00–3.99) and moderate to severe (BPI $\geq$ 4.00). The seven-item BPI pain interference subscale[16] measures the degree to which pain interferes with daily activities (general activity, working in and outside of home, mood, walking, social relationships, sleep, and enjoyment of life). Average scores were derived from the seven numeric rating scales (0 = no interference, 10 = complete interference) and coded as none (0), low ($\leq$1), medium (2–3), or high (>3) interference.

Demographic Characteristics and Health

Demographic characteristics included age, sex, race, and education (<12, 12–15, >15 years), recorded in the home interview. Self-rated health was identified as excellent, very good, good, fair, or poor. Disability was assessed using the activity of daily living (ADL)[18] and instrumental activity of daily living (IADL) questionnaires.[19] Mobility difficulty was assessed according to self-report of any difficulty walking one-quarter mile or climbing 10 stairs unaided.[20] Knee osteoarthritis (OA) was assessed using American College of Rheumatology criteria.[21] Anxiety was measured using the anxiety subscale of the Hospital Anxiety and Depression Scale (HADS).[22] Rheumatoid arthritis and cancer were assessed according to self-report of physician-diagnosed disease. Heart disease was classified according to self-report of heart disease, heart attack, congestive heart failure, angina pectoris, a pacemaker, or cardiac arrhythmia. Diabetes mellitus was assessed using an algorithm based on self-reported diabetes mellitus, current use of insulin or oral hypoglycemic agents, and laboratory measures (random blood glucose and glycosylated hemoglobin).

Self-Efficacy

Self-efficacy for pain management was scored using the five-item Chronic Pain Self-Efficacy (CPSE) questionnaire, which uses a numeric rating scale (1 = not certain at all, 10 = very certain) to rate self-confidence in ability to undertake activities associated with pain management.[23] Ratings were averaged, and low self-efficacy was defined as the lowest 25% on the CPSE (scores < 5.4).

Pain Management Strategies

PS modalities were assessed using the medication inventory method during the home interview.[24] Referring to the medication bottles, interviewers recorded the names of all medications participants reported taking in the previous 2 weeks. Original names of medications were transformed into their respective individual active ingredients and coded according to the Iowa Drug Information Service.[25] PS modalities included all medications classified as nonopioid and opioid analgesics. Daily analgesic users were those who reported use of one or more analgesics taken at least daily. Low-dose aspirin was not included as an analgesic. A modification of the list used in the Pain Management Inventory was used to assess NPS strategies.[26] Participants were asked whether they were currently using any of 17 approaches for pain relief on a regular basis.

Statistical Analysis

Descriptive statistics were used to describe demographic and health characteristics and prevalence of each pain management strategy grouped as no pain management, NPS strategies, PS strategies, or NPS and PS strategies. Associations between characteristics and pain management strategies were tested using chi-square statistics. Forward stepwise multinomial logistic regression modelling (P = .05 for inclusion) was used to determine independent associations between characteristics and pain management groups. Similarly, forward stepwise multivariable logistic regression modelling was used to determine independent associations between characteristics and individual NPS

Table 1. Demographic and Health Characteristics According to Pain Management Strategy Among Older Adults with Persistent Pain: The MOBILIZE Boston Study

Characteristic	All, N = 599	No Pain Management Strategies, n = 120	NPS, n = 185	PS, n = 69	PS and NPS, n = 225	*P*-Value[a]
Age, mean ± SD	77.8 ± 5.3	77.3 ± 5.1	78.5 ± 5.6	77.5 ± 4.8	77.7 ± 5.3	.06
Female, n (%)	400 (66.8)	84 (56)	115 (62.2)	49 (71.0)	170 (75.6)	.001
White, n (%)	460 (76.8)	96 (80.0)	141 (76.2)	55 (79.7)	168 (75.0)	.93
Education ≥16 years, n (%)	276 (46.1)	60 (50.0)	88 (47.6)	21 (30.9)	107 (47.6)	.15
Self-reported health fair to poor, n (%)	99 (16.5)	15 (12.5)	22 (11.9)	13 (18.8)	49 (21.8)	.02
Obese, n (%)	169 (28.2)	44 (37.9)	35 (19.3)	24 (34.8)	66 (30.1)	.02
Chronic diseases, n (%)						
Knee osteoarthritis	181 (30.2)	16 (13.3)	55 (29.7)	23 (33.3)	87 (38.8)	<.001
Rheumatoid arthritis	36 (6.0)	4 (3.3)	12 (6.5)	6 (8.7)	14 (6.2)	.48
Cancer	144 (24.0)	26 (21.7)	42 (22.7)	19 (27.5)	57 (25.3)	.79
Diabetes mellitus	125 (20.9)	24 (20.0)	42 (22.7)	17 (24.6)	42 (18.7)	.64
Heart disease	151 (25.2)	57 (47.5)	75 (40.5)	32 (46.4)	86 (38.2)	.32
Hospital anxiety and depression scale score, mean ± SD	3.9 ± 3.0	3.2 ± 2.7	4.1 ± 3.0	4.2 ± 3.4	4.0 ± 2.9	.006
Chronic pain self-efficacy score <5.4, n (%)[b]	132 (22.0)	21 (21.9)	32 (19)	21 (33.9)	58 (28.2)	.06
Self-reported mobility difficulty	230 (38.4)	37 (30.8)	57 (30.8)	30 (43.5)	106 (47.1)	.002
Activity of daily living difficulty	151 (25.2)	24 (20.0)	36 (19.5)	20 (29.0)	71 (31.6)	.02
Brief pain inventory						
Severity						
Very mild	210 (35.1)	68 (56.7)	78 (42.2)	17 (24.6)	47 (20.9)	
Mild	200 (33.4)	35 (29.2)	62 (33.5)	27 (39.1)	76 (33.8)	
Moderate to severe	189 (31.6)	17 (14.2)	45 (24.3)	25 (36.2)	102 (45.3)	<.001
Interference						
None	125 (20.9)	51 (42.5)	42 (22.7)	16 (23.2)	16 (7.1)	
Low	144 (24.0)	35 (29.2)	54 (29.2)	8 (11.6)	47 (21.0)	
Medium	162 (27.0)	19 (15.8)	50 (27.0)	18 (26.1)	75 (33.5)	
High	167 (27.9)	15 (12.5)	39 (21.1)	27 (39.1)	86 (38.4)	<.001

PS = pharmacological, NPS = nonpharmacological; SD = standard deviation.

[a] Pearson chi-square test of between-group differences for categorical variables and pairwise *t*-test for continuous variables (age and anxiety score). A borderline significant difference was detected using the *t*-test for mean group ages between none and NPS only (*p*-value as shown). The only significant difference detected by the *t*-test for anxiety was between none and NPS only (*p*-value as shown).

[b] Missing for 67 participants.

strategies. Supplements, herbal remedies, and vitamins and meditation, relaxation, and massage (MRM) were grouped to allow sufficient numbers for the multivariable modelling. There was little missing information in the baseline interviews and examinations, although CPSE scores were missing for 67 participants (11%). Using forward stepwise selection, this variable was included only in the MRM model. No adjustments to the models were made for missing data. Data were analyzed using PASW 18 statistical software (IBM Corp., Somers, NY).

RESULTS

The average age of participants with persistent pain (n = 599) was 77.8 ± 5.3 (range 64–95). Two-thirds of participants were female, 77% were non-Hispanic white, and 17% were black; 17% reported their health as fair or poor. The mean BPI pain severity score was 3.03 ± 1.96 (range 0.25–10); 35% of participants reported very mild pain, 33% mild pain, and 32% moderate to severe pain.

Forty-nine percent of participants reported use of one or more PS strategies to manage pain, with 27.7% reporting daily use; 11.5% reported analgesic use as their only strategy to manage pain. According to pain groups, slightly more than half of older adults who reported moderate to severe pain also reported use of both PS and NPS strategies to manage pain. Four hundred ten participants (68.4%) reported regular use of one or more NPS strategies. One hundred eighty-five participants (31%) reported NPS modalities as their only pain management modality. The most common NPS modalities were exercise (n = 298, 49.7%), nutritional supplements (n = 99, 16.5%), ointments (n = 85, 14.2%), heat (n = 83, 13.9%), and massage (n = 76, 12.7%). No participants reported use of Reiki, and fewer than 5% used each of transcutaneous electrical nerve stimulation, chiropractics, vitamins, herbal remedies, magnets, and acupuncture. Slightly more than one-third (37.5%) used PS and NPS.

Significant differences were observed in use of pain management strategies according to demographic and health characteristics (Table 1). Women were more likely than men to use any pain management strategy. Other factors associated with use of PS strategies alone or in combination with NPS strategies included fair or poor health,

OA, mobility or ADL difficulty, more severe pain, and greater pain interference with daily activities.

Participants using NPS strategies alone were least likely to report fair or poor health (11.9% vs 22% of those who used both strategies), be obese (body mass index $\geq$30, 19.3% vs 30% of persons using both strategies or 38% of nonusers), have low self-efficacy for pain management (19% vs 34% of persons using PS strategies alone), and report ADL disability (19.5% vs 31.6% of those using both strategies). Nonusers were more likely to be male; not have OA; and have better self-rated health, better physical function, and less pain than persons using any strategy (Table 1).

In the multivariable-adjusted analysis, health factors most strongly associated with combined use of PS and NPS strategies were pain severity, pain interference, and OA (Table 2). For example, persons who had moderate to severe pain were five times as likely to use multimodal approaches as those reporting very mild pain (odds ratio (OR) = 5.02, 95% confidence interval (CI) = 2.23–11.28). Obese persons were least likely to use NPS strategies alone (OR = 0.29, 95% CI = 0.15–0.56). Even after controlling for a number of health factors, women were more likely than men to use PS and NPS combined (OR = 2.2, 95% CI = 1.26–3.82).

Choice of NPS Strategies

The characteristics of users of each NPS strategy varied widely after multivariable adjustment (Table 3). Similar to the above findings, pain severity and pain interference were strongly associated with most individual NPS modalities. Participants with a body mass index of 30.0 kg/m^2 or more were less likely to report use of exercise as a pain management modality (OR = 0.53, 95%CI = 0.34–0.84). OA was associated with use of supplements, herbal remedies, and vitamins (OR = 2.2, 95% CI = 1.44–3.38) and with exercise for pain management (OR = 1.46, 95% CI = 1.0–2.13). Women were nearly twice as likely to report using thermal modalities compared to men (OR = 1.84, 95% CI = 1.09, 3.11). The use of MRM was associated with higher self-efficacy for pain management (OR = 1.19, 95% CI = 1.05–1.36).

DISCUSSION

To the best of the knowledge of the authors, this is the first population-based study exploring PS and NPS strategies used by community-dwelling older adults with pain. The results are generalizable to the broader population of English-speaking older adults with pain living in urban and suburban communities.

It was found that approximately one-third of older adults use strategies that are consistent with American Geriatrics Society (AGS)[7] recommendations to use PS and NPS modalities to manage pain. Use of NPS strategies was far greater than use of PS strategies. Although almost half of participants reported using PS strategies, only approximately one-quarter reported regular use. One troubling finding was that 9% of persons reporting moderate to severe pain reported no pain management. Women, those with OA, and those with moderate to severe pain are more likely to report a combination of PS and NPS, although associations between participant characteristics and individual NPS varied greatly.

The AGS[7] recommends that analgesics be used regularly to maximize pain relief. The low proportion of daily analgesic users among participants probably reflects suboptimal use of analgesics. A previous population study of older disabled women concluded that the majority underused analgesics.[6] Concerns of physicians and older adults about side effects or adverse reactions may explain this.[7] Also, it is possible that costs of analgesics, which are often over the counter and not covered by prescription drug

Table 2. Predictors of Pain Management Approach Used by Older Adults with Persistent Pain (N = 599)

Predictors	NPS, n = 180 OR (95% Confidence Interval)	PS, n = 69 OR (95% Confidence Interval)	PS and NPS, n = 213 OR (95% Confidence Interval)
Female	1.23 (.73–2.07)	1.66 (.84–3.3)	2.2 (1.26–3.82)
Fair or poor health	.56 (.23–1.36)	.56 (.2–1.59)	.52 (.22–1.21)
Body mass index $\geq$ 30.0 kg/m^2 (reference < 25.0 kg/m^2)	.29 (.15–.56)	.67 (.29–1.56)	.46 (.23–.91)
Knee osteoarthritis	2.64 (1.37–5.07)	2.41 (1.11–5.22)	3.07 (1.6–5.88)
Hospital Anxiety and Depression Scale score	1.06 (.96–1.16)	1.02 (.91–1.14)	.98 (.89–1.08)
Brief pain inventory			
Severity (reference very mild)			
Mild	1.48 (.82–2.68)	2.48 (1.12–5.49)	2.37 (1.27–4.45)
Moderate to severe	2.36 (1.05–5.32)	3.29 (1.21–8.94)	5.02 (2.23–11.28)
Interference (reference none)			
Low	1.60 (.86–3.0)	.69 (.26–1.83)	4.08 (1.91–8.69)
Moderate	2.19 (1.02–4.69)	2.37 (.92–6.12)	9.68 (4.15–22.56)
High	1.72 (.68–4.35)	3.27 (1.11–9.6)	8.58 (3.22–22.85)

Multinomial logistic regression models using forward stepwise selection ($P < .05$). All odds ratios (ORs) in comparison to those reporting no pain management.

NPS = nonpharmacological; PS = pharmacological.

Table 3. Demographic and Health Characteristics Associated with Use of Nonpharmacological Pain Management Strategies

Strategy	B	*P*-Value	Odds Ratio (95% Confidence Interval)
Exercise (n = 298)			
BPI severity (reference very mild)			
Mild	.11	.62	1.12 (.73–1.71)
Moderate to severe	.54	.04	1.71 (1.04–2.81)
BPI interference (reference none)			
Low	.74	.004	2.11 (1.27–3.49)
Moderate	.74	.005	2.1 (1.25–3.53)
High	.44	.13	1.56 (.88–2.76)
Body mass index, kg/m^2 (reference < 25.0, normal)			
25.0–29.9 (overweight)	−.20	.34	.82 (.54–1.23)
≥30.0 (obese)	−.63	.007	.53 (.34–.84)
Knee OA	.38	.05	1.46 (1.0–2.13)
Supplements (dietary), herbal remedies and vitamins (n = 123)			
Female	.45	.06	1.57 (.98–2.49)
Education, years (reference < 12)			
12–15	.89	.04	2.42 (1.02–5.73)
≥16	1.19	.006	3.27 (1.40–7.65)
Knee OA	.79	<.001	2.2 (1.44–3.38)
Thermal (cold or heat modalities) (n = 110)			
Female	.61	.02	1.84 (1.09–3.11)
BPI severity (reference very mild)			
Mild	−.04	.91	.96 (.51–1.82)
Moderate to severe	.69	.04	1.99 (1.03–3.84)
BPI interference (reference none)			
Low	1.23	.01	3.41 (1.31–8.85)
Moderate	1.53	.001	4.61 (1.81–11.72)
High	1.68	.001	5.34 (2.06–14.03)
Meditation, relaxation, and massage (n = 119)			
BPI severity (reference very mild)			
Mild	.43	.18	1.50 (.83–2.87)
Moderate to severe	1.16	.001	3.19 (1.64–6.17)
BPI interference (reference none)			
Low	.89	.04	2.45 (1.06–5.67)
Moderate	1.34	.002	3.83 (1.67–8.79)
High	1.17	.01	3.20 (1.30–7.87)
Average chronic pain self-efficacy score[a]	.18	.006	1.19 (1.05–1.36)
Physical therapy (n = 37)			
Age	.07	.04	1.07 (1.0–1.14)
Education, years (reference < 12)			
12–15	1.41	.18	4.09 (.51–32.6)
≥16	2.24	.03	9.40 (1.22–72.1)
BPI interference (reference none)			
Low	.27	.72	1.31 (.30–5.65)
Moderate	1.12	.10	3.05 (.82–11.32)
High	1.54	.02	4.68 (1.30–16.84)
Braces and splints (n = 44)			
BPI severity (reference very mild)			
Mild	.81	.09	2.25 (.89–5.67)
Moderate to severe	1.09	.02	2.96 (1.20–7.31)
Hospital anxiety and depression scale	.09	.06	1.10 (1.0–1.21)

(Continued)

Multivariable logistic regression models using forward stepwise selection ($P < .05$). For age and Brief Pain Inventory (BPI) severity and interference scales, continuous forms of the variables were used in the models.
OA = osteoarthritis.
[a] Scores were missing for 67 participants.

insurance plans, may have been a deterrent for persons with limited incomes. The findings that women and those with low self-efficacy for pain management were more likely to use analgesics were reported previously,[8] although not in representative samples of older adults with pain.

Older people tend to be less frequent users of complementary and alternative medicine than other age groups,[27] although one population-based survey[28] reported that 62% of the general community of older adults, regardless of pain, reported use of at least one complementary and alternative medicine approach in the previous year. The findings of the current study suggest that older adults are willing to use, and use, a variety of NPS strategies to manage pain. Research exploring the reasons behind older adults' use of NPS has found that pain management, dissatisfaction with conventional medicine, and concerns about medication side effects were frequently reported.[29] This may explain why older adults were found to use significantly more NPS modalities than analgesics.

This study was cross-sectional, and the direction of any associations (does greater pain severity lead to increased use of a modality, or does use of a modality lead to reports of reduced pain severity) cannot be assumed. The standard pain management inventory method may not capture the full breadth of pain management strategies that this population uses. Also, the exploration of PS strategies was limited to oral analgesics because they are the most common medications used in the treatment of pain. Other medications to treat persistent pain include antidepressants and muscle relaxants, but information was not available about indication for use of these medications, and thus their use could not be confirmed as a treatment for pain. Participants reported using unspecified ointments for pain relief that may have included topical analgesics. Other nonoral PS strategies, such as intra-articular or fluoroscopic guided injections, were not included. Although the study sample was largely representative of English-speaking older adults living in the Boston area, participants had somewhat higher levels of education than older adults in

the Boston area in general. Also, the results cannot be generalized to older adults who have moderate to severe cognitive impairments because they were ineligible to participate in the study. Finally, this study did not include individuals with pain whose symptoms were eliminated by pain treatments; therefore, their choice of treatment(s) could not be assessed.

CONCLUSION

This study has found that a small proportion of older adults (~one-third) who report persistent pain are using pain management strategies consistent with current geriatric guidelines. Use of NPS strategies by older adults with pain is common and may reflect the general avoidance of recommendations or prescriptions for PS strategies by healthcare providers caring for older adults. Substantial differences exist in the characteristics of those who use individual strategies, and these findings may inform future research in this area. Future studies should build upon existing knowledge of older people's preferences for pain management strategies to facilitate better adherence and targeting of pain management interventions for older adults living in the community. Clinicians should consider the potential influences of older adults' preferences and experiences with pain management when recommending pain management strategies.

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