

Impact of Pain on Outcomes in Long-Term Care Residents with and without Multiple Sclerosis

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OBJECTIVES: To compare long-term care (LTC) residents with and without multiple sclerosis (MS); to compare admission status of pain, physical disability, pressure ulcers, depression, and cognitive performance in LTC residents with and without MS; and to examine the impact of MS and pain on outcomes 90 and 180 days after LTC admission.

DESIGN: Retrospective analysis of a large data set.

SETTING: LTC facilities in Missouri.

PARTICIPANTS: Residents admitted to non-hospital-based LTC facilities.

MEASUREMENTS: Minimum Data Set/Resident Assessment Instrument, Version 2.0; Activities of Daily Living Scale; Cognitive Performance Scale.

RESULTS: Residents with and without MS had similar pain prevalence and intensity after admission, with daily pain more frequent in residents with MS ($P = .03$). On admission, residents with MS had more physical disability ($P < .001$) and a greater prevalence of pressure ulcers ($P = .004$) and depression ($P < .001$) than residents without MS. In all LTC residents, initial pain status was associated with physical disability ($P < .001$), pressure ulcers ($P < .001$), depression ($P < .001$), and cognitive performance ($P < .001$) 90 and 180 days after admission. A diagnosis of MS was associated with physical disability ($P < .001$) 90 and 180 days after admission and pressure ulcer development 180 days after admission ($P = .02$).

CONCLUSION: Residents with MS were more physically disabled and had more frequent pain and a higher prevalence of pressure ulcers and depression on admission than residents without MS. Pain, or lack thereof, in residents with and without MS on admission may warn of problems

that could occur within 6 months after admission to a LTC facility. *J Am Geriatr Soc* 53:1490–1496, 2005.

Key words: multiple sclerosis; pain; pressure ulcers; long-term care; Minimum Data Set

Multiple sclerosis (MS) is a chronic, inflammatory, neurological disease affecting approximately 350,000 persons in the United States. Typically, onset of MS occurs between the ages of 20 and 40.^{1,2} The clinical course of MS varies, with some individuals experiencing few symptoms and others having a debilitating disease progression.³ When significant disability occurs, the person may require placement in a long-term care (LTC) facility. Approximately one in four people with MS will need LTC in their lifetime.^{1,4}

The symptoms associated with MS affect the quality of life of persons with MS.⁵ Pain is a frequent symptom in MS, with a prevalence as high as 90%.^{2,3} Other symptoms experienced include physical disability, pressure ulcers, depression, and cognitive decline.^{1,4,6–8} Although researchers have compared symptoms on admission of residents with MS using the Minimum Data Set (MDS) with symptoms of residents without MS,^{1,4,7} the impact of pain on physical disability, pressure ulcers, depression, and cognition over time in residents with and without MS has not been examined.

METHODS

Purpose and Design

The purposes of this exploratory retrospective study were to compare LTC residents with and without MS; to compare admission status of pain, pressure ulcers, physical disability, depression, and cognitive performance in LTC residents with and without MS; and to examine the impact of the interaction between MS and pain 90 and 180 days after LTC admission. Outcome variables examined were physical disability, pressure ulcers, depression, and cognitive performance. Approval for the study was obtained from the University of Missouri Health Sciences Center Institutional Review Board.

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Sample and Setting

Data were obtained from the MDS database for residents admitted to non-hospital-based LTC facilities in Missouri between January 1, 2001, and October 31, 2002. Hospital-based skilled facilities were excluded. All residents aged 35 and older with admission MDS assessments were included. Residents without an admission assessment were excluded.

Instruments

MDS/Resident Assessment Instrument Version 2.0

Through a cooperative agreement with the Missouri Department of Health and Human Services, the investigators had access to the Missouri MDS database. Facility staff are required to complete a full MDS assessment by 14 days after admission, annually, and after a significant change in the resident's health status. Reassessments are completed quarterly using an abbreviated instrument. Because facilities do not complete reassessments exactly every 90 days, the number of days between assessments for this analysis was 90 ± 20 days. Several studies have found adequate validity and reliability on most MDS items.⁹⁻¹¹

Resident data included pain frequency and intensity (Section J, Item 2a, b), pressure ulcer status (Section M, Item 2a), diagnosis of depression (Section I, Item 1ee), and demographic information (age, sex, race/ethnicity, education, marital status, location from where admitted, current payment source). The diagnoses items in Section I of the MDS each have a correlation coefficient of 0.74. The reliability of the stasis/pressure ulcer item has a correlation coefficient of 0.62.⁹ The interrater reliability of the pain items (Section J) has a correlation coefficient of 0.73 or higher.^{9,12}

Activity of Daily Living Scale

Physical disability was measured using the Activity of Daily Living (ADL) Scale.¹³ Physical functioning was defined as dependence in the self-performance of ADLs on seven MDS items: dressing, eating, personal hygiene, bathing, transferring, bed mobility, and toilet use.¹⁴ Scores range from 0 to 28, with higher scores indicating more disability. Excellent concurrent validity and interrater reliability have been demonstrated.^{13,15}

Cognitive Performance Scale

Cognitive performance was measured using the Cognitive Performance Scale (CPS).¹⁶ This subscale consists of five MDS items: memory, decision-making, ability to express self verbally, ability to perform ADLs, and presence of coma. The total score ranges from 0 (intact) to 6 (very severe impairment). A score of 6 indicates that the resident is comatose and never makes decisions. The CPS has superior concurrent validity and interrater reliability.¹⁶

Data Analysis

Data were analyzed using SAS 8.0 statistical software (SAS Institute, Inc., Cary, NC). Although the analyses were unbalanced because of the unequal sample sizes of the groups (residents with MS vs residents without MS), this reflects the character of the LTC population in Missouri. The chi-square test of association for nominal data and the Kruskal-Wallis test for ordinal and interval level data were used to

compare residents at admission. Linear regression methods were used in combination with the method of generalized estimating equations to examine the impact of between MS and pain on physical disability 90 and 180 days after admission. Initial ADL status, age, and sex were covariates. To examine the impact of MS and pain on pressure ulcer development 90 and 180 days after admission, a logistic regression model was used to compare residents with MS (with and without pain) with residents without MS (with and without pain). Initial pressure ulcer status, age, and sex were covariates. Logistic regression was used to examine the impact of MS and pain on depression 90 and 180 days after admission. Initial depression status, age, and sex were covariates. A proportional odds regression model for ordinal data was used to test the strength of association of MS and pain on cognitive performance 90 and 180 days after admission. Odds ratios (ORs) with 95% confidence intervals (CIs) were reported with the regression results. Level of significance was $P < .05$.

RESULTS

Sample Description

A total of 41,208 residents aged 35 and older were admitted to 480 non-hospital-based LTC facilities during the study period. The number of residents with MS was 247; the number without MS was 40,963. Thus, in Missouri LTC facilities, admission MS prevalence was 0.6% (247/41,208), a lower prevalence than reported previously in LTC settings.^{1,4,6,7}

There were differences between residents with and without MS with respect to age ($P < .001$), marital status ($P < .001$), education ($P < .001$), and race/ethnicity ($P = .007$). The typical MS resident was a 58-year-old white married woman with Medicaid insurance coverage admitted from an acute care hospital. The typical LTC resident without MS was an 80-year-old white widowed woman with Medicare insurance coverage admitted from an acute care hospital. Residents with MS were younger (mean age \pm standard deviation 58.5 ± 13.5) than residents without MS (80.2 ± 11.7). A greater percentage of residents with MS had more education (84.2% vs 57.6%) and were married (32.4% vs 25.8%) than residents without MS. A greater percentage of residents without MS (90.5%) were classified as white than residents with MS (85.4%).

Demographic characteristics were similar for residents with MS admitted with and without pain (Table 1) except for education. A greater percentage of residents with MS with pain (21.0%) had less than a high school education than of residents with MS without pain (9.3%, $P = .01$). This difference may reflect the ability of educated residents with MS to effectively articulate their pain, advocate for medication, and minimize their pain.²

Pain Prevalence, Frequency, and Intensity

Admission pain prevalence tended to be slightly higher ($P = .08$) in residents with MS (56.3%) than in those without MS (50.7%). Daily pain was more frequent in residents with MS (34.4%) than in those without MS (27%, $P = .03$), although residents with MS with pain reported similar pain

Table 1. Demographic Characteristics of Residents with Multiple Sclerosis with and without Pain Admitted to Long-Term Care Facilities

Demographic Characteristic	With Pain (n = 139)	Without Pain (n = 108)
Age, mean \pm standard deviation	59.6 \pm 13.4	57.1 \pm 13.6
Sex, %		
Women	70.5	64.8
Men	29.5	35.2
Race, %		
White	89.2	80.5
Black	10.1	16.7
Hispanic	0.7	2.8
Marital status, %		
Never married	15.8	19.4
Married	30.9	34.3
Widowed	24.5	16.7
Separated/divorced	28.8	29.6
Education, %		
<High school	21.0*	9.3
\geq High school	79.0	90.7

* $P = .01$.

intensity (mild 30.2%, moderate 58.3%) as residents without MS with pain (mild 32.1%, moderate 58.5%).

Physical Disability

Figure 1 portrays mean admission ADL scores for LTC residents. Residents with MS with and without pain had similar ADL scores ($P = .68$). In contrast, admission ADL scores of all residents with MS, regardless of pain status, were not similar to those of all residents without MS. Residents with MS had more disability (mean ADL score 17.9) than residents without MS (mean ADL score 13.2, $P < .001$).

Initial ADL status ($P < .001$), age ($P < .001$), initial pain status ($P < .001$), and a diagnosis of MS ($P < .001$) were associated with disability 90 days after admission. After adjusting for age and initial ADL status, all residents with pain (least square mean (LSM) 12.2) scored, on average, 1 point lower on the ADL scale than residents without pain (LSM 13.2), indicating slightly less disability. Even after adjusting for the large differences in age and admission ADL status, residents with MS scored, on average, 1.3 points higher (LSM 13.4) on the ADL scale, indicating slightly greater disability than residents without MS (LSM 12.1). Sex ($P = .22$) and MS-by-pain interaction ($P = .44$) were not significant.

The 180-day analysis was consistent with the 90-day analysis. Initial ADL status ($P < .001$), age ($P < .001$), initial pain status ($P < .001$), and MS ($P < .001$) were associated with disability 180 days after admission. Likewise, sex ($P = .68$) and the MS-by-pain interaction ($P = .39$) were not significant.

Pressure Ulcers

Figure 2 depicts percentages of LTC residents with a pressure ulcer at admission. The odds of having a pressure ulcer upon admission were 2.3 times (95% CI = 1.2–4.4,

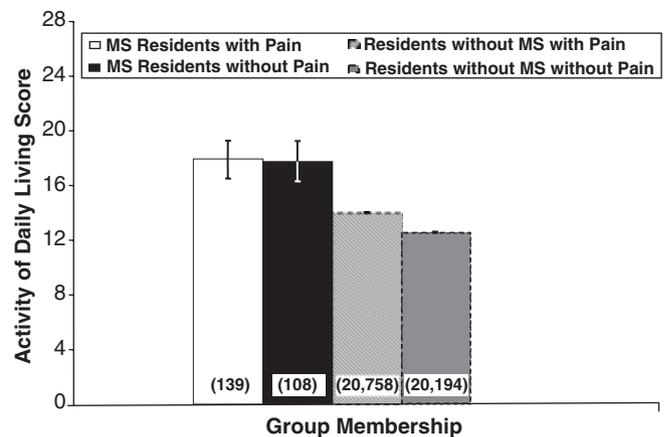


Figure 1. Activities of daily living in long-term care (LTC) residents at admission. Data are presented as means and 95% confidence intervals (CIs). Dashed bars represent the population of LTC residents without multiple sclerosis (MS) and provide for a visual comparison with residents with MS. 95% CIs for residents without MS and with pain (bar with diagonal lines) (13.9–14.1) and residents without MS and without pain (gray bar) (12.4–12.6) cannot be displayed visually because of their extremely narrow range. Sample size indicated as (n).

$P = .008$) greater in residents with MS with pain than in residents with MS without pain. Regardless of pain status, pressure ulcer prevalence was higher in residents with MS (23.9%) than in residents without MS (15.9%). Specifically, the odds of having a pressure ulcer on admission were 1.6 times (95% CI = 1.2–2.2, $P = .004$) greater in residents with MS on admission than in residents without MS.

The presence of a pressure ulcer 90 days after admission was associated with initial pressure ulcer status ($P < .001$), initial pain status ($P < .001$), and the male sex

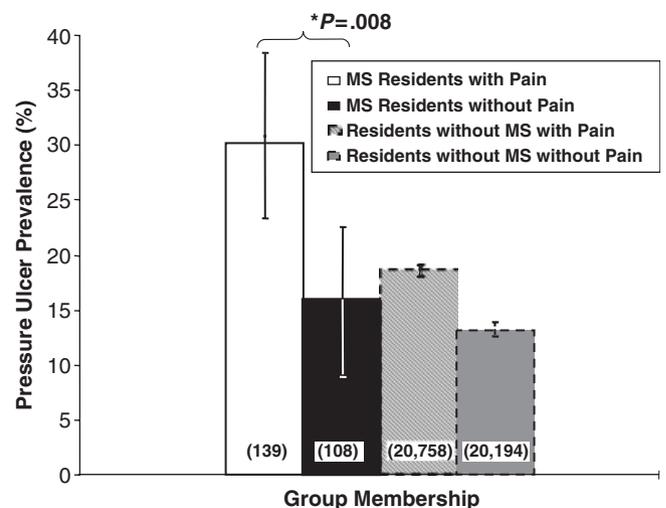


Figure 2. Pressure ulcer prevalence in long-term care (LTC) residents at admission. Data are presented as means and 95% confidence intervals (CIs). Dashed bars represent the population of LTC residents without multiple sclerosis (MS) and provide for a visual comparison with residents with MS. Sample size indicated as (n) * $P = 0.08$. Residents with MS with pain > residents with MS without pain.

($P < .001$). Residents with pain on admission had an approximately 30% greater odds of having a pressure ulcer than residents without pain (OR = 1.3, 95% CI = 1.2–1.5). Men had 40% greater odds (OR = 1.4, 95% CI = 1.3–1.5) of having a pressure ulcer than women. Being admitted with a pressure ulcer was the largest determinant of pressure ulcer status 90 days later (OR = 10.6, 95% CI = 9.5–11.9). A diagnosis of MS ($P = .34$), age ($P = .33$), and the MS-by-pain interaction ($P = .53$) were not significant.

Similar to the 90-day analysis, a pressure ulcer 180 days after LTC admission was associated with initial pressure ulcer status (OR = 6.2, 95% CI = 5.4–7.1, $P < .001$), initial pain status (OR = 1.3, 95% CI = 1.2–1.5, $P < .001$), and the male sex (OR = 1.3, 95% CI = 1.2–1.5, $P < .001$) and was not associated with age ($P = .84$) or MS-by-pain interaction ($P = .23$). In contrast, a pressure ulcer was associated with a diagnosis of MS ($P = .02$). Residents with MS had 2.4 times greater odds (95% CI = 1.1–5.2) of having a pressure ulcer 180 days after admission than residents without MS.

Depression

Figure 3 displays percentages of LTC residents with an admission diagnosis of depression. Depression prevalence was similar for residents with MS with and without pain ($P = .60$). Regardless of pain status, depression was more prevalent on admission in all residents with MS (44.5%) than all residents without MS (29.4%, $P < .001$).

Initial depression status ($P < .001$), age ($P = .006$), initial pain status ($P < .001$), and the MS-by-pain interaction ($P = .01$) were associated with depression 90 days after admission. Being admitted with depression was the largest determinant (OR = 152.0, 95% CI = 125.7–183.7) of depression 90 days later. Because the MS-by-pain interaction was significant, the main effect of pain could not be interpreted directly. The odds of depression in residents with MS without pain were approximately 80% (OR = 1.8) higher than in residents with MS with pain. In addition, the odds of depression for residents with pain without MS were approximately 39% higher than in LTC residents with MS

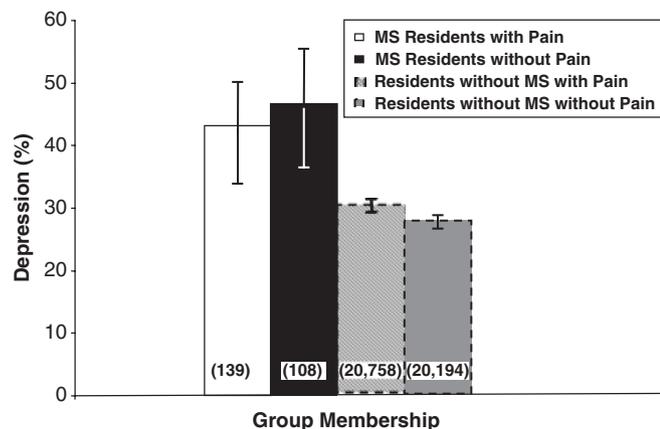


Figure 3. Depression in long-term care (LTC) residents at admission. Data are presented as means and 95% confidence intervals (CIs). Dashed bars represent the population of LTC residents without multiple sclerosis (MS) and provide for a visual comparison with residents with MS. Sample size indicated as (n).

with pain. Older residents had slightly lower odds of depression (OR = 0.99, 95% CI = 0.99–1.0), but the effect of a 1-year age difference was of little clinical significance. A diagnosis of MS ($P = .20$) and sex ($P = .13$) were not significant.

Similar to the 90-day analysis, initial depression status (OR = 64.8, 95% CI = 54.5–76.9, $P < .001$), age (OR = 0.99, 95% CI = 0.99–1.0, $P < .001$), and initial pain status (OR = 1.4, 95% CI 1.2–1.5, $P < .001$) were associated with depression 180 days after admission. Residents experiencing pain had approximately 40% greater odds (OR = 1.4, 95% CI = 1.2–1.5) of a diagnosis of depression 180 days after admission than residents without pain. Unlike the 90-day analysis, a diagnosis of MS ($P = .15$) and the MS-by-pain interaction ($P = .20$) were not significant, although sex ($P = .01$) was associated with depression. Women had approximately 10% higher odds (OR = 0.9, 95% CI = 0.8–1.0) of being depressed 180 days after admission than men.

Cognitive Performance

Figure 4 depicts the mean admission CPS scores for LTC residents. Cognitive performance was similar for residents with MS with and without pain ($P = .13$). Specifically, 38.1% of residents with MS with pain and 29.6% without pain were cognitively intact (CPS score = 0), whereas 22.3% of residents with MS with pain and 28.7% without pain were moderately cognitively impaired (CPS score = 3, 4, or 5). Regardless of pain status, all residents with MS (mean CPS score 1.6 ± 1.6) had slightly better admission cognitive performance ($P < .001$) than all residents without MS (mean CPS score 2.1 ± 1.8).

Initial cognitive performance ($P < .001$), age ($P < .001$), and initial pain status ($P < .001$) were associated with cognitive performance 90 days after admission. The largest determinant of cognitive performance 90 days after admission was initial cognitive performance. The odds of the CPS score being 1 point higher than the admission score, for a

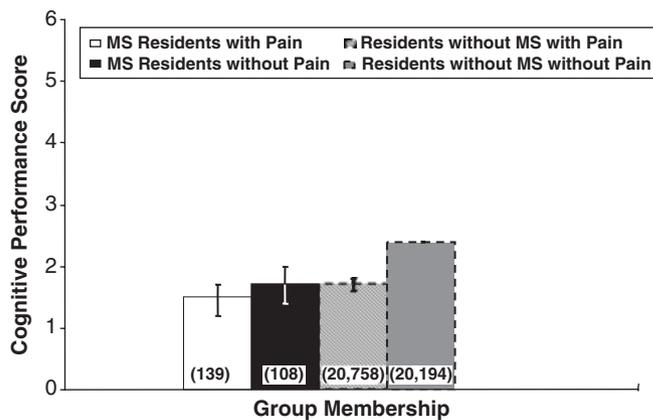


Figure 4. Cognitive performance in long-term care (LTC) residents at admission. Data are presented as means and 95% confidence intervals (CIs). Dashed bars represent the population of LTC residents without multiple sclerosis (MS) and provide for a visual comparison with residents with MS. 95% CI for residents without MS and without pain (gray bar) (2.4–2.4) cannot be displayed visually because of the extremely narrow range. Sample size indicated as (n).

resident who was admitted with a higher CPS score, were 10.3 times the odds (95% CI = 9.9–10.6) of a resident who was admitted with a lower CPS score. After adjusting for age and initial cognitive performance, residents admitted with pain had 14.3% lower odds (OR = 0.9, 95% CI = 0.8–0.9) of having worse cognitive performance (i.e., higher CPS scores) than residents without pain. Age was statistically significant but of little clinical significance. A diagnosis of MS ($P = .37$), MS-by-pain interaction ($P = .86$), and the sex ($P = .80$) were not significant.

The results for the 180-day analysis were consistent with the 90-day analysis. Initial cognitive performance (OR = 6.3, 95% CI = 6.1–6.5, $P < .001$), initial pain status (OR = 0.8, 95% CI = 0.8–0.9, $P < .001$), and age (OR = 1.0, 95% CI = 1.0–1.0, $P < .001$) were associated with 180-day cognitive performance. Likewise, MS ($P = .84$), MS-by-pain interaction ($P = .84$), and sex ($P = .85$) were not significant.

DISCUSSION

This study revealed two key findings. First, residents with MS were more physically disabled and had a high prevalence of pain, pressure ulcers, and depression on admission to LTC facilities despite being, on average, 20 years younger and less cognitively impaired than residents without MS. Second, in all LTC residents, admission pain status was associated with a cluster of adverse outcomes (physical disability, pressure ulcers, depression, cognitive performance) 90 and 180 days after admission. Collectively, these data indicate that residents with MS present a challenge to the traditional scenario for care of LTC residents. Pain, or lack thereof, in residents with and without MS appears to be a key early indicator that may warn of potential problems that could occur within the first 6 months in the LTC facility.

Given the low prevalence of residents with MS in Missouri (<1%) as well as nationwide,^{1,4} LTC staff may not be familiar with the progression of MS or the typical profile of LTC residents with MS. LTC staff may assume wrongly that, because residents with MS are usually young, cognitively intact, well-educated, and married, their pain experience, skin care, physical and emotional care needs will be less than those required by typical LTC residents. These data are in sharp contrast to that erroneous assumption.

Residents with MS had significant physical and emotional care needs upon LTC admission. Because of spasticity, loss of balance and coordination, limited range of motion, and loss of voluntary movement associated with MS progression,^{1,4,6–8} residents with MS required extensive assistance or were totally dependent on staff to perform ADLs. Given their high level of disability at a young age, residents with MS need restorative interventions that increase muscle strength, maintain function, facilitate independence, and prevent increased disability. Although these data did not show a difference in disability based on pain status (Figure 1), clinical experience suggests that adequate pain management is necessary to maximize the effectiveness of restorative interventions. Additional research is needed to design and test restorative programs that meet the special needs of residents with MS.

This study (Figure 3), as well as work by others,^{2,6–8,17,18} indicates that depression is a significant problem in residents with MS. Depression is thought to be related to the stress of living with a chronic debilitating illness as well as being a side effect of some medications prescribed to treat MS.^{8,17,18} Depression also may result from atrophy of the corpus callosum, the part of the brain affected by depression.¹⁹ Regardless of the etiology, research has found that residents with MS with depression do not receive mental health services.^{1,4,6,7} It is critical that depression be identified and treated effectively because unrecognized and inadequately treated depression may lead to poor adherence to restorative care.² Furthermore, given the sociodemographic differences of residents with MS, mental health interventions may need modification to meet the unique needs of the younger MS resident.

Although others^{20–22} have found that residents with daily pain were more likely to have severe ADL impairment, these data suggest that residents with pain had slightly less disability 90 and 180 days after LTC admission. It is not possible to know from these data why residents with pain had less disability. Practically speaking, a 1-point difference on the ADL scale is not likely of clinical significance. Because the MDS in general, and the ADL scale in particular, does not distinguish whether disability is related to pain, it is essential for LTC staff to assess residents' self-report of pain and provide adequate pain management before initiating ADLs in all LTC residents.

Because the majority of residents with MS were admitted from an acute care facility, the high admission pressure ulcer prevalence suggests poor nursing care quality in acute care hospitals. It is not possible to ascertain from this study whether a pressure ulcer developed before or during an acute care hospitalization. It also is not known whether the pain of residents with MS was from the pressure ulcer,²³ was associated with MS, or was a combination of both. Prospective research is needed to determine whether persons with MS admitted to an acute care facility have pain before pressure ulcer development or whether the pressure ulcer that develops during their hospitalization causes their pain.

It is unclear why pressure ulcer prevalence is so much greater in residents with MS with pain. Because most residents with MS report daily pain of moderate intensity, it is possible that residents with MS are limiting their body movements to minimize their pain (e.g., refusing to turn every 2 hours). This explanation is unlikely because admission physical disability was not different for residents with MS admitted with and without pain. Differences in age, depression, and cognitive performance also cannot explain the difference in pressure ulcer prevalence, because residents with MS with and without pain were similar on these factors (Table 1, Figures 3 and 4).

Initial pain status was associated with pressure ulcer development in LTC residents 90 and 180 days after admission. One plausible explanation for pain's impact on pressure ulcer development is peripheral vasoconstriction due to sympathetic nervous system release of catecholamines.²⁴ Peripheral vasoconstriction, and the subsequent decrease in subcutaneous blood flow, may result in tissue hypoxia.²⁵ The tissue hypoxia may decrease the skin and subcutaneous tissues' tolerance to pressure, friction, shear,

and moisture, thus increasing likelihood of pressure ulcer development. LTC staff need to provide effective pain management and assess skin integrity and pressure ulcer risk in all newly admitted residents with pain. Because residents with MS continued to have greater odds for pressure ulcer development 180 days after admission, regular reassessment of skin integrity and pressure ulcer risk using the Braden Scale and use of evidence-based pressure ulcer prevention and treatment guidelines are vital in this high-risk population.²⁶

Unraveling the relationship between pain and depression in LTC residents over time is complicated. Initial pain status was associated with depression in LTC residents without MS at 90 days and all LTC residents 180 days after admission. These data support those of others that suggest that untreated pain is associated with depression in LTC residents.^{7,20-22} Pain is believed to be processed in the limbic system of the cerebral cortex, which manifests the affective-motivational dimension of pain. By effectively treating pain, LTC staff may increase neurotransmitters, which improves both pain and depression.²⁷

At 90 days after admission, residents with MS without pain had greater odds of depression than residents with MS with pain. Although it is possible that this was a spurious finding, another explanation exists. Specifically, residents within different MS subgroups (e.g., secondary progressive, primary progressive) may not sense pain because of the demyelination of neurons and the sclerotic plaques on the somatosensory pathway or brainstem.²⁸ Additional research is needed to examine the relationship between pain and depression in different MS subgroups to gain a better understanding of this complicated phenomenon.

A notable finding was that residents with pain had better admission cognitive performance than residents without pain (Figure 4), as well as lower odds of having worse cognitive performance 180 days after admission. Although it is possible that pain is "protective" in terms of cognitive performance, it is more likely that pain is not assessed adequately in cognitively impaired residents. Residents who are cognitively intact can effectively communicate their pain to LTC staff,^{29,30} and thus it is documented on the MDS. Because the pain assessment item reflects pain experienced over a 7-day period, residents with cognitive decline may have difficulty recalling their pain.^{20,29} Thus, LTC staff need to use additional items such as physiological measures (e.g., heart rate, blood pressure) and facial expression (e.g., wincing, grimacing)²⁰ to more effectively assess pain. Direct care staff (e.g., nursing assistants and licensed practical nurses) must be consulted regarding pain status of residents with cognitive decline to insure that pain behaviors have not been missed. A clinical practice guideline is available for LTC staff on the management of persistent pain in older persons.³¹

Although the MDS and the ADL scale and CPS have satisfactory psychometric properties,^{9-13,15,16} some investigators have reservations about MDS reliability. Consequently, use of the MDS may be viewed as a study limitation, although advantages of the MDS should not be minimized. By using the MDS, a large number of facilities and residents were studied. Given that the average Missouri LTC facility has one MS resident at any given time, it would not have been feasible to study the Missouri MS resident

population otherwise. The resident profile was similar to that published previously, suggesting that the sample can be generalized to other residents in Missouri and the United States.^{1,24,26} Even though the MS resident group was small compared with the large group of residents without MS, the non-MS group provided good context for contrasting with the residents with MS. An alternative to the MDS would have been to use the Department of Veterans Affairs Patient Assessment File (PAF) administrative database, but this option was rejected because MS is more prevalent in women and the PAF database contains predominantly men.³²

In addition, the pain site does not have "wound pain" as an option. Instead, "soft tissue pain" was likely the item used for assessing pressure ulcer pain. Thus, a question remains as to whether LTC staff who use the MDS are assessing pain accurately and consistently. Because of the limitations of the pain items of the MDS instrument and the retrospective design of the study, it was not possible to discern the exact etiology of the pain documented in this study (e.g., MS-related pain vs wound pain).

In conclusion, these data demonstrate that residents with MS present a significant challenge to LTC staff. Overall, on admission, the residents with MS were younger and better educated and had more frequent pain, greater physical disability, and a higher prevalence of pressure ulcers and depression than residents without MS. The results support a need for educating LTC staff about the skin care, physical, and emotional needs of residents with MS. Careful assessment of pain may warn of potential problems, such as increased disability, pressure ulcer development, depression, and cognitive decline, within the first 6 months of stay in the LTC facility. Additional research is needed to determine whether timely pain management can help minimize or alleviate these potential adverse outcomes.

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REFERENCES

1. Buchanan RJ, Wang S, Huang C et al. Profiles of nursing home residents with multiple sclerosis using the minimum data set. *Mult Scler* 2001;7:189-200.

2. Kerns RD, Kassirer M, Otis J. Pain in multiple sclerosis: A biopsychosocial perspective. *J Rehab Res Dev* 2002;39:225–232.
3. Kassirer M. Multiple sclerosis and pain: A medical focus. *Int J Mult Scler Care* (serial online) 2000;2:30–35.
4. Buchanan RJ, Wang S, Ju H. Analyses of minimum data set: Comparisons of nursing home residents with multiple sclerosis to other nursing home residents. *Mult Scler* 2002;8:512–522.
5. Koch LC, Rumrill PD, Roessler RT et al. Illness and demographic correlates of quality of life among people with multiple sclerosis. *Rehab Psychol* 2001;46:154–164.
6. Buchanan RJ, Wang S, Ju H. Gender analyses of nursing home residents with multiple sclerosis. *J Gend Specif Med* 2003;6:35–46.
7. Buchanan RJ, Wang S, Tai-Seale M et al. Analyses of nursing home residents with multiple sclerosis and depression using the minimum data set. *Mult Scler* 2003;9:171–188.
8. Thompson AJ. Multiple sclerosis: Symptomatic treatment. *J Neurol* 1996;243:559–565.
9. Hawes C, Morris JN, Phillips CD. Reliability estimates for the minimum data set for nursing home resident assessment and care screening. *Gerontologist* 1995;35:172–178.
10. Morris JN, Nonemaker S, Murphy K et al. A commitment to change. Revision of HCFA's RAI. *J Am Geriatr Soc* 1997;45:1011–1016.
11. Sgadari A, Morris JN, Fries BE et al. Efforts to establish the reliability of the resident assessment instrument. *Age Ageing* 1997;26 Suppl 2:27–31.
12. Fries BE, Simon SE, Morris JN et al. Pain in U.S. nursing homes. Validating a pain scale for the Minimum Data Set. *Gerontologist* 2001;41:173–179.
13. Morris JN, Fries BE, Morris SA. Scaling ADLs within the MDS. *J Gerontol A Biol Sci Med Sci* 1999;54A:M546–M553.
14. Health Care Financing Administration. Medicare and Medicaid: Resident Assessment in Long Term Care Facilities: Final Rule (HCFA-2180F). *Fed Reg* 1997;62:174.
15. Lawton MP, Casten R, Parmelee PA et al. Psychometric characteristics of the Minimum Data Set II. Validity. *J Am Geriatr Soc* 1998;46:736–744.
16. Morris JN, Fries BE, Mehr DR et al. MDS cognitive performance scale. *J Gerontol* 1994;49:174–182.
17. Thompson AJ. Symptomatic treatment in multiple sclerosis. *Curr Opin Neurol* 1998;11:305–309.
18. Lynch SG, Kroencke DC, Denney DR. The relationship between disability and depression in multiple sclerosis: The role of uncertainty, coping, and hope. *Mult Scler* 2001;7:411–416.
19. Simon JH, Jacobs LD, Campion MK et al. A longitudinal study of brain atrophy in relapsing multiple sclerosis. The Multiple Sclerosis Collaborative Research Groups (MSCRG). *Neurology* 1999;53:139–148.
20. Weiner D, Peterson B, Ladd K et al. Pain in nursing home residents. An exploration of prevalence, staff perspectives, and practical aspects of measurement. *Clin J Pain* 1999;15:92–101.
21. Won A, Lapane K, Gambassi G et al. Correlates and management of nonmalignant pain in the nursing home. SAGE Study Group. Systematic Assessment of Geriatric drug use via Epidemiology. *J Am Geriatr Soc* 1999;47:936–942.
22. Teno JM, Kabumoto G, Wetle T et al. Daily pain that was excruciating at some time in the previous week. Prevalence, characteristics, and outcomes in nursing home residents. *J Am Geriatr Soc* 2004;52:762–767.
23. Langemo DK, Melland H, Hanson D et al. The lived experience of having a pressure ulcer: A qualitative analysis. *Adv Skin Wound Care* 2000;13:225–235.
24. Wipke-Tevis DD, Rantz MJ, Mehr DR et al. Prevalence, incidence, management, and predictors of venous ulcers in the long-term care population using the MDS. *Adv Skin Wound Care* 2000;13:218–224.
25. Hunt TK, Hopf HW. Wound healing and wound infection: What surgeons and anesthesiologists can do. *Surg Clin North Am* 1997;77:587–606.
26. Wipke-Tevis DD, Williams DA, Rantz MJ et al. Nursing home quality and pressure ulcer prevention and management practices. *J Am Geriatr Soc* 2004;52:583–588.
27. Bair MJ, Robinson RL, Katon W et al. Depression and pain comorbidity: A literature review. *Arch Intern Med* 2003;163:2433–2445.
28. Moulin DE. Pain in central and peripheral demyelinating disorders. *Neurol Clin* 1998;16:889–897.
29. Fisher SE, Burgio LD, Thom BE et al. Pain assessment and management in cognitively impaired nursing home residents: Association of certified nursing assistant pain report, Minimum Data Set pain report, and analgesic medication use. *J Am Geriatr Soc* 2002;50:152–156.
30. Cohen-Mansfield J. The adequacy of the Minimum Data Set assessment of pain in cognitively impaired nursing home residents. *J Pain Symp Manage* 2004;27:343–351.
31. American Geriatrics Society Panel on Persistent Pain in Older Persons. The management of persistent pain in older persons. *J Am Geriatr Soc* 2002;50:S205–S224.
32. Ashton CM, Petersen NJ, Wray NP et al. The Veterans Affairs medical care system. Hospital and clinic utilization statistics for 1994. *Med Care* 1998;36:793–803.