Advanced Illness Care

The Relationship of Reported Pain Severity to Perceived Effect on Function of Nursing Home Residents

Mary P. Cadogan, 1,4 Maria Orlando Edelen, 3 Karl A. Lorenz, 2,3,4 Malia Jones, 3 Julia Yosef, 4 Thomas Hascall, 4 Barbara Simon, 4 Judith O. Harker, 4 Bruce Ferrell, 2 and Debra Saliba 3,4,5

Schools of 1Nursing and 2Medicine, University of California, Los Angeles. 3Rand Corporation, Santa Monica, California. 4Veterans Administration Greater Los Angeles Healthcare System, California. 5UCLA Borun Center for Gerontological Research, Los Angeles, California.

Background. We examined whether questions addressing the effect of pain on day-to-day function add unique information to the standardized verbal descriptor scale for pain severity in nursing homes (NHs).

Methods. Interviews were conducted with 123 residents in two Veterans Affairs NHs. All participants were asked about pain presence. Residents reporting pain were asked about severity of worst pain (mild, moderate, severe, very severe/horrible), degree of bother (not at all, a little, a moderate amount, a great deal), and the effect of pain on daily function (whether pain made it hard to “sleep,” “get out of bed,” or “spend time with other people” and whether activities were limited because of pain).

Results. Fifty-one percent of participants reported pain. The correlation between pain severity report and overall count of activity interference was significant (Spearman’s rho = .449, p = .001). In general, for each activity, the proportion reporting interference increased as severity increased. Fischer’s exact test showed significant association only for “hard to get out of bed” (p = .0175) and “hard to sleep” (p = .0211). As expected, residents reporting “mild” pain reported less activity interference than those reporting “very severe” pain. The association between pain and activity interference was more variable and less predictable among residents with “moderate” or “severe” pain.

Conclusion. Questions addressing the effect of pain on day-to-day functions are an important addition to standardized pain assessments, particularly for persons who report intermediate levels of pain severity because the perceived effect on daily function may vary most among individuals at these levels.

Key Words: Pain—Nursing home—Activity limitation.

Pain is a prevalent condition among older adults in the community and in nursing home (NH) settings (1–8). In recognition of the importance of pain as a common symptom, self-reported measures of pain presence and severity are routinely promoted as a “5th vital sign” (9,10). Although pain self-report is the accepted gold standard for identifying pain presence and severity, providers question the adequacy of a severity metric alone for understanding day-to-day pain experiences and titrating pain treatments (11,12).

For these reasons, pain assessment was identified as one of eight areas targeted for improvement as part of the national revision of the Minimum Data Set (MDS) for NHs (13). Currently, all Medicare certified and Veterans Affairs (VA) NHs are required to complete the MDS assessment on every resident at the time of admission and to update it quarterly, annually, and whenever there is a significant change in the resident’s status. The MDS includes more than 400 items that are meant to inform care plans and to identify issues requiring more intensive assessment or intervention (14). Since its introduction, MDS applications have expanded beyond clinical assessment to include providing data for NH quality measure (QM) reports. The MDS pain measure is the basis for one of the QMs included on the Centers for Medicare and Medicaid Services (CMS) Nursing Home Compare Web site (15). The current MDS 2.0 pain measures consist of NH staff assessment of frequency (no pain, less than daily, daily), intensity (mild, moderate, horrible/excruciating), and location. Research evidence demonstrates that the current MDS approach to pain assessment may underestimate the prevalence and impact of pain experienced by NH residents (16–18). In addition, a pain assessment approach that uses frequency, severity, and location may provide insufficient information regarding pain impact on which to base treatment decisions and monitor response.
Support for expanding severity assessments to incorporate items that measure the impact of pain on everyday function of older adults is increasing (19,20), and one recent study suggests that the older the respondent, the more likely he or she is to report that pain is associated with interference (21). The specific additional questions and actual utility vary across studies, most of which have focused on community-dwelling older adults, and have asked either multiple items or used open ended item responses. Prior studies in older adults do suggest particular items of importance. In a study of 40 adult outpatients with chronic pain, patients identified decreasing pain, increasing function, and improving sleep among top goals for pain assessment and management (22). In another outpatient study, a summary question about pain interference with any daily activities was associated with pain severity, frequency, and depressive symptoms (23). Although the association between pain and recreational activities has been documented in NH populations (24), the relationships among self-reported pain severity, associated bother, and limitations in day-to-day function have not been fully explored.

The purpose of this study was to examine whether four self-report questions addressing the effect of pain on day-to-day functions of NH residents add unique information beyond what is obtained through self-reported measures of pain severity.

**Methods**

**Setting and Participants**

The current study was conducted as part of the joint VA and CMS effort to validate proposed revisions to the MDS 3.0 for NHs. The current study protocol was authorized through the VA human subjects review and privacy review process. Participants were recruited from two VA NHs in California. One hundred thirty-nine postacute and long-stay residents who were scheduled for MDS assessment from September 2005 through October 2005 were eligible for inclusion in the study. Nine residents who were approached refused to participate, two were hospitalized, three were unable to communicate verbally, and two were discharged prior to interview, leaving a final sample of 123.

**Measures**

All demographic items were obtained from medical records. Cognitive status was measured using items from the most recent MDS to calculate the MDS Cognitive Performance Scale (CPS). CPS scores range from intact (0) to severely impaired (6) and are correlated with Mini-Mental Status Examination (MMSE) score (25).

The pain items used in the current analysis were part of a larger symptom interview that elicited data regarding global pain, severity, bother, and impact on daily function, seven specific pain subtypes, and 11 additional symptoms. Structured interviews were administered by trained research assistants. Three pain items modified from the Memorial Symptom Assessment Scale (MSAS) were used in the current study to measure pain presence, severity, and bother. Although the main objective of this study was to examine the relationship between pain severity and activity limitations, pain-associated bother was examined also because of the suggestion that self-reported bother might be another way to summarize the effect of pain on daily function (26). Although the MSAS has well-established validity and reliability for adults hospitalized on a medical–surgical unit (27) and for inpatient veterans with cancer (28), no evidence of use with NH populations could be found. Pain presence for the prior 24 hours was determined by asking participants, “Have you had any pain since yesterday afternoon?” Residents were also asked if they were experiencing pain at the time of the interview: “Are you having any pain right now?” Participants who reported any pain were asked to rate the severity of their worst pain (mild, moderate, severe, very severe to horrible) and to indicate how much they were bothered by the pain (not at all, a little, a moderate amount, a great deal). To minimize order effects, residents were randomly assigned so that half would receive the severity before the bother question and half were asked the bother before the severity question.

Four items modified from the Geriatric Pain Measure (29), which has been used in NH populations across varying levels of cognitive ability (30), were used to measure functional limitations in the current study. In each interview, when residents reported any pain, they were asked, “Did pain make it hard for you to get out of bed since yesterday afternoon? Did pain make it hard for you to sleep last night? Since yesterday afternoon, have you limited your activities because of pain? Since yesterday afternoon, has pain made it hard to be with other people?”

Interviews were conducted in the resident’s room or in a private section of a common area. Interviewers provided visual aids with response options to assist residents with selection of responses. Residents could respond verbally or point to their response. If the resident provided nonresponsive answers (i.e., answers that were not related to the question) or no response to all questions in two consecutive subsections of the symptom interview, the interview was terminated.

**Data Analysis**

Two specific research questions provided the framework for analysis.

1. What is the correlation between pain severity level and self-reported number of limitations in daily functions?

   The nonparametric Spearman’s rank correlation coefficient was used to evaluate the relationship between pain severity and number of functional limitations.

2. What is the association between reported pain severity and patterns of specific functional limitations?

   This relationship was examined by testing for a linear trend between pain severity and the proportion of subjects saying “yes” to specific pain-related limitations of daily activities. Fisher’s Exact test was used when necessary to account for sparse cells.
RESULTS

Participant Demographic Characteristics
One hundred twenty-three residents comprised the final sample. The mean age was 74 years with a range from 45 to 101 years. Eighty-nine percent of participants were male, and 70% were white. The median length of stay in the NH was 1.4 years. Sixty-nine percent had CPS scores of 0–1, indicating no or mild cognitive impairment.

Pain Prevalence and Characteristics
Fifty-one percent of participants (n = 63) reported pain during the previous 24 hours, and 38% (n = 47) reported being in pain at the time of the interview. Fifty-six of the 63 participants who reported pain answered all of the follow-up questions and comprised the final sample for pain analyses. For this group, 18% (n = 10) reported their pain as mild, 43% (n = 24) reported moderate pain, 25% (n = 14) reported severe pain, and 14% (n = 8) reported their pain as very severe.

Pain severity and amount of bother associated with pain.—Table 1 shows the amount of bother reported at each level of pain severity. In general, the amount of pain-related bother increased with pain severity. Ninety percent of participants who reported mild pain indicated that they were not bothered by the pain or bothered only a little. In contrast, 86% of participants who reported very severe pain indicated that they were bothered “a great deal” by their pain. This relationship was not as direct in the less extreme categories. It is interesting to note that, of participants who reported moderate pain severity, an equal percentage (21%) reported “a little” bother as reported a “great deal” of bother.

Number of limitations in daily activities reported by pain severity.—Figure 1 shows the relationship between reported pain severity and number of activity limitations. As self-reported pain severity increased, the number of limitations in day-to-day activities increased (Spearman’s rho = .449, p = .001). Although residents reported pain-associated limitation in daily function at all levels of pain severity, the association was most clear at the extreme ends of the pain severity scale (“mild” or “severe” pain). For example, 70% of residents with mild pain reported no functional limitations, whereas 100% of residents with very severe pain reported two or more functional limitations. In contrast to these extremes, the association between pain and functional limitations was more variable for residents with intermediate levels of pain severity. As illustrated in Figure 1, among residents reporting either moderate or severe pain, a broader distribution of interference with daily function was observed. The number of pain-related functional limitations

<table>
<thead>
<tr>
<th>Amount of Bother Reported</th>
<th>Mild (N = 10)</th>
<th>Moderate (N = 24)</th>
<th>Severe (N = 14)</th>
<th>Very Severe (N = 7)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>40% (4)</td>
<td>12% (3)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A little</td>
<td>50% (5)</td>
<td>25% (6)</td>
<td>7% (1)</td>
<td>0</td>
</tr>
<tr>
<td>A moderate amount</td>
<td>10% (1)</td>
<td>37% (9)</td>
<td>43% (6)</td>
<td>14% (1)</td>
</tr>
<tr>
<td>A great deal</td>
<td>0</td>
<td>25% (6)</td>
<td>50% (7)</td>
<td>86% (6)</td>
</tr>
</tbody>
</table>

Note: *One participant who reported Very Severe pain provided a non-responsive answer to the item regarding amount of bother.

Figure 1. Number of limitations reported by pain severity level. Correlation significant: (Spearman’s rho = .449, p = .001).
ranged from 0 to 4 for respondents in the moderate and severe pain severity groups.

**Type of activity limitations reported by levels of pain severity.**—The pattern of specific activity limitations reported by pain severity level is shown in Table 2. In general, for each activity, as severity increased, more persons reported the limitation. However, some residents reported interference with each activity at all levels of severity. Using Fisher’s Exact test, which adjusts for small cell sizes, a statistically significant relationship was seen for pain interfering with sleep ($p = .0462$) and for pain interfering with getting out of bed ($p = .0055$). The relationships between levels of severity and the other two limitation items (limiting activities and hard to be with other people) were not statistically significant ($p = .1138$ and $p = .3545$, respectively). Note that column totals do not equal 100% because up to four limitations could be independently endorsed at each level of pain severity.

A similar trend was seen for the relationships between amount of pain-associated bother and each activity limitation (data not presented). A trend toward increased report of limitations was seen as level of bother increased. However, as with severity, only interference with getting up and sleep were statistically significant ($p = .0419$ and $p = .0265$, respectively). Not statistically significant were the relationships between amount of bother and pain leading to self-reported limitation of activity ($p = .0547$) or between bother and hard to be with others ($p = .1166$).

**DISCUSSION**

There are three important findings from this study. First, the results show that, at all levels of pain severity, at least some individuals perceive that pain limits function in one or more of their most basic day-to-day activities. Second, particularly at moderate and severe levels of self-reported pain, the perceived effect on function may vary widely across individuals. Examination of frequency tables indicates that the strength of the association between pain severity and function was primarily among residents reporting pain at the extreme ends of the scale (“mild” or “very severe”), whereas among residents reporting “moderate” or “severe” pain the association was less evident. This finding suggests that, among residents reporting intermediate levels of pain severity, there is more variability in the perceived effect of pain on interference with daily function than there is among residents reporting mild or very severe pain. The third significant finding is that the relationship between pain severity and functional limitations differs by specific activity. In the current study, pain severity was significantly associated with reported difficulty sleeping and getting out of bed, whereas the associations with limiting day-to-day activities and hard to be around other people were not statistically significant.

These results are important for our understanding of the contributions of function questions to a standardized pain severity question in NH residents. Assessing pain-associated limitations in basic daily activities can provide important clinical information, particularly for persons who report intermediate levels of pain. These items ask residents to report their daily pain experience as it effects daily function, effectively anchoring pain reports to basic experience and providing additional perspective on self-reported severity. The focus on these items on function is consistent with an objective of gerontology, namely understanding and maximizing the function of older adults in their daily lives.

The addition of these items to standardized pain assessment also recognizes an emerging consensus that pain is multidimensional; therefore, even abbreviated pain assessments should reach beyond severity measures. For example, a study of 68 community-dwelling adults using a momentary, within-person perspective to understand individual differences found a differential association between narratives describing activity limitations and different levels of endorsed pain intensity (31). The lack of perfect association between pain severity and functional limitations in these studies suggests that questions addressing the effect of pain on day-to-day activities are a particularly important addition to standardized pain assessments for persons who report moderate or severe pain.

When considering the relative contributions of items, it is interesting to note that the one item that asked if the respondent limited activities because of pain did not show a statistically significant relationship with severity report. This finding may be explained, in part, by some prior research that suggests that, in addition to asking about limitations related to pain, respondents should be asked about task modification because pain-related fear may cause individuals to avoid or limit certain activities that they anticipate may provoke or exacerbate their pain (32). This is an important aspect to explore in future research and suggests the importance of retaining at least one item focused on limitation of activity to complement reports of pain severity.

Some limitations in the study must be acknowledged. The sample size was too small to examine the association of pain severity and activity limitations by specific resident
characteristics. This may be interesting to explore in a larger sample because there is some evidence that the association may differ by resident characteristics (33). In addition, this veteran sample may not be representative of a broader population of NH residents.

Based on the results of this pilot study, the association between pain severity and activity limitations is being examined in a large, national validation study of revisions to the MDS that will include both VA and community NHs. Identification of the best subset of items to measure both pain severity and activity interference will provide direction for creating a simple, standardized pain assessment tool that may ultimately improve the ability of clinicians to make treatment decisions and evaluate treatment response.

ACKNOWLEDGMENTS

This research was supported by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development Service SDR 03-217.

The views expressed in this research are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs.

REFERENCES