Behavioral Manifestations of Pain in the Demented Elderly

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In long-term care settings, behavioral disturbances are exhibited more often by those residents with some level of cognitive impairment. The extent to which pain influences dysfunctional behaviors, and the extent to which pain manifests itself as dysfunctional behaviors, has not been empirically studied. The purpose of our study was to investigate the relationship between pain and behavioral disturbances among long-term care residents suffering from varying levels of dementia. A cross-sectional study of 277 long-term care residents aged 60 and older was conducted to (1) determine the influence of pain on the number, intensity, frequency, and duration of dysfunctional behaviors; (2) investigate the differences between residents with varying levels of dementia who were suffering from acute pain in the intensity, frequency, and duration of 19 behavioral categories; and (3) investigate the differences between residents with varying levels of dementia who were suffering from chronic pain in the intensity, frequency, and duration of 19 behavioral categories. Results suggest that pain influenced behavioral disturbances among those with severe dementia more often than those with moderate or mild dementia, and residents with chronic pain who have severe dementia exhibit significantly more dysfunctional behaviors than those with earlier-stage dementia. These findings support the utility of comprehensive behavioral analysis involving clinical ratings of intensity, frequency, and duration of dysfunctional behaviors, with the assessment of the resident's level of dementia. Moreover, our results imply that pain and other forms of physical suffering must be adequately treated in order to reduce behavioral disturbances and improve quality of life. **(J Am Med Dir Assoc 2006; 7: 355–365)**

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Behavioral disturbances are believed to be a possible indicator of physical discomfort among the cognitively impaired elderly. In US nursing homes, the prevalence of behavioral disturbances ranges between 64% and 83%.[1,2] Behavioral disturbances often include physical combativeness, verbal aggression, agitation, socially disruptive behavior, withdrawal, and wandering. Levels of dementia have been found to have a strong association with behavioral dysfunction in long-term care.[3,4] When long-term care residents progress to moderate and severe levels of dementia, their capacity to effectively communicate pain to caregivers becomes diminished.[5] With progressing cognitive impairment, pain is often expressed in the form of behavioral disturbances, and may include agitation and other observable behaviors associated with discomfort.[6,7]

The prevalence of pain among the elderly has been estimated to be as much as 3 times higher than among the younger adult populations—40%[8] to 85%[9] versus 10%[10] to 30%,[11] respectively. For those patients who can report pain directly to their attending nurse or physician, pharmacological approaches appear to be largely successful in alleviating the pain.[12,13] However, many residents of long-term care (LTC) settings have difficulty communicating their pain. Researchers have noted that pain is difficult to detect by hospital staff because of more salient issues such as behavioral disturbances and emotional distress.[14] Residents, depending on factors such as type of dementia and chronic illness, can manifest pain in differing behavioral and affective ways.[15]

Delineating between acute and chronic pain in LTC residents who are suffering from dementia can be difficult. Pain associated with an accidental fall seems to be the most commonly studied example of acute pain in LTC settings. Thousands of LTC residents suffer from a fall every day in the United States, and when a fall occurs in an elder, the injuries are often more serious than what a younger person may sustain.[16,17] Pain caused by a fall is most often effectively treated with analgesics; however, a resident's level of dementia may interfere with adequate care and rehabilitation. Morrison and Siu[18] found that patients recovering from a fall-related hip fracture and had moderate to severe dementia were grossly undertreated by the LTC staff.

Chronic pain, as opposed to acute pain, is more difficult to identify and assess. Chronic pain is not associated with a new injury; rather, it is associated with old tissue damage, lasts longer than 3 to 6 months, and lasts beyond the normal course of healing.[19] Chronic pain is associated with a substantial

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percentage of psychiatric comorbidity.[20–22] In the younger population, chronic pain is usually *not* treated effectively with analgesics alone,[23] and this is likely to also be the case with LTC residents. Given the differences between the acute and chronic pain experience, it is possible that acute pain is manifested, assessed, and treated differently than chronic pain among demented LTC residents.

In a previous study, we investigated the behavioral and emotional ways in which pain may be expressed by those with dementia.[24] Specifically, we tested a path model composed of variables representing cognitive impairment, emotional distress, pain, activities of daily living, and behavioral disturbances. Path analyses revealed that a mediational model had the best model fit. We found that pain levels did not influence activities of daily living directly, but rather influenced behavioral disturbances and depression, which in turn influenced activities of daily living. These findings suggest that among persons suffering from dementia who cannot express pain directly, pain may be expressed via behavioral and emotional disturbances. Because of the correlational nature of the methodology, we did not test the kind of pain (acute versus chronic) experienced by the residents, nor did we delineate between the different types of behavioral disturbances. Therefore, further investigation was warranted in order to test the relationships between specific types of pain, categories of dementia, and specific kinds of behavioral disturbances that residents may express.

The purpose of this study was to investigate the relationships between pain and behavioral disturbances among LTC residents of differing levels of dementia. Three hypotheses guided the study: (1) the relationship between pain levels and overall behavioral disturbances will be significantly stronger among LTC residents suffering from later-stage dementia than that of residents suffering from earlier-stage dementia; (2) those LTC residents with moderate to severe dementia who are suffering from acute pain associated with a recent fall are likely to exhibit more intense, frequent, and longer-lasting behavioral disturbances than those residents with mild, early stage dementia; and (3) those LTC residents with moderate to severe dementia who are documented to be suffering from chronic pain in the absence of acute pain are likely to exhibit more intense, frequent, and longer-lasting behavioral disturbances than those residents with mild, early stage dementia.

METHODS

Participants

The study sample consisted of 277 residents living in a total of 16 LTC facilities in the Dallas, Texas, area. Fourteen of the care facilities were LTC/skilled nursing units, 1 was an inpatient rehabilitation unit, and 1 was a long-term acute care facility. Seventy–five percent of the residents in the sample were females, and the mean age was 82 years (SD = 9.3). The sample was predominantly white (89%), followed by African American (4%), and Asian American (2%). Residents were diagnosed with more than 2 chronic medical conditions on average ($\bar{X}$ = 2.7, SD = 1.8), the most common condition being hypertension (47%) followed by coronary artery disease (38%), cerebral vascular damage (29%), diabetes (24%), congestive heart failure (24%), atrial fibrillation (20%), chronic obstructive pulmonary disease (17%), and kidney disease (8%). The majority of the residents were functioning at the level of moderate dementia or worse (63%) and 37% suffered from mild to minimal cognitive impairment as indicated by the criteria outlined by Reisberg and colleagues[25] (Table 1). Using the Reisberg et al criteria from the Functional Assessment Staging Tool,[26] we divided our residents into 3 dementia categories for analytic purposes: Mild, Moderate, and Severe. The first 3 criteria fell into our "Mild" category, the next 3 criteria fell into our "Moderate" category, and the last 2 criteria fell into our "Severe" category.

Measures

Geriatric Level of Dysfunction Scale (GLDS)[27]

Residents were rated on the intensity, frequency, duration, and number (count) of each of 19 possible behavioral categories, including agitation, verbal aggression, withdrawal, and physical aggression.

Intensity ratings were made on a 7-pronged scale, with lower numbers representing the least intensity (1 = Tolerable), and progressive ratings of mildly distressing, moderately distressing, disruptive to self or others, interfering in medical care, possible danger to self of others, and (7 = Immediate Danger to Self or Others). Frequency ratings were made on a 7-pronged scale, with lower numbers representing fewer episodes (1 = Less than twice per month) and progressive ratings of once per week, 2 to 6 times per week, once a day, a few times per day, several times per day and (7 = Continuous). Duration ratings were made on a 7-pronged scale, with lower numbers representing shorter duration (1 = Less than or equal to 1 to 2 minutes per day), and progressive ratings of less than or equal to 30 minutes per day, less than or equal to 1 hour per day, less than or equal to 2 hours per day, less than or equal to 4 hours per day, less than or equal to 6 hours per day, and (7 = Greater than 6 hours per day). These ratings

Table 1. *Frequency Table of Study Dementia Categories Created Using Reisberg Categories*

Study Dementia Categories	Reisberg et al[26] Dementia Categories	n	%
Mild	None, Normal	17	6.1
Mild	Very mild, Forgetfulness	42	15.2
Mild	Mild, Early confusion	52	18.8
Moderate	Moderate, Late confusion	49	17.7
Moderate	Moderate–Early dementia	64	23.1
Severe	Severe, Middle dementia	39	14.1
Severe	Very Severe, Late dementia	14	5.1
	Total	277	100.0

have been evidenced to have excellent internal consistency ($\alpha = 0.96$). Test-retest coefficients have ranged between 0.86 and 0.94 among 3 raters. Any of the behavioral categories that were not exhibited at all were given a "0" entry. Composite variables were also computed for each resident to indicate their average behavioral intensity, frequency, and duration ratings across the 19 behavioral categories by computing means, in addition to counting the overall number of dysfunctional behaviors to represent number of dysfunctional behaviors per resident.

The Geriatric Multidimensional Pain and Illness Inventory (GMPI)[28]

The GMPI is a 12-item clinician-rated instrument designed to assess pain and its functional, social, and emotional consequences in LTC. The first item is, "How bad is your pain right now?" Other items include, "How much have you suffered because of your pain this last week?" "How much has your pain affected your ability to leave the room for social or recreational activities?" and "How irritable have you been this last week because of your pain?" All items are rated on a 10-point scale, with each point associated with specific behavioral criteria. The scaling of the items is behaviorally oriented because the GMPI is rated by a clinician who can only rate based on what the rater and the staff members can observe. The GMPI has been evidenced to have high internal consistency ($\alpha = 0.88$), and test-retest reliabilities for the 3 subscales have ranged from 0.62 to 0.96.[28] Higher values are indicative of higher levels of pain and/or higher levels of functional/social/emotional difficulties.

Functional Assessment Staging Tool (FAST)[26]

The FAST was developed to assist professionals and caregivers to chart the decline of patients with Alzheimer disease and other dementia-associated disorders. This tool consists of rating scales that culminate in designating a phase of dementia for the patient (see 7 phases in Table 1).

Neurobehavioral Cognitive Status Examination (NCSE)[29]

The NCSE is a clinician-administered examination of impairment in orientation, repetition, naming, attention span, comprehension, short-term memory, constructional ability, social judgment, abstraction, and calculation. The NCSE uses a differentiated approach to assess various aspects of cognitive functioning, and was developed to overcome weaknesses of other brief instruments. Higher values are indicative of higher cognitive functioning; lower values are indicative of impairment. The NCSE has good reliability and validity indicators, and has been evidenced to have a low false-negative rate.[30]

Procedure

The GLDS, GMPI, FAST, and NCSE were administered as part of a neuropsychological evaluation that was administered by 3 licensed doctoral-level clinical geropsychologists, after obtaining informed consent and caregiver assent for those participants suffering from later stages of dementia. This sample consisted of consecutive patient referrals from attending physicians to a clinical psychologist for 1 of 3 reasons: (1) change in cognitive functioning; (2) emotional distress; or (3) behavioral dysfunction associated with dementia. Each instrument was administered by 1 of the 3 clinical geropsychologists after interviewing the resident, nursing staff, and family members who were involved with the resident's care.

RESULTS

Descriptive statistics and intercorrelations for the GLDS intensity, frequency, and duration items are shown in Table 2 below. Residents exhibited a mean of 3.04 (SD = 1.67) behavioral disturbances. The mean frequency of behavioral disturbances was 6.15 (SD = 1.17). The mean intensity of behavioral disturbances was 4.39 (SD = 0.78). The mean duration of behavioral disturbances was 6.60 (SD = 0.75). The most commonly occurring behavioral dysfunction was depressive and withdrawal-related behavior (74% of the sample), followed by loss of weight or appetite (38%), low activity levels (38%), noncompliant behavior (22%), and unsafe impulsive behaviors (18%). The least frequently occurring behavioral dysfunction was pillaging, hoarding, and stealing (0.5%).

On average, residents reported that their current pain (GMPI Pain and Suffering scale) was at a level of "distressing" (pain is distracting more than 40% of the day). Residents reported high levels of activity interference associated with their pain (GMPI Activity Interference scale), and moderate levels of emotional distress due to pain (GMPI Emotional Distress scale). When these data were divided into our dementia categories, those residents in the Mild dementia category reported the most amount of pain and associated sequelae, and those residents in the Severe dementia category

Table 2. *Descriptive Statistics and Intercorrelations for Intensity, Frequency, and Number of Dysfunctional Behaviors*

	Mean	SD	Mean Intensity of All Behaviors	Mean Frequency of All Behaviors	Mean Duration of All Behaviors	Number (Count) of Dysfunctional Behaviors
Mean Intensity of All Behaviors	4.53	0.75	—			
Mean Frequency of All Behaviors	6.17	1.07	0.30*	—		
Mean Duration of All Behaviors	6.61	0.74	0.23*	0.70*	—	
Number (Count) of Dysfunctional Behaviors	3.32	1.57	0.11	−0.14*	−0.18*	—

* $r(275)_{0.95} = 0.12$; $r(275)_{0.99} = 0.16$.

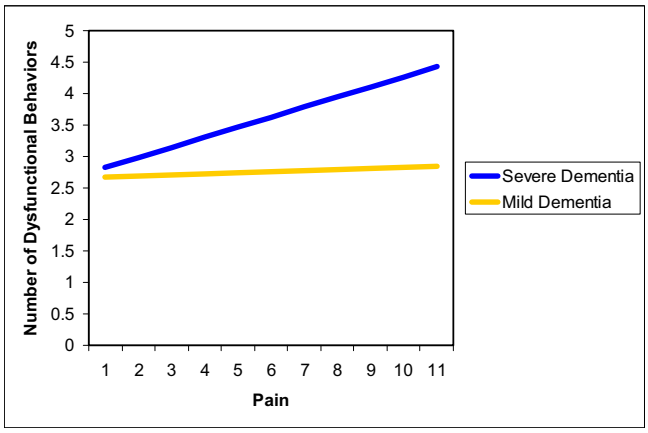

Fig. 1. *Differences between the dementia groups on the relationship between pain and number of dysfunctional behaviors.*

reported the least amount of pain and associated sequelae ($F(2,261) = 4.24$, $P < .05$).

Two of the 10 NSCE scales, Orientation and Calculation, were significantly negatively correlated with the residents' mean behavioral intensity ratings; $r = -0.13$ and -0.14, respectively, $P < .05$. Thus, higher cognitive functioning was mildly associated with lower intensity ratings. Seven of the 10 NSCE scales were significantly positively correlated with the residents' mean behavioral frequency ratings, with a range of $r = 0.13$ to 0.18 ($P < .05$). Five of the 10 NCSE scales were significantly positively correlated with the residents' mean behavioral duration ratings, with a range of $r = 0.14$ to 0.16 ($P < .05$). Thus, higher cognitive functioning was mildly associated with higher frequency and duration ratings. Finally, 6 of the NSCE scales were significantly negatively correlated with the residents' mean number of dysfunctional behaviors, with a range of $r = -0.12$ to -0.18 ($P < .05$). Thus, higher cognitive functioning was mildly associated with fewer dysfunctional behaviors.

Relationship Between Pain and Behavioral Disturbances

The GMPI Pain and Suffering subscale was significantly correlated with the residents' mean behavioral intensity and frequency ratings ($r(275) = 0.18$ and 0.14, $P < .05$, respectively), and also number of dysfunctional behaviors ($r(275) = 0.16$, $P < .01$), but not with mean duration ratings ($r(275) = .07$, ns). Thus, higher pain levels were associated with higher behavioral intensity and frequency, and more dysfunctional behaviors. The GMPI Activity Interference subscale was significantly correlated with the residents' mean behavioral intensity, frequency, and duration ratings ($r(275) = 0.20$, 0.20, and 0.16, $P < .01$, respectively) but not with number of dysfunctional behaviors ($r(275) = 0.09$, ns). Thus, higher functional impairment due to pain was associated with higher levels of behavioral disturbances, as measured by the behavioral intensity, frequency, and duration ratings. The GMPI Emotional Distress subscale was not significantly correlated with behavioral intensity, frequency, and duration ($r(275) = 0.03$, 0.07, and 0.05, ns, respectively), nor was it significantly correlated with number of dysfunctional behaviors ($r(275) = 0.08$, ns).

The number of dysfunctional behaviors for each resident was regressed on their GMPI Pain and Suffering subscale (pain was the predictor, number of behaviors was the dependent variable) for the Severe dementia group and the Mild dementia group. As shown in Figure 1, the regression slopes were significantly different between the 2 dementia groups, ($t(203) = 3.36$, $P < .0001$). The Severe dementia group exhibited a significantly stronger relationship between pain and number of dysfunctional behaviors.

The mean GLDS behavioral intensity rating for each resident was regressed on their GMPI Pain and Suffering subscale (pain was the predictor, mean behavioral intensity rating was the dependent variable) for the Severe dementia group and the Mild dementia group. The regression slopes were significantly different between the 2 dementia groups, ($t(203) = -5.37$, $P < .0001$). The Mild dementia group exhibited a significantly stronger relationship between pain and mean behavioral intensity ratings than did the Severe dementia group.

The mean GLDS behavioral frequency rating for each resident was regressed on the GMPI Pain and Suffering subscale (pain was the predictor, mean behavioral frequency rating was the dependent variable) for the Severe dementia group and the Mild dementia group. As shown in Figure 2, the regression slopes were significantly different between the 2 dementia groups, ($t(203) = 3.49$, $P < .0001$). The Severe dementia group exhibited a significantly stronger relationship between pain and mean behavioral frequency than did the Mild dementia group.

Finally, the mean GLDS behavioral duration rating for each resident was regressed on their GMPI Pain and Suffering subscale (pain was the predictor, mean behavioral duration rating was the dependent variable) for the Severe dementia group and the Mild dementia group. The regression slopes did not significantly differ between the 2 dementia groups ($t(203) = 0.55$, ns). The Severe dementia group exhibited the same

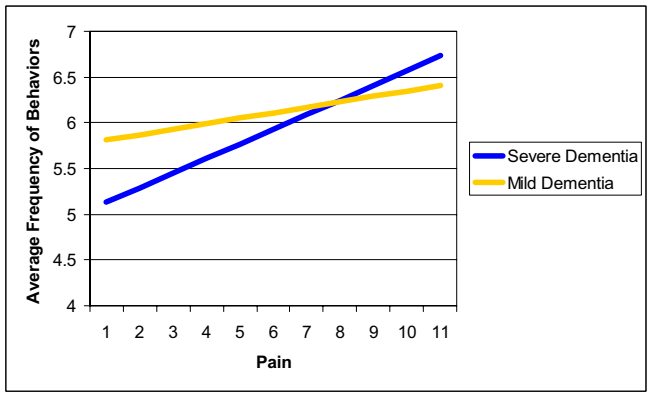

Fig. 2. *Differences between the dementia groups on the relationship between pain and mean behavioral frequency.*

Table 3. *Comparison of GLDS Intensity Ratings Between Dementia Groups Among Residents Suffering From Acute Pain (n=78)*

GLDS Category	Dementia Group						F Value
	Mild		Moderate		Severe		
	a	b	a	b	a	b	
Physical Combativeness	0.35	4.00	0.37	5.00	1.28	3.83	2.72
Verbal Aggression	0.32	2.75	0.74	4.00	0.78	4.67	0.89
Agitation/Sundowning Syndrome	0.06	2.00	0.74	5.00	0.78	4.67	2.48
Noncompliant Behavior	0.85	4.83	1.07	4.83	1.61	4.83	0.81
Distressing Repetitive Behavior	0.15	5.00	0.41	5.50	0.17	3.00	0.49
Delusional Territorial Behaviors	0.24	4.00	0.22	3.00	0.83	5.00	1.73
Yelling and/or Repetitive Behaviors	0.12	4.00	0.33	4.50	0.61	3.67	1.23
Socially Disruptive Behaviors	0.12	4.00	0.15	4.00	0.00	—	0.31
Depression, Withdrawal	3.59	4.52	3.63	4.67	2.72	4.45	1.21
Unrealistic Demands	0.68	4.60	0.96	3.71	0.39	3.50	0.74
Dysfunctional Pain/Illness Behaviors	1.06	4.50	1.33	4.50	0.56	5.00	0.85
Public Disrobing, Sexual Behaviors	0.00	—	0.11	3.00	0.00	—	0.96
Wanting To Go Home	0.38	4.33	0.37	3.33	0.44	4.00	0.02
Wandering	0.00	—	0.22	6.00	0.33	6.00	0.84
Loss of Weight or Appetite	1.62	4.58	2.78	5.00	2.28	5.13	1.70
Pillaging, Hoarding, Stealing	—	—	—	—	—	—	—
Unsafe Impulsive Behaviors	0.15	5.00	1.85	5.00	3.00	5.40	12.17*
Low Activity Levels	2.26	4.81	2.22	5.00	1.94	5.00	0.10
Sleep Problems	0.59	4.00	1.04	4.67	0.00	—	2.50

GLDS, Geriatric Level of Dysfunction Scale; a, includes those patients for whom the given behavioral disturbance was absent; b, includes only those patients for whom the behavioral disturbance was present; —, rare incidence, frequencies were too small to submit to computations.
* $F(2,76)_{0.95} = 3.13$; $F(2,76)_{0.99} = 4.93$.

relationship between pain and mean behavioral duration ratings as did the Mild dementia group.

Pain and Behavioral Disturbances Among Recently Injured Residents

Residents who experienced an injury due to a recent fall (within the past month, according to the residents' medical records) and were observed to be suffering from acute pain symptoms were the focus of the following analyses (n = 78). Among only those residents with a recent fall-associated injury, when the 3 dementia groups were compared on each GLDS Intensity rating, there were no significant differences between the groups, with the exception of Unsafe Impulsive Behaviors ($F(2,76) = 12.17$, $P < .001$) (Table 3). Those residents in the Severe dementia category exhibited significantly higher intensity ratings than those with Moderate dementia, and those with Moderate dementia exhibited significantly higher intensity ratings than those with Mild dementia. Depression, Withdrawal, Low activity levels, and Loss of Weight or Appetite behaviors received the highest intensity ratings for the Mild and Moderate dementia groups, but Unsafe Impulsive Behaviors received the highest intensity ratings among the Severe dementia group.

When the 3 dementia groups were compared on each GLDS frequency rating, there were no significant differences between the groups, with the exception of Physical Combativeness ($F(2,76) = 5.19$, $P < .01$) and Unsafe Impulsive Behaviors ($F(2,76) = 9.85$, $P < .001$) (Table 4). Post hoc analyses revealed that those residents in the Severe dementia category exhibited significantly higher Physical Combativeness frequency ratings than those with Moderate dementia, and those with Moderate dementia exhibited significantly higher Physical Combativeness frequency ratings than those with Mild dementia. Those residents in the Severe dementia category exhibited significantly higher Unsafe Impulsive Behavior frequency ratings than those with either Moderate or Mild dementia. Depression and Withdrawal behaviors received the highest frequency ratings across all 3 dementia groups, and Low Activity levels and Loss of Weight or Appetite also received high frequency ratings across all 3 dementia groups.

When the 3 dementia groups were compared on each GLDS duration rating, there were no significant differences between the groups, with the exception of Physical Combativeness ($F(2,76) = 3.61$, $P < .05$) and Unsafe Impulsive Behaviors ($F(2,76) = 8.84$, $P < .001$) (Table 5). Post hoc analyses revealed that those residents in the Severe dementia category exhibited significantly higher Physical Combativeness duration ratings than those with Moderate dementia, and those with Moderate dementia exhibited significantly higher Physical Combativeness duration ratings than those with Mild dementia. Those residents in the Severe dementia category exhibited significantly higher Unsafe Impulsive Behavior duration ratings than those with either Moderate or Mild dementia. Across all dementia groups, Depression, Withdrawal, Loss of Weight or Appetite, and Low Activity levels received high duration ratings.

Pain and Behavioral Disturbances Among Residents With Chronic Pain

Residents who had no evidence of a recent injury nor acute pain, but had chronic pain symptoms that were documented

Table 4. *Comparison of GLDS Frequency Ratings Between Dementia Groups Among Residents Suffering From Acute Pain (n = 78)*

GLDS Category	Dementia Group						F Value
	Mild		Moderate		Severe		
	a	b	a	b	a	b	
Physical Combativeness	0.21	2.33	0.30	4.00	1.33	4.00	5.19*
Verbal Aggression	0.35	3.00	0.81	4.40	0.94	5.67	0.96
Agitation/Sundowning Syndrome	0.15	5.00	0.85	5.75	0.61	5.50	1.47
Noncompliant Behavior	1.00	5.67	1.33	6.00	1.94	5.83	0.82
Distressing Repetitive Behavior	0.21	7.00	0.52	7.00	0.33	6.00	0.33
Delusional Territorial Behaviors	0.21	3.50	0.19	2.50	0.83	5.00	2.02
Yelling and/or Repetitive Behaviors	0.03	1.00	0.44	6.00	0.67	4.00	1.70
Socially Disruptive Behaviors	0.18	6.00	0.19	5.00	0.00	—	0.29
Depression, Withdrawal	5.29	6.67	5.41	6.95	3.72	6.70	2.00
Unrealistic Demands	0.79	5.40	1.67	6.43	0.56	5.00	1.65
Dysfunctional Pain/Illness Behaviors	1.47	6.25	1.96	6.63	0.72	6.50	1.09
Public Disrobing, Sexual Behaviors	0.00	—	0.19	5.00	0.00	—	0.96
Wanting To Go Home	0.56	6.33	0.74	6.67	0.67	6.00	0.07
Wandering	0.00	—	0.11	3.00	0.28	5.00	1.07
Loss of Weight or Appetite	2.47	7.00	3.89	7.00	3.11	7.00	1.24
Pillaging, Hoarding, Stealing	—	—	—	—	—	—	—
Unsafe Impulsive Behaviors	0.21	7.00	2.04	6.11	3.22	5.80	9.85*
Low Activity Levels	3.24	6.88	3.07	6.92	2.33	6.00	0.43
Sleep Problems	0.68	4.60	1.26	5.67	0.00	—	2.50

GLDS, Geriatric Level of Dysfunction Scale; a, includes those patients for whom the given behavioral disturbance was absent; b, includes only those patients for whom the behavioral disturbance was present; —, rare incidence, frequencies were too small to submit to computations.
* $F(2,76)_{0.95} = 3.13$; $F(2,76)_{0.99} = 4.93$.

by the LTC staff, were the focus of the following analyses (n = 164). Among only those residents documented to exhibit chronic pain symptoms without evidence of acute pain, Depression, Withdrawal, Loss of Weight or Appetite, and Low Activity level behaviors received the highest or high intensity ratings across all 3 dementia groups. Those residents with Severe dementia exhibited significantly higher GLDS intensity ratings on Physical Combativeness, Agitation, Distressing

Table 5. *Comparison of GLDS Duration Ratings Between Dementia Groups Among Residents Suffering From Acute Pain (n = 78)*

GLDS Category	Dementia Group						F Value
	Mild		Moderate		Severe		
	a	b	a	b	a	b	
Physical Combativeness	0.44	5.00	0.30	4.00	1.56	4.67	3.61*
Verbal Aggression	0.62	5.25	0.85	4.60	1.00	6.00	0.25
Agitation/Sundowning Syndrome	0.15	5.00	0.96	6.50	0.61	5.50	1.71
Noncompliant Behavior	1.21	6.83	1.41	6.33	1.89	5.67	0.37
Distressing Repetitive Behavior	0.21	7.00	0.52	7.00	0.39	7.00	0.31
Delusional Territorial Behaviors	0.29	5.00	0.37	5.00	1.06	6.33	1.39
Yelling and/or Repetitive Behaviors	0.09	3.00	0.48	6.50	1.00	6.00	2.05
Socially Disruptive Behaviors	0.21	7.00	0.07	2.00	0.00	—	0.42
Depression, Withdrawal	5.56	7.00	5.41	6.95	3.67	6.60	2.53
Unrealistic Demands	0.82	5.60	1.63	6.29	0.72	6.50	1.08
Dysfunctional Pain/Illness Behaviors	1.65	7.00	1.89	6.38	0.72	6.50	0.95
Public Disrobing, Sexual Behaviors	0.00	—	0.07	2.00	0.00	—	0.96
Wanting To Go Home	0.62	7.00	0.78	7.00	0.78	7.00	0.05
Wandering	0.00	—	0.22	6.00	0.33	6.00	0.84
Loss of Weight or Appetite	2.47	7.00	3.89	7.00	3.11	7.00	1.24
Pillaging, Hoarding, Stealing	—	—	—	—	—	—	—
Unsafe Impulsive Behaviors	0.21	7.00	2.04	6.11	3.06	6.11	8.84*
Low Activity Levels	3.29	7.00	3.11	7.00	2.44	6.29	0.36
Sleep Problems	1.00	6.80	1.41	6.33	0.00	—	2.12

GLDS, Geriatric Level of Dysfunction Scale; a, includes those patients for whom the given behavioral disturbance was absent; b, includes only those patients for whom the behavioral disturbance was present; —, rare incidence, frequencies were too small to submit to computations.
* $F(2,76)_{0.95} = 3.13$; $F(2,76)_{0.99} = 4.93$.

Table 6. *Comparison of GLDS Intensity Ratings Between Dementia Groups Among Residents Suffering From Chronic Pain (n = 164)*

GLDS Category	Dementia Group						F Value
	Mild		Moderate		Severe		
	a	b	a	b	a	b	
Physical Combativeness	0.13	4.00	0.35	3.71	1.52	4.10	12.44*
Verbal Aggression	0.51	3.56	0.41	3.88	0.63	3.40	0.28
Agitation/Sundowning Syndrome	0.00	—	0.52	4.33	1.22	4.71	8.65*
Noncompliant Behavior	1.1	4.93	1.04	4.88	1.67	4.50	0.94
Distressing Repetitive Behavior	0.00	—	0.11	4.00	0.74	4.00	8.48*
Delusional Territorial Behaviors	0.33	4.20	0.39	3.63	1.15	3.88	4.05*
Yelling and/or Repetitive Behaviors	0.13	4.00	0.13	3.33	0.41	3.67	1.40
Socially Disruptive Behaviors	0.06	4.00	0.00	—	0.30	4.00	3.13*
Depression, Withdrawal	3.63	4.40	3.64	4.33	3.04	4.32	1.13
Unrealistic Demands	0.89	3.73	0.31	3.83	0.11	3.00	4.95*
Dysfunctional Pain/Illness Behaviors	1.32	4.61	0.80	5.00	0.00	—	5.05*
Public Disrobing, Sexual Behaviors	0.05	1.50	0.04	3.00	0.00	—	0.26
Wanting To Go Home	0.33	3.50	0.31	4.60	0.15	4.00	0.27
Wandering	0.05	3.00	0.12	4.50	0.7	3.80	5.62*
Loss of Weight or Appetite	2.05	4.61	1.88	5.04	2.04	5.00	0.09
Pillaging, Hoarding, Stealing	0.08	5.00	0.00	—	0.15	4.00	1.01
Unsafe Impulsive Behaviors	0.52	5.50	0.63	4.70	1.11	5.00	1.14
Low Activity Levels	2.37	4.81	2.16	4.76	1.48	5.00	1.26
Sleep Problems	0.40	3.57	0.2	3.75	0.3	4.00	0.58

GLDS, Geriatric Level of Dysfunction Scale; a, includes those patients for whom the given behavioral disturbance was absent; b, includes only those patients for whom the behavioral disturbance was present; —, rare incidence, frequencies were too small to submit to computations.
* $F(2,162)_{0.95} = 3.06$; $F(2,162)_{0.99} = 4.78$.

Repetitive Behaviors, Delusional Territorial Behaviors, Socially Disruptive Behaviors, and Wandering than those residents with Moderate or Mild dementia (Table 6). However, the residents with Mild dementia exhibited significantly higher behavioral intensities of Unrealistic Demands and Dysfunctional Pain and Illness Behaviors.

When the 3 dementia groups were compared on each GLDS frequency rating, Depression, Withdrawal, Loss of weight or Appetite, and Low Activity level behaviors received the highest or high ratings, regardless of dementia group. Those residents with Severe dementia exhibited significantly higher GLDS frequency ratings on Physical Combativeness, Agitation/Sundowning, Distressing Repetitive Behaviors, Delusional Territorial Behaviors, and Wandering than those residents with Moderate or Mild dementia (Table 7). However, the residents with Mild dementia exhibited significantly higher frequencies of Unrealistic Demands and Dysfunctional Pain and Illness Behaviors.

When the 3 dementia groups were compared on each GLDS duration rating, once again, Depression, Withdrawal, Loss of Weight or Appetite, and Low Activity level behaviors received the highest or high ratings, regardless of dementia group. Those residents with Severe dementia exhibited significantly higher GLDS duration ratings on Physical Combativeness, Agitation/Sundowning, Distressing Repetitive Behaviors, Delusional Territorial Behaviors, Socially Disruptive Behaviors, and Wandering than those residents with Moderate or Mild dementia (Table 8). However, as with behavioral intensities and frequencies, the residents with Mild dementia exhibited significantly higher behavioral durations of Unrealistic Demands and Dysfunctional Pain and Illness Behaviors.

DISCUSSION

The purpose of this study was to investigate the relationships between pain and behavioral disturbances among LTC residents with differing levels of dementia. Our first study hypothesis was that the relationship between pain levels and overall behavioral disturbances would be significantly stronger among LTC residents suffering from later-stage dementia than that of residents suffering from earlier-stage dementia. This hypothesis was partially confirmed. Pain had a stronger influence on number of dysfunctional behaviors and mean frequency of dysfunctional behaviors among the residents with severe dementia as compared to residents with mild dementia. However, pain had a stronger influence on the mean intensity of dysfunctional behaviors among the residents with *mild* dementia. Finally, pain had the same influence on mean duration of dysfunctional behaviors, regardless of level of dementia.

Our second study hypothesis was that the LTC residents with moderate to severe dementia who are suffering from acute pain associated with a recent fall are likely to exhibit more intense, frequent, and longer-lasting behavioral disturbances than those residents with mild, early stage dementia. This hypothesis was supported to a certain extent. The residents with severe dementia had significantly more intense, frequent, and long-lasting physical combativeness and unsafe impulsive behaviors than did those residents with moderate or

Table 7. *Comparison of GLDS Frequency Ratings Between Dementia Groups Among Residents Suffering From Chronic Pain (n = 164)*

GLDS Category	Dementia Group						F Value
	Mild		Moderate		Severe		
	a	b	a	b	a	b	
Physical Combativeness	0.1	3.00	0.32	3.43	1.59	4.30	13.03*
Verbal Aggression	0.65	5.13	0.48	4.50	0.7	3.80	0.27
Agitation/Sundowning Syndrome	0.00	—	0.55	4.56	1.52	5.86	9.28*
Noncompliant Behavior	1.29	5.79	1.33	6.25	1.81	4.90	0.44
Distressing Repetitive Behavior	0.00	—	0.15	5.50	1.15	6.20	9.73*
Delusional Territorial Behaviors	0.32	4.00	0.49	4.63	1.74	5.88	7.33*
Yelling and/or Repetitive Behaviors	0.17	5.50	0.23	5.67	0.67	6.00	1.60
Socially Disruptive Behaviors	0.08	5.00	0.00	—	0.22	3.00	1.96
Depression, Withdrawal	5.65	6.85	5.65	6.73	4.44	6.67	2.22
Unrealistic Demands	1.48	6.20	0.37	4.67	0.19	5.00	7.04*
Dysfunctional Pain/Illness Behaviors	1.87	6.56	1.12	7.00	0.00	—	5.15*
Public Disrobing, Sexual Behaviors	0.11	3.50	0.04	3.00	0.00	—	0.71
Wanting To Go Home	0.63	6.67	0.32	4.80	0.11	3.00	1.32
Wandering	0.02	1.00	0.12	4.50	0.89	4.80	7.46*
Loss of Weight or Appetite	2.97	6.68	2.52	6.75	2.56	6.90	0.33
Pillaging, Hoarding, Stealing	0.11	7.00	0.00	—	0.15	4.00	0.81
Unsafe Impulsive Behaviors	0.52	5.50	0.75	5.60	1.41	6.33	1.78
Low Activity Levels	3.37	6.84	3.19	6.83	1.78	6.86	2.22
Sleep Problems	0.49	4.43	0.11	4.00	0.15	4.00	2.52

GLDS, Geriatric Level of Dysfunction Scale; a, includes those patients for whom the given behavioral disturbance was absent; b, includes only those patients for whom the behavioral disturbance was present; —, rare incidence, frequencies were too small to submit to computations.
* $F(2,162)_{0.95} = 3.06$; $F(2,162)_{0.99} = 4.78$.

mild dementia. The other behavioral categories did not differ among the 3 dementia groups.

Our third study hypothesis was that the LTC residents with moderate to severe dementia who are documented to be suffering from chronic pain in the absence of acute pain are likely to exhibit more intense, frequent, and longer-lasting behavioral disturbances than those residents with mild, early stage dementia. This hypothesis was confirmed. Among only

Table 8. *Comparison of GLDS Duration Ratings Between Dementia Groups Among Residents Suffering From Chronic Pain (n = 164)*

GLDS Category	Dementia Group						F Value
	Mild		Moderate		Severe		
	a	b	a	b	a	b	
Physical Combativeness	0.16	5.00	0.45	4.86	2.00	5.40	12.50*
Verbal Aggression	0.71	5.63	0.56	5.25	1.04	5.60	0.63
Agitation/Sundowning Syndrome	0.00	—	0.77	6.44	1.63	6.29	7.95*
Noncompliant Behavior	1.4	6.29	1.4	6.56	2.22	6.00	0.99
Distressing Repetitive Behavior	0.00	—	0.16	6.00	1.26	6.80	9.89*
Delusional Territorial Behaviors	0.49	6.20	0.6	5.63	1.96	6.63	5.50*
Yelling and/or Repetitive Behaviors	0.19	6.00	0.27	6.67	0.7	6.33	1.37
Socially Disruptive Behaviors	0.08	5.00	0.00	—	0.37	5.00	3.06*
Depression, Withdrawal	5.75	6.96	5.73	6.83	4.59	6.89	1.96
Unrealistic Demands	1.59	6.67	0.51	6.33	0.26	7.00	5.39*
Dysfunctional Pain/Illness Behaviors	1.97	6.89	1.12	7.00	0.00	—	5.55*
Public Disrobing, Sexual Behaviors	0.11	3.50	0.08	6.00	0.00	—	0.30
Wanting To Go Home	0.67	7.00	0.47	7.00	0.19	5.00	0.70
Wandering	0.05	3.00	0.19	7.00	1.04	5.60	6.61*
Loss of Weight or Appetite	3.08	6.93	2.56	6.86	2.59	7.00	0.44
Pillaging, Hoarding, Stealing	0.11	7.00	0.00	—	0.22	6.00	0.81
Unsafe Impulsive Behaviors	0.6	6.33	0.85	6.40	1.52	6.83	1.58
Low Activity Levels	3.41	6.94	3.24	6.94	1.81	7.00	2.20
Sleep Problems	0.7	6.29	0.15	5.50	0.26	7.00	2.43

GLDS, Geriatric Level of Dysfunction Scale; a, includes those patients for whom the given behavioral disturbance was absent; b, includes only those patients for whom the behavioral disturbance was present; —, rare incidence, frequencies were too small to submit to computations.
* $F(2,162)_{0.95} = 3.06$; $F(2,162)_{0.99} = 4.78$.

those residents documented to exhibit chronic pain symptoms without evidence of acute pain, those residents with severe dementia exhibited significantly more intense, frequent, and longer lasting Physical Combativeness, Agitation/Sundowning, Distressing Repetitive Behaviors, Delusional Behaviors, Socially Disruptive Behaviors, and Wandering than those residents with moderate or mild dementia. However, we found the residents with mild dementia exhibited significantly more intense, frequent, and longer-lasting Unrealistic Demands and Dysfunctional Pain and Illness Behaviors than those residents with severe dementia.

When the GLDS items were correlated with the NCSE items, we found that GLDS mean intensity, frequency, duration, and number of behaviors were mildly to moderately associated with cognitive impairment. Specifically, residents with lower cognitive functioning tended to have higher mean behavior intensity ratings and numbers of dysfunctional behaviors. On the other hand, residents with lower cognitive functioning tended to have lower frequency and duration of dysfunctional behaviors. Based on our sample, residents who were more cognitively impaired tended to present with dysfunctional behaviors. These behaviors were not as persistent among the less cognitively impaired residents.

Residents' mean behavioral intensity and frequency ratings were positively associated with pain levels. Higher pain levels (as measured by the Pain and Suffering subscale of the GMPI) were associated with higher behavioral intensity and frequency. Higher pain levels were also significantly positively associated with residents' number of dysfunctional behaviors. Functional impairment due to pain (as measured by the Activity Interference subscale of the GMPI) was significantly associated with residents' mean behavioral intensity, frequency, and duration ratings. More functional impairment due to pain was associated with higher behavior intensity, frequency, and duration. However, emotional distress due to pain (as measured by the Emotional Distress subscale of the GMPI) was not significantly associated with behavioral intensity, frequency, duration, or the residents' number of dysfunctional behaviors.

In light of these collective findings, it is likely that residents suffering from pain may manifest that pain in the form of dysfunctional behaviors, especially when cognitive impairment limits their ability to communicate pain. These findings appear to be especially applicable to those residents who are suffering from chronic, persistent pain in the absence of acute pain symptoms. Our results support prior evidence that persons suffering from chronic pain need a multidisciplinary approach to improving quality of life. Because residents suffering from pain are exhibiting behavioral and emotional disturbances, they are likely to benefit from biomedical and psychological approaches to decreasing pain and increasing functional capacity.[6,23]

The inclusion of "intensity" and "duration" ratings with frequency ratings is also an important contribution to interdisciplinary care and consultation in LTC. Prior assessment instruments of behavioral dysfunction have focused solely on the frequency of the behavior, without the inclusion of the level of danger to self or others. Prior behavioral assessments also have not included the extent to which the behavior lasts. Intensity ratings contribute to the assessment of medical necessity in the consultative consideration of pharmacological and cognitive-behavioral forms of therapy. Physicians, psychologists, nurses, social workers, and speech/physical/occupational therapists can use the GLDS and its components to establish the need for specific interventions, as well as the efficacy of these interventions over time.

Future research is encouraged to validate the relationship between pain and behavioral disturbances among other samples of LTC residents. Our sample consisted largely of chronically ill residents, most of whom were not ambulatory, who were referred to a psychologist for evaluation and cognitive-behavioral treatment because of behavioral problems associated with dementia or depression that were interfering with activities of daily living (ADLs) and quality of life. Moreover, the assessment of personality characteristics may be an important predictor of behavioral disturbances in LTC. In younger samples of persons suffering from chronic pain, personality characteristics are strong and reliable predictors of good compliance with and response to multidisciplinary treatment.[21]

CLINICAL IMPLICATIONS

As stated above, the referrals for psychological evaluation in this study were precipitated by observed mental status changes, symptoms suggesting depression, or behavioral disturbances associated with dementia. Although this study focused on the differences between acute and chronic pain and dysfunctional behaviors observed across differing levels of dementia, a consistent finding in this study was that pain is most often associated with behavioral expressions of anhedonia, depressed mood, withdrawal, low activity levels, and low appetite and weight loss. These symptoms were high across all dementia levels and this finding is consistent with observations of younger chronic pain patients. Depression, low activity levels, and unintentional weight loss are problems in LTC, and our study findings suggest that pain may contribute to the development of these problematic quality of life indicators. Therefore, when residents report that they "can't enjoy life," or that they "don't feel like doing anything," and resist getting out of bed or request to be in bed most of the time, or that they "don't feel like eating," providers must assess for the presence of chronic pain conditions, even if residents deny pain initially.

Clinicians working in LTC settings often have difficulty assessing and managing pain among residents with progressive levels of dementia because of individual differences or unreliable self-reporting of pain. Behavioral signs of depression, social withdrawal, and decreased appetite or weight loss can often serve as indicators that pain assessment and treatment are warranted. Our findings suggest that pain experienced by residents with severe dementia is likely to be manifested in higher numbers of behavioral disturbances that tend to occur frequently. Thus, when LTC staff observe residents who, because of their stage of dementia are exhibiting a variety of frequent behavioral disturbances involving physical combativeness, agitation, distressing repetitive behaviors, delusional

paranoia, social disruptive behaviors, and unsafe impulsive behaviors, the assessment and treatment of pain is necessary.

Severely demented residents who were suffering from a recent injury and experiencing acute pain exhibited more intense, frequent, and longer-lasting unsafe impulsive behaviors. These patients are often on skilled nursing units and receiving daily physical and occupational therapies. Dysfunctional behaviors might include getting out of bed or a wheelchair, attempting to transfer unsafely to a toilet, inability to appreciate or apply new safety procedures (ie, lock wheelchair wheels before transferring), and therefore residents put themselves or others at risk. The impulsive resident may just be an inappropriately assertive resident who is trying to change positions to relieve pain or act independently of unrecognized safety precautions. Premorbidly active residents normally attempt to be active after an acute injury. Many of these residents will not complain of pain or ask for as-needed analgesics, therefore as their level of dementia progresses, "as needed or requested" analgesics are less appropriate. Routine analgesics may help restless antalgic standing or getting out of bed, but they will not eliminate irrational wanderlust.

Residents with mild dementia are more likely to present with dysfunctional behaviors such as irrational unrealistic demands. These behaviors might include excessive use of call lights, wanting constant one-on-one time or service, demanding requests be performed immediately, demonstration of poor frustration tolerance, unreasonable or unrealistic expectations of staff, and trouble coping with reasonable delays. Residents with severe dementia exhibited the lowest levels of such behaviors, which indicates that residents who can still communicate effectively are likely to be more verbally demanding when experiencing chronic pain or discomfort. Dysfunctional pain behaviors are common in residents with mild dementia levels. These behaviors often involve refusal of care or rehabilitation secondary to pain, even when appropriate analgesics are administered. These residents often want 100% pain relief before they agree to rehabilitate or get out of bed. Motivational and cognitive behavioral therapy is usually effective in these situations.[23]

In summary, behavioral disturbances such as physical aggression, agitation, repetition, delusions, withdrawal, depression, low activity levels, low appetite and weight loss, wandering, and impulsivity may be indicators that residents are experiencing pain and may not be able to effectively and appropriately communicate that pain to LTC staff. The presence of such behaviors may serve as a sign to staff to interview family and other caregivers for any history of painful conditions in the resident's past that are commonly associated with chronic pain symptoms (eg, arthritis; degenerative joint disease; sites of old fractures; peripheral vascular disease—anoxia; diabetes—diabetic neuropathy; CVA—thalamic neuropathy; deep vein thrombosis, claudication; connective tissue diseases; infective neuropathies, eg, shingles; cancer—neoplasm). Assessment instruments that are appropriate for residents with later-stage dementia that assess facial expressions, pain descriptors, and posturing can easily be administered by LTC staff to aid in pain treatment decisions.[31–33] However, many residents will deny pain when briefly questioned. Comprehensive psychological and multidisciplinary evaluations that observe both verbal and behavioral manifestations of pain over extended periods and ADLs are more likely to assess and effectively treat chronic and acute pain in residents with varying levels of dementia in LTC settings.

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