

# Assessing Dysfunctional Behaviors in Long-term Care

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**Objective:** The Geriatric Level of Dysfunction Scale (GLDS) was developed to assess the intensity, frequency, and duration of 19 behavioral disturbance categories that can potentially interfere with long-term care.

**Design:** Secondary analysis of data collected from residents in long-term care facilities.

**Participants:** Participants were 399 adults aged 60 and older residing in one of 16 long-term care facilities.

**Results:** The GLDS items were analyzed for reliability, content validity, and convergent and discriminant validity. The GLDS items were significantly correlated with items from the Geriatric Multidimensional Pain and Illness Inventory, Geriatric Depression Scale, Neu-

ropsychological Status Examination, and the Psychosocial Resistance to Activities of Daily Living Index.

**Conclusions:** The GLDS is evidenced to be a reliable and valid assessment tool for assessing dysfunctional behaviors of residents in long-term care facilities. Its brevity and clearly defined assessment criteria are assets to the administering clinician. Research on the utility of the GLDS as a treatment outcome instrument in long-term care is warranted. The potential for psychologists, physicians, social workers, and registered nurses to administer the GLDS in long-term care settings is discussed. (*J Am Med Dir Assoc* 2005; 6: 300–309)

**Keywords:** Long-term care; behavioral disturbances; elderly; assessment

In nursing homes in the United States, the prevalence of behavioral disturbances ranges between 64% and 83%.<sup>1,2</sup> Behavioral disturbances often include physical combativeness, verbal aggression, agitation/sundowning syndrome, socially disruptive behavior, withdrawal, and wandering. Cognitive impairment is believed to influence from 50% to 90% of the behavioral problems in the elderly.<sup>3,4</sup> Persons with cognitive impairment may express their pain in the form of behavioral disturbances. These behaviors may include agitation and other observable behaviors associated with discomfort.<sup>5,6</sup>

One of the most commonly used measures of behavioral disturbances in long-term care (LTC) settings is the Cohen-Mansfield Agitation Inventory (CMAI).<sup>7</sup> The CMAI assesses the frequencies of 36 behaviors using a 7-pronged scale. The CMAI is verbally administered to a caregiver of the LTC resident. Each of the 36 behaviors is associated with physiological or emotional agitation, and there are no items that include depression-related behaviors, such as withdrawal, loss of weight and appetite, or low activity levels. Moreover, the CMAI only assesses the frequency of the behavioral distur-

bances, and not the intensity (the behavior's level of interference with provider care or quality of life) or the duration of the behavior (ie, total hours per day that the behavior is a problem).

Another instrument that is commonly used to assess behavioral disturbances is the Minimum Data Set 2.0 (MDS).<sup>8</sup> The MDS is a commonly administered instrument in long-term care settings, and consists of items that assess functional capacity across many domains. The MDS only includes 5 dysfunctional behavioral items: wandering, verbal abuse, physical abuse, socially inappropriate behaviors, and resisting care. Unfortunately, these behavioral items are generally acknowledged to have low reliability and validity.<sup>9</sup> Lawton and colleagues<sup>9</sup> found that validity indices for Section E ranged from 0.15 to 0.26, indicating very limited utility of those items. Moreover, the MDS uses ordinal- and nominal-level scales of measurement, therefore limiting the use of parametric statistical analyses with the MDS items.<sup>10</sup>

The purpose of the present study was to develop a comprehensive assessment instrument of dysfunctional behaviors that can be used with residents in long-term care facilities, including skilled nursing facilities, inpatient rehabilitation, and acute and long-term acute care facilities. The Geriatric Level of Dysfunction Scale (GLDS; Figure 1) was designed to assess the intensity, frequency, and duration of 19 behavioral disturbance categories that can potentially interfere with long-term care. The purpose of this study was to investigate the internal reliability, test-retest reliability, content validity, convergent validity, and discriminant validity of the GLDS.

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**Rate for intensity, frequency, and duration *per day* as indicated below:**

Immediate Danger to self or others	Possible Danger to self or others	Interfering medical status/care	Disruptive Self/Others/Staff	Distressing Self/Others/Staff	Distressing to staff or family	Tolerable
7	6	5	4	3	2	1
Continuous > 6 hours/day	Several times/day ≤ 6 hours/day	Few times/day ≤ 4 hours/day	Once a day ≤ 2 hours/day	2-6 times/week ≤ 1 hour/day	Once/week ≤ 30 mins	< twice/month 1-2 mins

**Targeted Behavioral Analysis (circle all that apply and indicate level of dysfunction using the GLDS):**

	I	F	D		I	F	D		I	F	D
Physical Combativeness	___	___	___	Depression, Withdraw, Helplessness	___	___	___	Loss of weight	___	___	___
Verbal Aggression,	___	___	___	Low Motivation, suicidality	___	___	___	Or appetite	___	___	___
Agitation/Hypomania,	___	___	___	Unrealistic demands	___	___	___	Pillaging, Hoarding,	___	___	___
Hyperactivity	___	___	___	Dysfunctional Pain/Illness behaviors	___	___	___	Stealing	___	___	___
Non-compliant Behaviors	___	___	___	Public disrobing, Sexual Behaviors	___	___	___	Unsafe Impulsive	___	___	___
Distressing repetitive behaviors	___	___	___	Wanting to go home	___	___	___	Behaviors	___	___	___
Distressing delusional Behaviors	___	___	___	Wandering	___	___	___	Low Activities	___	___	___
Yelling/Repetitive verbalizations	___	___	___		___	___	___	Levels	___	___	___
Socially Disruptive Behaviors	___	___	___		___	___	___	Sleep Problems	___	___	___

Fig. 1. Geriatric Level of Dysfunction Scale (GLDS).

**METHODS**

**Participants**

The study sample consisted of 399 residents living in a total of 16 long-term care 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 average age was 82 years (SD = 9.3). The sample was predominantly white (89%), followed by African American (4%), and Asian American (2%). Seventy-two percent (n = 287) of the sample reported persistent pain (pain experienced most of the day) and/or recurrent pain (pain experienced most days of the week). Residents were suffering from 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 Neurobehavioral Cognitive Status Examination.<sup>11</sup>

**Measures**

**Geriatric Level of Dysfunction Scale**

In the Geriatric Level of Dysfunction Scale (GLDS; Figure 1), residents were rated on the average intensity, frequency, duration, and number (count) of each of 19 possible behavioral categories. All ratings were made on a 7-pronged scale. For the ratings of intensity, frequency, and duration, lower

numbers represented the lower levels of dysfunction, and higher numbers indicated higher levels of dysfunction.

The following behaviors are assessed by the GLDS:

1. Physical combativeness: Any physically aggressive acts, behavioral postures, or gestures. These behaviors include acts, gestures, or attempts to hit, kick, push, pull, shove, bite, or harm others. Spitting, slamming doors, or throwing things in anger are also included if these behaviors are perceived as aggressive acts or gestures toward others.
2. Verbal aggression: Any verbal aggression that includes threatening physical aggression, cursing, or yelling at others. This also includes verbal abuse spoken to degrade, insult, or hurt feelings of staff or other residents.
3. Agitation, hypomania, or hyperactivity: Any *driven* behaviors that appear to be fueled by elevation of affect, anxiety, or attention deficit/hyperactivity states. Behaviors include but are not limited to pacing, compulsive checking or questioning of staff, distressful searching for something that is perceived to be lost, elation behaviors of feeling too happy, childish pranks, talking “big” (grandiose), inappropriate laughing, compulsions of repeatedly getting dressed and undressed, packing and unpacking clothes, rapid mood shifts.
4. Resistance to activities of daily living (ADLs) and/or noncompliant behaviors: Any uncooperative behaviors where the resident or patient resists necessary help. He or she may be confused or upset at a caregiver; stubborn; or complain of pain, fatigue, or any symptom as an excuse to resist care.
5. Distressing repetitive behaviors: Any nonaggressive repetitive behaviors such as handling, picking, or voli-

- tional movements that are distressing, disruptive, or injurious to self or others.
6. Distressing delusional behaviors: Any behaviors associated with or elicited by delusions involving fear of harm, fear of theft, spousal infidelity, fear of abandonment, visits or messages from family members, or messages from God/TV. Delusions can be confabulations or distortions of emotionally intense experiences or dreams, and may also include behaviors associated with hallucinations, such as hearing voices, talking to people who are not there, feeling things not there, or seeing things not there.
  7. Yelling/repetitive verbalizations: Any repetitive verbal behaviors that are not aggressive, but are distressing or disruptive to self or others.
  8. Socially disruptive behaviors: Any behavior that is distressing or disruptive to other residents, staff, or family members. This includes but is not limited to inappropriate urination in public areas, inappropriate touching of self or self-grooming behaviors in public areas, or inappropriate behaviors or verbalizations that disrupt social or recreational activities.
  9. Depression, withdrawal, helplessness, low motivation, and/or suicidality: Behaviors may include tearfulness, verbalizations of hopelessness, being a burden to family, being a failure, not wanting to live, and wishing he or she was dead or deserves being punished. Behaviors may also include changed behaviors suggesting apathy or indifference: decreased initiation of conversation; less affectionate or emotional; social withdrawal; and lost interest in family, friends, or staff.
  10. Unrealistic demands: Includes 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, impatient, and trouble coping with reasonable delays.
  11. Dysfunctional pain/illness behaviors: Refuses ADLs up time (being out of bed) and restorative or rehabilitation therapies because of mild to moderate chronic pain or illness symptoms. These dysfunctional behaviors are assumed to be beyond the effects of objective pathology and persist after appropriate analgesic use and medical stabilization. Residents often use illness or pain as an excuse to avoid self-care and undesirable ADLs.
  12. Public disrobing, sexual behaviors: Any inappropriate verbal or physical behavior suggesting sexual intent or that is distressing to staff or other residents because it suggests inappropriate sexual behavior. May include crude or sexual remarks, disclosure of sexual desires/experiences, inappropriate touching, or being excessively familiar or affectionate to strangers.
  13. Wanting to go home: Ideation and intent that often leads to attempts to elope and/or demanding verbalizations to staff and family. These behaviors are a problem when the resident is irrational or unrealistic and going home would put him or her at immediate risk.
  14. Wandering: Any ambulatory behaviors involving inappropriate entry into another resident's private quarters, or attempts to elope. These behaviors are irrational and often cause distress in other residents or their families.
  15. Loss of weight or appetite: Any weight loss or loss of appetite associated with medical, psychiatric, painful, emotional, or cognitive disorder /impairment that is judged to be responsive to cognitive behavioral and/or psychopharmacological interventions.
  16. Pillaging, hoarding, stealing: Compulsive or irrationally driven behaviors where residents take or collect objects that are not their own, which in some way distresses, disrupts, or interferes with the quality of life of other residents and staff. Resident is often confused and delusional about who owns items being taken or hoarded.
  17. Unsafe impulsive behaviors: Any behavior including getting out of bed or a wheelchair, attempting to transfer unsafely to a toilet, inability to appreciate or apply safety procedures (ie, lock wheelchair wheels before transferring), or attempting to do anything impulsively that distresses or disrupts other residents or puts the resident or others at risk. Behaviors may also include eating or drinking things inappropriately.
  18. Low activity levels: Any decrease in appropriate activity levels associated with medical, psychiatric, painful, emotional, or cognitive disorder or impairment that is judged to be responsive to cognitive behavioral and/or psychopharmacological interventions.
  19. Sleep problems: Any disturbance of sleep patterns associated with medical, psychiatric, painful, emotional, or cognitive disorder/impairment that is judged to be responsive to cognitive behavioral and/or psychopharmacological interventions.
- The GLDS Intensity rating categories are delineated as follows:
- 7, immediate danger: This level of intensity has strong implications for the LTC facility. It should be given only in consultation with medical and nursing staff. Such a rating requires immediate professional intervention (eg, one-on-one supervision of resident/patient to ensure safety of self and others, restraints, medication adjustment, or inpatient hospitalization). Therapeutic interventions attempt to significantly reduce risk immediately with cautious supervision, and/or therapeutic management of perceived danger.
  - 6, possible danger: While not as critical a risk as immediate (but greater than minimal), this level of intensity also has strong implications for the LTC facility. It should be given only in consultation with medical and nursing staff. Such a rating requires prompt and cautious professional intervention (eg, one-on-one supervision of resident/patient to ensure safety to self and others, hourly monitoring, application of a wander monitor, appropriate restraints, medication adjustment, or inpatient hospitalization). Therapeutic interventions attempt to sig-

nificantly reduce risk immediately with cautious supervision, and/or therapeutic management of perceived danger.

- 5, interfering with medical care and/or status: Not an immediate risk, but if behavior is not changed or therapeutically managed it is judged to be detrimental to the health and well-being of the resident's medical care and/or outcome. Therapeutic interventions attempt to change or improve the resident's situation and behaviors within a few days or 1 to 4 weeks with the intent of reducing medical risk.
- 4, disruptive: Signifies a significant decrease in measurable quality of life involving the resident's ADL levels and the emotional well-being of self and others. Therapeutic interventions attempt to change or improve the resident's situation and behaviors within a few days to 1 to 4 weeks with intent to reduce level of disruption of behaviors.
- 3, distressing: Represents a significant decrease in measurable quality of life involving the emotional well-being of self and/or others. Therapeutic interventions attempt to change or improve the resident's situation and behaviors within a few days to 4 to 6 weeks with the intent of reducing level of distress to self and others.
- 2, distressing: Represents a significant decrease in measurable quality of life involving the emotional well-being of staff or family. Therapeutic interventions attempt to change or improve the resident's situation and behaviors within a few days to 4 to 6 weeks.
- 1, tolerable: Rational, realistic, or desired treatment goals have been met.

The GLDS Frequency rating categories are delineated as follows:

- 7: Continuous
- 6: Several times per day
- 5: A few times per day
- 4: Once a day
- 3: 2 to 6 times per week
- 2: Once per week
- 1: Less than twice per month

GLDS Duration rating categories are delineated as follows:

- 7: More than 6 hours per day
- 6: Less than or equal to 6 hours per day
- 5: Less than or equal to 4 hours per day
- 4: Less than or equal to 2 hours per day
- 3: Less than or equal to 1 hour per day
- 2: Less than or equal to 30 minutes per day
- 1: Less than or equal to 1 to 2 minutes per day

### **The Geriatric Multidimensional Pain and Illness Inventory**

The Geriatric Multidimensional Pain and Illness Inventory (GMPI)<sup>12</sup> is a 12-item clinician-rated instrument designed to assess pain and its functional, social, and emotional consequences in LTC. In the absence of pain, the GMPI assesses the severity of the resident's primary chronic medical condi-

tion and its functional and emotional consequences. The first item is, "How bad is your pain or illness right now?" Other items include, "How much have you suffered because of your pain or illness this past week?" "How much has your pain and illness affected your ability to leave the room for social or recreational activities?" and "How irritable have you been this past week because of your pain or illness?" 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.<sup>12</sup> Higher values are indicative of higher levels of pain and/or higher levels of functional/social/emotional difficulties.

### **Geriatric Depression Scale**

The shortened (15-item) version of the Geriatric Depression Scale (GDS)<sup>13</sup> is a clinician-rated inventory that assesses depression. The GDS was standardized specifically toward the elderly population. An example of an item is, "Do you think it is wonderful to be alive?" Respondents answer each item with either "yes" or "no." The 15-item version has been evidenced to have good interrater reliability, with values ranging from 0.70 to 0.87.<sup>14</sup> Higher GDS values are indicative of higher depression.

### **Psychosocial Resistance to Activities of Daily Living Index**

The Psychosocial Resistance to Activities of Daily Living Index (PRADLI)<sup>15</sup> is an 8-item clinician-rated instrument that assesses the resident's level of functional independence and cooperation with 8 psychosocially related ADLs. The 8 domains are the following: Up time, eating habits, dressing, toileting, bathing, medical compliance, restorative care, and social/recreational activities. These items are rated on a 7-pronged scale, with 1 representing the lowest levels of independence and cooperation, and 7 representing the highest levels of independence and cooperation. The PRADLI has been evidenced to have high internal consistency ( $\alpha = 0.88$ ) and high convergent validity (from 0.95 to 0.98).<sup>15</sup>

### **Neurobehavioral Cognitive Status Examination**

The Neurobehavioral Cognitive Status Examination (NCSE)<sup>11</sup> 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.<sup>16</sup>

**Table 1.** Descriptive Statistics and Intercorrelations for Intensity, Frequency, and Number of Dysfunctional Behaviors

	Mean	SD	Average Intensity of All Behaviors	Average Frequency of All Behaviors	Average Duration of All Behaviors	Number of Dysfunctional Behaviors
Average intensity of all behaviors	4.39	0.78	—			
Average frequency of all behaviors	6.15	1.17	0.21*	—		
Average duration of all behaviors	6.60	0.75	0.17*	0.72*	—	
Number of dysfunctional behaviors	3.04	1.67	0.17*	-0.17*	-0.18*	—

\*  $r(397)_{.95} = 0.10$ ;  $r(397)_{.99} = 0.13$ .

## Procedure

The GLDS, GMPI, GDS, PRADLI, and NCSE were administered as part of a neuropsychological evaluation conducted by a clinical geropsychologist. This sample consisted of patient referrals in the years 2000 to 2002 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 GLDS was completed as part of the above-mentioned assessment battery, which involved a 60- to 90-minute face-to-face interview with the resident (or resident with a family member present). The GLDS, GMPI, and PRADLI are all clinical rating scales, which together require 30 to 50 minutes to complete (including brief interviews with LTC staff). Separately, the GLDS takes 15 to 20 minutes to complete, depending on the complexity of the resident's behavioral dysfunction. Nurses were typically interviewed by our geropsychologists during afternoon shift changes and debriefing, so that both AM and PM nurses could give their clinical observations of the resident. Most of the nurses and caregivers were very familiar with the assessment process and the GLDS so they could quickly give clinical input to our geropsychologists. Our assessment and treatment protocols involve regular (once or twice weekly) interdisciplinary communication between practitioners and caregivers in order to attain accurate assessment information while facilitating efficacious patient care. As the resident's level of dementia progresses, the assessment and treatment process becomes more dependent on interdisciplinary communication and cooperation between practitioners, family, and caregivers.

## RESULTS

Descriptive statistics for the GLDS intensity, frequency, and duration items are shown in Table 1 below. Residents exhibited an average of 3.04 (SD = 1.67) behavioral disturbances. The average frequency of behavioral disturbances was 6.15 (SD = 1.17). The average intensity of behavioral disturbances was 4.39 (SD = 0.78). The average duration of behavioral disturbances was 6.60 (SD = 0.75). As shown in Tables 2, 3, and 4, 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%).

## Reliability

In order to investigate internal consistency of the GLDS, Chronbach's alphas were computed using the intensity, frequency, and duration ratings of each of the 19 behavioral categories. As shown in Table 5, the alpha coefficients ranged from 0.21 (wanting to go home) to 0.81 (socially disruptive behaviors). The median alpha was 0.64, suggesting that most GLDS categories evidenced moderate to high internal consistency.

A subset of this sample that consisted of 22 consecutively evaluated patients was used for the test-retest reliability portion of this study. After being trained in the administration of the GLDS, 3 licensed doctoral-level clinical psychologists rated the 22 patients on the 3 most salient behavioral dysfunction items (because the average number of behavioral disturbances per resident was 3.04), in 2 administrations that were scheduled 48 hours apart. Thus, the intensity, frequency, and duration of 3 GLDS items were rated twice, with 48 hours between ratings. Both administrations were conducted using the input of LTC staff and caregivers. Table 6 shows the

**Table 2.** Descriptive Statistics for GLDS Intensity Items

GLDS Category	n	Mean	SD
Physical combativeness	53	4.19	1.14
Verbal aggression	60	3.87	1.05
Agitation/sundowning syndrome	36	4.56	0.84
Noncompliant behavior	88	4.74	0.67
Distressing repetitive behavior	18	4.33	1.08
Delusional territorial behaviors	39	4.10	1.02
Yelling and/or repetitive behaviors	23	4.00	0.90
Socially disruptive behaviors	12	4.00	0.43
Depression, withdrawal	295	4.34	0.95
Unrealistic demands	57	3.88	0.87
Dysfunctional pain/illness behaviors	63	4.65	0.74
Public disrobing, sexual behaviors	6	2.83	1.17
Wanting to go home	34	3.74	1.21
Wandering	19	4.32	1.53
Loss of weight or appetite	152	4.86	0.65
Pillaging, hoarding, stealing	2	4.50	0.71
Unsafe impulsive behaviors	70	5.16	0.71
Low activity levels	150	4.77	0.67
Sleep problems	36	4.14	1.10

**Table 3.** Descriptive Statistics for GLDS Frequency Items

GLDS Category	n	Mean	SD
Physical combativeness	53	3.92	1.84
Verbal aggression	59	4.66	1.54
Agitation/sundowning syndrome	35	5.26	1.60
Noncompliant behavior	88	5.70	1.44
Distressing repetitive behavior	18	6.22	1.11
Delusional territorial behaviors	39	4.72	1.75
Yelling and/or repetitive behaviors	23	5.00	1.76
Socially disruptive behaviors	12	3.92	1.44
Depression, withdrawal	293	6.75	0.73
Unrealistic demands	57	5.81	1.09
Dysfunctional pain/illness behaviors	63	6.60	0.98
Public disrobing, sexual behaviors	6	3.50	0.84
Wanting to go home	34	5.97	1.53
Wandering	19	4.58	1.89
Loss of weight or appetite	151	6.80	0.65
Pillaging, hoarding, stealing	2	5.50	2.12
Unsafe impulsive behaviors	69	5.93	1.40
Low activity levels	150	6.83	0.56
Sleep problems	33	5.00	1.68

correlations between the intensity, frequency, and duration of the 3 GLDS items of the first administration and the second administration. The item test-retest reliability coefficients ranged from 0.86 for First behavior intensity to 0.96 for Second behavior duration.

### Validity

The GLDS subscales were assessed for convergent and discriminant validity by correlating the residents' average intensity, frequency, duration, and number of dysfunctional behaviors with the NCSE, GDS, GMPI, and PRADLI, using Pearson product-moment correlations. As shown in Table 7, all 10 of the NSCE scales were negatively correlated with the residents' average behavioral intensity ratings, with a range of

**Table 4.** Descriptive Statistics for GLDS Duration Items

GLDS Category	n	Mean	SD
Physical combativeness	53	5.11	1.55
Verbal aggression	59	5.58	1.33
Agitation/sundowning syndrome	35	6.34	0.87
Noncompliant behavior	88	6.32	1.08
Distressing repetitive behavior	18	6.83	0.51
Delusional territorial behaviors	40	6.10	1.13
Yelling and/or repetitive behaviors	22	6.00	1.38
Socially disruptive behaviors	12	4.75	1.60
Depression, withdrawal	293	6.90	0.45
Unrealistic demands	57	6.49	1.09
Dysfunctional pain/illness behaviors	63	6.81	0.84
Public disrobing, sexual behaviors	6	4.00	1.67
Wanting to go home	34	6.91	0.38
Wandering	19	5.84	1.26
Loss of weight or appetite	151	6.94	0.35
Pillaging, hoarding, stealing	2	6.50	0.71
Unsafe impulsive behaviors	68	6.40	1.24
Low activity levels	150	6.94	0.33
Sleep problems	33	6.45	0.97

**Table 5.** Internal Consistency Coefficients for GLDS Items

GLDS Category	Alpha
Physical combativeness	0.71
Verbal aggression	0.67
Agitation/sundowning syndrome	0.69
Noncompliant behavior	0.74
Distressing repetitive behavior	0.61
Delusional territorial behaviors	0.53
Yelling and/or repetitive behaviors	0.73
Socially disruptive behaviors	0.81
Depression, withdrawal	0.60
Unrealistic demands	0.47
Dysfunctional pain/illness behaviors	0.71
Public disrobing, sexual behaviors	0.61
Wanting to go home	0.21
Wandering	0.79
Loss of weight or appetite	0.50
Pillaging, hoarding, stealing	—*
Unsafe impulsive behaviors	0.45
Low activity levels	0.43
Sleep problems	0.66

\* Rare incidence; frequencies were too small to submit to computation.

$r = -0.05$  to  $-0.14$ . Thus, higher cognitive functioning was associated with lower intensity ratings. All 10 of the NSCE scales were positively correlated with the residents' average behavioral frequency and duration ratings, with a range of  $r = 0.09$  to  $0.18$  for frequency and  $r = 0.07$  to  $0.16$  for duration. Thus, higher cognitive functioning was associated with higher frequency and duration ratings. Finally, all 10 of the NSCE scales were negatively correlated with the residents' average number of dysfunctional behaviors, with a range of  $r = -0.08$  to  $-0.18$ . Thus, higher cognitive functioning was associated with fewer dysfunctional behaviors.

As shown in Table 8, residents' GDS scores were positively correlated with the residents' average behavioral intensity,

**Table 6.** Test-Retest Correlations for the GLDS Items

	Pearson <i>r</i>
GLDS first behavior intensity: Administration 1 with 2	0.86
GLDS first behavior frequency: Administration 1 with 2	0.94
GLDS first behavior duration: Administration 1 with 2	0.92
GLDS second behavior intensity: Administration 1 with 2	0.96
GLDS second behavior frequency: Administration 1 with 2	0.94
GLDS second behavior duration: Administration 1 with 2	0.96
GLDS third behavior intensity: Administration 1 with 2	0.93
GLDS third behavior frequency: Administration 1 with 2	0.86
GLDS third behavior duration: Administration 1 with 2	0.87

**Table 7.** Correlations Between GLDS Items and NCSE Scales

	Average Intensity of All Behaviors	Average Frequency of All Behaviors	Average Duration of All Behaviors	Number of Dysfunctional Behaviors
Orientation	-0.14*	0.18*	0.14*	-0.18*
Attention	-0.10*	0.09	0.07	-0.09
Comprehension	-0.10*	0.14*	0.14*	-0.15*
Repetition	-0.06	0.13*	0.16*	-0.13*
Naming	-0.09	0.18*	0.15*	-0.14*
Constructions	-0.09	0.13*	0.11*	-0.12*
Memory	-0.10*	0.09	0.11*	-0.08
Calculations	-0.13*	0.10*	0.10*	-0.08
Similarities	-0.07	0.17*	0.15*	-0.14*
Judgment	-0.05	0.14*	0.10*	-0.09

\*  $r(397)_{.95} = 0.10$ ;  $r(397)_{.99} = 0.13$ .

frequency, and duration ratings, with a range of  $r = 0.07$  to  $0.16$ . Thus, higher depression scores were associated with higher intensity, frequency, and duration ratings. The GDS was significantly correlated with number of dysfunctional behaviors ( $r(397) = 0.10$ ,  $P < .05$ ). Higher depression scores were associated with more dysfunctional behaviors.

The GMPI Pain and Suffering subscale was significantly correlated with the residents' average behavioral intensity and frequency ratings ( $r(397) = 0.16$  and  $0.10$ ,  $P < .05$ , respectively), and also number of dysfunctional behaviors ( $r(397) = 0.15$ ,  $P < .01$ ), but not with average duration ratings ( $r(397) = 0.02$ , not significant [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' average behavioral intensity, frequency, and duration ratings ( $r(397) = 0.16$ ,  $0.17$ , and  $0.13$ ,  $P < .01$ , respectively) but not with number of dysfunctional behaviors ( $r(397) = 0.02$ , ns). Thus, higher functional impairment due to pain was associated with higher behavioral intensity, frequency, and duration. The GMPI Emotional Distress Subscale was not significantly correlated with behavioral intensity, frequency, and duration ( $r(397) = 0.03$ ,  $0.04$ , and  $0.03$ , ns, respectively), nor was it significantly correlated with number of dysfunctional behaviors ( $r(397) = 0.08$ , ns).

All 8 items of the PRADLI were significantly correlated with residents' average intensity ratings, with a range of  $-0.17$  to  $-0.32$ . Thus, the more independent and cooperative the residents were, the lower the behavioral intensity exhibited (Table 9). Four of the 8 PRADLI items were significantly correlated with residents' average frequency ratings, and 2 of the 8 PRADLI items were significantly correlated with average duration ratings. All PRADLI items with the exception of up time and toileting were significantly correlated with residents' number of dysfunctional behaviors (ranging from  $-0.11$  to  $-0.19$ ). The more independent and cooperative the residents were, the fewer dysfunctional behaviors they exhibited.

## DISCUSSION

The purpose of this study was to investigate the reliability and validity of the GLDS by examining its internal psycho-

metric properties and also its association with cognitive impairment, depression, ADLs, and pain levels. Our analyses revealed the GLDS to evidence good internal consistency, test-retest reliability, and good convergent and discriminant validity. The Intensity, Frequency, and Duration scales were correlated with one another and with other measures as would be expected.

With the exception of "Wanting to go home," each GLDS behavioral category evidenced moderate to high internal consistency. It should be noted that the intensity of a dysfunctional behavior is not necessarily highly associated with frequency or duration of the behavior. Although they are certainly not orthogonal, we do not necessarily believe that a behavior that is disruptive or dangerous would occur frequently or last for any particular amount of time.

The GLDS items were mildly to moderately associated with cognitive impairment. Specifically, residents with lower cognitive functioning tended to have higher average 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, which were more dangerous to self and others. These behaviors were not as persistent among the less cognitively impaired residents.

Residents' average 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 a resident's number of dysfunctional behaviors. Functional impairment due to pain (as measured by the Activity Interference subscale of the GMPI) was significantly associated with residents' average 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 findings, it is likely that

**Table 8.** Correlations Between GLDS Items, GDS, and GMPI Subscales

	GDS	GMPI Pain and Suffering	GMPI Activity Interference	GMPI Emotional Distress
I - Physical combativeness	0.02	0.01	0.11	0.06
F - Physical combativeness	-0.18	-0.14	0.01	0.04
D - Physical combativeness	-0.07	-0.13	0.07	0.10
I - Verbal aggression	-0.15	0.03	-0.15	0.07
F - Verbal aggression	-0.20	0.11	-0.01	-0.05
D - Verbal aggression	-0.27*	0.06	-0.01	0.08
I - Agitation/sundowning syndrome	-0.09	0.13	0.27	0.22
F - Agitation/sundowning syndrome	-0.16	0.36	0.02	0.15
D - Agitation/sundowning syndrome	-0.19	0.11	-0.05	-0.05
I - Noncompliant behavior	-0.11	0.09	-0.03	0.18
F - Noncompliant behavior	-0.11	0.05	-0.04	-0.06
D - Noncompliant behavior	-0.08	-0.07	0.03	-0.11
I - Distressing repetitive behavior	0.27	0.22	0.41	0.43
F - Distressing repetitive behavior	0.24	0.40	0.34	0.18
D - Distressing repetitive behavior	-0.06	0.16	0.04	0.20
I - Delusional territorial behaviors	0.11	0.24	0.09	0.11
F - Delusional territorial behaviors	-0.05	-0.02	0.07	0.07
D - Delusional territorial behaviors	-0.10	-0.03	-0.22	-0.11
I - Yelling and/or repetitive behaviors	-0.24	0.14	-0.41	-0.25
F - Yelling and/or repetitive behaviors	-0.37	0.05	-0.27	-0.25
D - Yelling and/or repetitive behaviors	-0.41	-0.18	-0.18	-0.23
I - Socially disruptive behaviors	0.22	0.26	0.40	0.31
F - Socially disruptive behaviors	0.57	0.22	0.18	0.52
D - Socially disruptive behaviors	0.20	0.49	0.45	0.57
I - Depression, withdrawal	0.18 <sup>†</sup>	0.21 <sup>†</sup>	0.26 <sup>†</sup>	0.10
F - Depression, withdrawal	0.17 <sup>†</sup>	0.07	0.11	0.07
D - Depression, withdrawal	0.14*	0.02	0.11	0.10
I - Unrealistic demands	0.03	0.25	0.14	0.19
F - Unrealistic demands	0.18	0.15	0.23	0.14
D - Unrealistic demands	-0.01	0.02	0.03	0.03
I - Dysfunctional pain/illness behaviors	-0.05	0.25	0.09	-0.09
F - Dysfunctional pain/illness behaviors	0.23	0.41 <sup>†</sup>	0.32*	0.23
D - Dysfunctional pain/illness behaviors	0.12	0.37 <sup>†</sup>	0.29*	0.23
I - Public disrobing, sexual behaviors	0.15	0.40	-0.36	0.44
F - Public disrobing, sexual behaviors	-0.12	-0.75	-0.33	-0.58
D - Public disrobing, sexual behaviors	0.35	0.59	-0.15	0.62
I - Wanting to go home	0.18	0.24	0.22	0.25
F - Wanting to go home	0.49 <sup>†</sup>	0.03	0.18	0.22
D - Wanting to go home	0.18	0.19	0.30	0.21
I - Wandering	0.03	0.14	0.44	0.23
F - Wandering	0.04	0.17	0.06	0.37
D - Wandering	-0.19	0.00	0.08	0.02
I - Loss of weight or appetite	0.20*	0.06	0.05	-0.05
F - Loss of weight or appetite	-0.14	0.00	-0.14	-0.08
D - Loss of weight or appetite	-0.04	0.09	-0.08	0.03
I - Pillaging, hoarding, stealing	— <sup>‡</sup>	— <sup>‡</sup>	— <sup>‡</sup>	— <sup>‡</sup>
F - Pillaging, hoarding, stealing	— <sup>‡</sup>	— <sup>‡</sup>	— <sup>‡</sup>	— <sup>‡</sup>
D - Pillaging, hoarding, stealing	— <sup>‡</sup>	— <sup>‡</sup>	— <sup>‡</sup>	— <sup>‡</sup>
I - Unsafe impulsive behaviors	-0.01	0.02	0.08	0.05
F - Unsafe impulsive behaviors	0.17	-0.33	0.05	-0.09
D - Unsafe impulsive behaviors	0.05	-0.25	0.07	-0.06
I - Low activity levels	0.03	0.07	-0.03	-0.08
F - Low activity levels	0.03	0.05	-0.01	0.04
D - Low activity levels	0.02	-0.04	-0.04	-0.08
I - Sleep problems	-0.30	-0.26	-0.09	-0.35*
F - Sleep problems	-0.03	-0.18	0.22	0.01
D - Sleep problems	0.16	-0.20	0.13	-0.22
Average intensity of all behaviors	0.07	0.16 <sup>†</sup>	0.16 <sup>†</sup>	0.03
Average frequency of all behaviors	0.16 <sup>†</sup>	0.10*	0.17 <sup>†</sup>	0.04
Average duration of all behaviors	0.11*	0.02	0.13*	0.03
Number of dysfunctional behaviors	0.10*	0.15 <sup>†</sup>	0.02	0.08

I, intensity; F, frequency; D, duration.

\*  $P < .05$ .

<sup>†</sup>  $P < .01$ .

<sup>‡</sup> Rare incidence; frequencies were too small to submit to computations.



**Table 9.** Correlations Between PRADLI Items and Intensity, Frequency, Duration, and Number of Dysfunctional Behaviors

PRADLI Domain	Average Intensity of All Behaviors	Average Frequency of All Behaviors	Average Duration of All Behaviors	Number of Dysfunctional Behaviors
Up time	-0.22 <sup>†</sup>	-0.18 <sup>†</sup>	-0.10*	-0.02
Eating habits	-0.32 <sup>†</sup>	-0.12*	-0.09	-0.17 <sup>†</sup>
Dressing	-0.17 <sup>†</sup>	-0.09	-0.02	-0.17 <sup>†</sup>
Toileting	-0.20 <sup>†</sup>	-0.07	-0.02	-0.08
Bathing	-0.17 <sup>†</sup>	-0.04	0.00	-0.19 <sup>†</sup>
Medical compliance	-0.18 <sup>†</sup>	-0.03	0.03	-0.11*
Restorative care	-0.22 <sup>†</sup>	-0.12*	-0.06	-0.17 <sup>†</sup>
Social/recreational	-0.32 <sup>†</sup>	-0.23 <sup>†</sup>	-0.11*	-0.19 <sup>†</sup>

\*  $r(397)_{.95} = 0.10$ ;  $r(397)_{.99} = 0.13$ ;  $P < .05$ .

<sup>†</sup>  $P < .01$ .

residents suffering from pain may manifest that pain in the form of dysfunctional behavior, especially when cognitive impairment limits their ability to communicate pain.

Residents' average behavioral frequency and duration ratings were positively associated with depression. That is, higher levels of depression were associated with more frequent and longer-lasting behavioral disturbances. In addition, higher levels of depression were associated with higher numbers of dysfunctional behaviors. The clinical implication may be that residents who are suffering from severe depression demonstrate more constant dysfunctional low activity avoidant behaviors consistent with their unrelenting negative mood. One noted strength of the GLDS is that it is sensitive to both agitated and apathetic dysfunctional behaviors. Future studies might explore the specific associations for both agitated "acting out" behaviors and dysfunctional low activity/avoidant behaviors.

Residents' average behavior intensity ratings were significantly associated with all 8 ADLs as measured by the PRADLI. Specifically, residents who were more limited in terms of their ADLs tended to exhibit higher intensity ratings, and, to a lesser extent, higher frequency and duration ratings. The same trend was also observed of the relationships between ADLs and residents' number of dysfunctional behaviors. In general, residents who were more impaired in terms of their ADL levels tended to present with a higher degree of behavioral dysfunction.

These collective findings are indicative of the convergent and discriminant validity of the GLDS. Thus, the GLDS appears to have potential clinical utility, especially when used as a treatment outcome measure in long-term care. Since dysfunctional behaviors can interfere with quality care, addressing such dysfunction is likely to improve a resident's functional capacity and quality of life. Therefore, improvements in the GLDS are likely to represent successful treatment outcomes. The brevity and psychometric properties of the GLDS are also assets to the clinician working in LTC, and can easily be incorporated into a monthly follow-up assessment schedule.

The inclusion of "intensity ratings" with frequency and duration ratings is also an important contribution of the

GLDS to interdisciplinary care and consultation in LTC. 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 GLDS in other residents of LTC facilities. Our sample consisted largely of chronically ill residents, most of whom were not ambulatory and 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 ADLs and quality of life. With appropriate training, other LTC professionals, such as social workers and registered nurses, could administer the GLDS to help establish the medical necessity for specific interventions, or monitor the effectiveness of specific corrective or restorative care plans within the domain of LTC. Further research on the GLDS as administered by clinical LTC staff is warranted, particularly in the area of pain management and restorative care in residents suffering from various levels of dementia.

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