A Direct Functional Measure to Help Ascertain Optimal Level of Residential Care

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A brief direct measure of daily living skills might help place cognitively impaired elders in suitable living environments. In this study, the Test of Everyday Functional Abilities (TEFA) as a possible adjunctive measure was investigated. The authors recruited 77 cognitively impaired persons in independent living (IL; N = 26), assisted living (AL; N = 25), and dementia special care (SC; N = 26) units. Participants in IL and AL were administered the TEFA and other instruments at baseline and every 6 months over 18 months and when transferred to a higher level of care. Special care subjects were administered the same instruments only at baseline. The TEFA clearly separated IL, AL, and SC residents ($P < .0001$). A TEFA score >50 suggests adequate functional competence for IL; a score from 30 to 40 adequate functional competence for AL; and a score of <30 probable need for an SC unit in the absence of a capable spouse.

Keywords: Test of Everyday Functional Abilities; assisted living; dementia special care

P hysically healthy elders seeking a protected environment have the options in retirement communities of independent living (IL), assisted living (AL), or dementia special care (SC). Level-of-care decisions made by professional personnel in these retirement communities typically rely on patient self-assessment and informal family reports, but with cognitively impaired elders, self-assessments are likely to be inaccurate and family reports are frequently biased.[1] Formal assessment instruments include the Functional Assessment Staging Scale[2] and the Instrumental Activities of Daily Living Scale,[3] but informal family reports and formal scales administered to family members are prone to positive bias when the cognitively intact spouse has been dependent on the impaired spouse and to negative bias when loved ones manifest behavioral difficulties.

Placement decisions are often aided by inferences about functional abilities drawn from brief cognitive examinations, such as the Mini-Mental State Examination (MMSE),[4] although the relationship between scores on such instruments and everyday functioning remains unclear.[5,6,7] Assessment of functional abilities would seem to be tested best by hands-on performance measures. Available measures vary in content and number of tasks used. Some, such as the Daily Activities Questionnaire,[8] require long periods of observation. Another, the Bay Area Functional Performance Evaluation,[9] includes tasks (eg, sorting shells) that bear little resemblance to actual activities of daily living. Others use only a single task, as in the Kitchen Task Assignment[10] and the Timed Test of Money Counting.[11] The Independent Living Scale (ILS)[12] includes memory/orientation,

managing money, managing home and transportation, health and safety, and social adjustment and includes 70 items which tap factual knowledge in addition to the ability to perform instrumental activities of daily living (IADLs). However, the ILS is lengthy and was standardized on a nonclinical sample with only 20 persons diagnosed with dementia included. A brief, portable, easily administered instrument that can objectively characterize the functional capabilities of elders at varying levels of cognitive impairment could help place cognitively impaired elders in appropriate settings and alleviate some of the difficulties in making placement decisions experienced by cognitively impaired persons, family members, and facility personnel. The Test of Everyday Functional Abilities (TEFA; formerly the Texas Functional Living Scale)[13] was developed as a brief, performance-based measure of daily living skills for use with cognitively impaired elders.

In this study, we examined the utility of the TEFA in determining the level of functional ability needed to live successfully in IL and AL facilities and in characterizing the rate of decline in functional skills at varying levels of cognitive impairment. We also examined the relationships between TEFA scores and scores on a brief cognitive measure (MMSE), a caregiver rating of elders' functional abilities (TEFA [caregiver version]), a global assessment measure (Clinical Dementia Rating Scale; CDR), a quality-of-life scale (Quality of Life in Late-Stage Dementia; QUALID), and a behavioral symptoms scale (Neuropsychiatric Inventory; NPI). We hypothesized that the TEFA would distinguish elders capable of successful IL and AL from elders requiring an SC unit.

Method

Subjects

Participant dyads were recruited at 3 local extended care facilities. Each facility offers IL, AL, and SC. In theory, individuals residing in an IL facility require no assistance, and those residing in an AL facility require only minimal assistance or prompting to carry out IADLs (including taking medications) and are typically capable of carrying out activities of daily living (ADLs) such as feeding and dressing independently or with minimum prompting. In contrast, SC residents require supervision and regular assistance with all IADLs and several ADLs.

Inclusion criteria were self-report or spouse or caregiver report of memory difficulty, willingness to cooperate with testing procedures, and sufficient familiarity with English to follow test instructions. We excluded individuals with significant physical limitations (vision, hearing, mobility, and/or debilitating medical conditions) that prevented them from performing hands-on tasks and also excluded subjects and caregivers with rapidly deteriorating general medical conditions. As informants, we allowed paid caregivers or family caregivers with at least 8 hours of contact with the resident per week.

Instruments

Mini-Mental State Exam. The MMSE[4] is a brief measure of cognitive impairment with sound psychometric properties,[5] and age-corrected and education-corrected norms are available.[14] Higher scores represent higher cognitive function.

Test of Everyday Functional Abilities. The 21-item TEFA[13] takes 15 minutes to administer and yields a maximum score of 52 points, with higher scores indicating better IADL skills. It is designed to be administered by a bachelor's-level technician. In studies using both cognitively impaired and intact elderly individuals, the TEFA demonstrated good reliability and validity.[13] The TEFA rates IADLs such as making change, telling time, dialing a telephone, reading a calendar, tying shoelaces, addressing a letter, writing a check, reciting steps in making a peanut butter and jelly sandwich, and remembering to take medications. In a study assessing a cognition-enhancing medication, the TEFA captured subtle changes in functional status of Alzheimer's disease patients which were paralleled by improvements in their global cognitive abilities that were not detected in caregiver reports.[15] Scores of TEFA correlate well with ILS scores,[16] and the TEFA is sensitive to decrements in functional skills that are affected by cognitive decline.[15] In addition to administering the TEFA directly to subjects, informants were asked to estimate performance of the subjects on the individual TEFA items.

Clinical Dementia Rating. The CDR[17] measures cognitive and functional impairment in patients with dementia. The CDR uses interviews with the patient and informant interviews to assess patient performance in 6 areas of cognitive functioning:

memory, orientation, judgment and problem solving, home and hobbies, community affairs, and personal care. Each area is rated in 1 of 5 levels of impairment severity: 0 indicates no dementia, whereas ratings of 0.5, 1, 2, and 3 suggest questionable, mild, moderate, and severe dementia.

Neuropsychiatric Inventory. The NPI[18] assesses psychopathology in cognitively impaired patients through caregiver interviews. It quantifies frequency (1 = *occasionally* to 4 = *very frequently*) and severity (1 = *mild* to 3 = *severe*) in 12 domains (delusions, hallucinations, dysphoria, anxiety, agitation, apathy, euphoria, irritability, disinhibition, aberrant motor behavior, night-time behavior, and changes in appetite and eating behaviors). Higher scores indicate more severe psychopathology.

Quality of Life in Late-Stage Dementia. The QUALID[19] is a brief, informant-based instrument that rates quality of life as observed within a 1-week window in persons with late-stage Alzheimer's disease and other dementias. The scale uses 11 observable behaviors thought to be associated with quality of life and rated by frequency on a 5-point Likert-type scale, with total scores ranging from 11 to 55. Lower scores reflected a higher quality of life. The QUALID is a reliable and valid scale that is also sensitive to change.[20]

Procedure

Informed consent was obtained from subjects and/or legally authorized representatives, using forms approved by the University of Texas Southwestern Medical Center Institutional Review Board. Subjects were administered the MMSE, the CDR, and the TEFA by a trained psychometrician. Within 1 week of each participant's evaluation, caregivers were administered the TEFA (informant version), the QUALID, the informant part of the CDR, and the NPI. All participants in IL and AL were reevaluated at 6-month intervals for a period of 18 months; those in SC were evaluated only once. Participants were also reevaluated at the time of transfer to a higher level of care or another living setting.

Statistical Methods

For dichotomous measures (sex), proportions for each group are reported and compared using χ^2. For continuous measures (age, education, MMSE, TEFA, TEFA [caregiver version], CDR, QUALID, and NPI), medians and ranges for each group are reported and statistical analyses were performed using the Kruskal-Wallis test; when significant, nonparametric multiple comparisons were performed using the Dunn method.[21] The association of the direct administration and caregiver estimates of TEFA scores was examined using Spearman's rank order correlations (rho), and administration was examined using Wilcoxon's signed ranks test (WSR). SPSS V 14 was used for all analyses, and statistical significant was set to $P < .05$.

Results

Subjects

Participants were 77 persons and their caregivers. All care-recipients were 65 years or older; 26 initially resided in IL, 25 in AL, and 26 in SC units. Their median age was 83.5 years (64-96 years), median education was 14 years (7-20 years), and 75% (57/76) were women. The demographics for each group are presented in Table 1, which includes baseline testing data.

Age and education did not differ between groups. Significant differences were found on all measures including both versions of the TEFA, MMSE, CDR, QUALID, and NPI. As expected, worse cognition (MMSE), global function (CDR), quality of life (QUALID), and more disturbed behavior (NPI) were associated with higher levels of care. All groups were significantly different from each other on both versions of the TEFA. Persons in dementia care were significantly different from persons in the other two groups on MMSE and CDR; persons in dementia care were significantly different from persons in IL in QUALID and NPI scores. We also found that despite a high correlation, rho (72) = 0.86, $P < .0001$, between direct administration of the TEFA to memory-impaired persons and estimates by their informants, informants significantly (WSR, $P < .0001$) overestimated the actual TEFA performance of subjects. Although the mean MMSE score for the IL group was approximately at the mean (26 vs 27 points) for persons with college experience between 80 and 84 years of age,[14] their median CDR score of 0.5 (0.5-3.0) suggested at least mild functional impairment.

Table 2 shows changes in participants' status over the 18 months of the study. Of the 3 in the IL group transferred to a higher level of care, 1 was

Table 1.   Demographics and Baseline Level of Function Data From Independent Living, Assisted Living, and Dementia Care

	Independent (N = 26)	Assisted (N = 25)	Dementia Care (N = 26)	χ^2 P value
	53 (% of women) Median (Range)	92 (% of women) Median (Range)	80 (% of women) Median (Range)	.0055 Kruskal-Wallis P value
Age (y)	83 (74-91)	85 (64-96)	84 (66-96)	.5985
Education (y)	16 (11-18)	13 (9-19)	14 (7-20)	.1816
MMSE	28 (12-30)	23 (2-30)	9 (1-24)	< .0001
TEFA	46.5 (19-52)	33 (12-51)	12 (1-35)	< .0001
TEFA (caregiver)	50.5 (34-52)	41.5 (17-52)	20 (4-50)	< .0001
CDR	0.5 (0.5-3)	1 (0.5-3)	3 (2-4)	< .0001
QUALID	12 (11-24)	15.5 (11-26)	17 (11-42)	.0159
NPI	1.5 (0-19)	6 (0-42)	12 (0-50)	.0039

Note: MMSE, Mini-Mental State Exam; TEFA, Test of Everyday Functional Ability; TEFA (caregiver), Test of Everyday Function performance estimated by caregiver; CDR, Clinical Dementia Rating Scale; QUALID, Quality of Life in Late-Stage Dementia Scale; NPI, Neuropsychiatric Inventory.

Table 2.   Changes in Participant Status and Level of Care

	Independent Living (N = 26)	Assisted Living (N = 25)	Dementia Care (N = 26)
Dropped out, N (%)	2 (7.7)	0	0
Died, N (%)	1 (3.8)	0	1 (4)
Changed care level, N (%)	3 (11.5)[a]	6 (24)	N/A

Note: N/A, not applicable.
[a] 2 due to death of spouse.

transferred to AL, and 2 due to spousal death were transferred to SC. All 6 of the transfers from AL to a higher level of care (1 at home and 5 in SC) were due to functional decline.

Independent living subjects showed no significant change in any measure over the period of 18 months; AL subjects showed greater impairment on all functional measures than IL subjects and also showed greater change over time. Because of the small number, it was not possible to determine if the 9 individuals who required a higher level of care differed significantly at baseline from their cohort. It was clear, however, that TEFA scores between the 3 groups showed very little overlap. As expected, lower TEFA scores predicted greater impairment in cognitive and global function, more severe neuropsychiatric symptoms, and somewhat lower quality of life.

Conclusions

In this 18-month study, TEFA scores discriminated best of all measures administered between individuals at the 3 levels of care, whether administered directly to residents or to their caregivers, who tended to modestly overestimate residents' abilities. There was very little overlap in TEFA scores between the 3 groups. We propose that a TEFA score >50 suggests adequate functional competence for IL; a score from 30 to 40 adequate functional competence for AL; and a score of <30 probable need for an SC unit in the absence of a capable spouse. As was expected, persons at different levels of care showed significant differences in functional ability, with lesser differences in behavioral disturbance and quality of life. It was clear that having a cognitively intact spouse enabled many persons with moderate cognitive impairment to maintain IL status; the transfer to SC of 2 of the 3 IL subjects was because of spousal death.

We were surprised at the relative stability of the IL and AL groups, given their average age of approximately 83 years at the outset of the study; a longer study would have been a better test of the predictive value of the TEFA. There are several limitations to our study. Our subjects were not a random sample of a population; rather, they consisted of volunteers motivated to participate in the study. These individuals are also not a representative sample of persons of their age; they had greater-than-average education and affluence. The facilities in which they lived

may also have been differently staffed and more tolerant of functional impairment than other facilities

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