Improving Early Recognition of Alzheimer’s Disease: A Review of Telephonic Screening Tools
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As the elderly population in the United States has grown, there has been a commensurate increase in the incidence and prevalence of Alzheimer’s disease (AD). The U.S. General Accounting Office estimates that 1.9 million Americans aged 65 years and older have some form of AD, with 1.1 million having moderate or severe AD [1]. Unfortunately, Alzheimer’s disease frequently remains unrecognized or undiagnosed, particularly in its early stages. Although individuals with this condition may receive medical care regularly, physicians and other health care providers often fail to identify patients with dementia, even when the symptoms are quite pronounced [2–4]. In addition, even close family members often fail to recognize the signs of dementia.

Developing and implementing a valid and efficient case-finding methodology for use in today’s busy and cost-conscious primary care setting is an important first step in identifying and treating early-stage AD in a greater number of patients. For Medicare managed care organizations (MCOs) required to do a general health screen of all new members, a telephone screening instrument for dementia represents such a methodology. Telephonic assessment of elderly persons is reliable and valid in a range of domains, including activities of daily living [5], quality of life [6], and depression [7]. In a comparison of face-to-face and telephone versions of several cognitive assessments, Carpenter and colleagues found that for healthy elderly persons, assessing memory via telephone (at least for verbal memory) can be an efficient means of evaluating individuals [8].

To be useful in today’s cost-conscious medical environments, whether in a managed care or large group practice setting, a telephonic screening tool needs to possess several attributes. The tool must be easy to administer and structured so that a nonclinical interviewer can administer it; it must be able to be administered regardless of caregiver availability; and it should be short, taking no more than 3 to 5 minutes to administer. This length would allow the tool to be added to existing regularly conducted health status questionnaires, thus minimizing overall administrative burden. This article will review current AD telephone screening tools and assess their overall usefulness in a managed care or group practice setting.

Benefits of Early Recognition of AD
Individual MCOs determine which screening questions they will include in their general screening tests, and there are several reasons for them to incorporate dementia-related questions. First, mental well-being contributes to a patient’s overall health status and level of medical and pharmaceutical utilization. In particular, dementia has been shown to significantly contribute to overall medical costs [9]. In a study of more than 80,000 elderly members of a Medicare MCO, care of dementia patients was significantly more expensive with regard to total claims, medical claims, inpatient claims, and emergency room claims [9]. In addition, comorbid conditions such as heart disease and diabetes were more costly to treat in individuals with dementia compared to age- and sex-matched controls.

Second, identifying patients with dementia and enrolling them in a disease management program during the earliest stages of their disease is likely to improve quality of care and reduce organizational costs. Early identification allows for more effective disease management, thus offering the potential to better manage costs as well as provide opportunities for patients and families to plan for the future. The importance of early detection is underscored by research showing consistent cost savings if a patient’s score on the Mini-Mental State Examination (MMSE) is raised through treatment by as little as 1 point. Raising the MMSE score by 2, 5, or 10 points increases cost savings commensurately [10]. Preventing a 1-point fall in MMSE scores in patients with moderate to severe dementia would result in an annual cost of care savings of several hundred dollars per patient.

Third, results from the screen would help facilitate the follow-up evaluation needed to definitively diagnose dementia when the symptoms are still fairly mild. Early diagnosis increases the likelihood that patients found to be at risk for dementia would receive new dementia treatments.

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early enough for these therapies to make a difference. Currently, 3 drugs that are moderately efficacious in the management of AD, particularly in its early stages, have been approved in the United States. These drugs are cost-effective, as shown by a study of the impact of donepezil on cost of care in a MCO in which elderly patients receiving the drug had statistically significant decreases in outpatient and office costs. [11]

Finally, the National Committee for Quality Assurance is looking at issues related to mental health treatment as important quality indicators for 2001 and future reviews. Addressing the problem of early identification of dementia will be of immediate concern for MCOs that want to pass these reviews.

**Telephonic Screening Tools**

**Telephone Cognitive Assessment Battery (TCAB)**
The TCAB [12] was designed to assess cognitive status in older persons; it consists of 6 neuropsychological tests. The Short Blessed Test (CERAD version) is a measure of mental status, including concentration, language, memory, and orientation. The word fluency test is a measure of verbal production, semantic memory, and language; spelling “world” backwards is a test of concentration. The cognitive estimation test measures judgment and has been shown to be sensitive to deficits in judgment not revealed by standard measures of intelligence and reasoning. Serial 7 subtraction is a test of concentration and calculation, and the logical memory test measures immediate and delayed recall. In a study that compared the test battery given to dementia patients in person by a trained clinician with the test battery given to an age-, sex-, and education-matched group over the telephone, the telephone version was found to distinguish between normal and cognitively impaired subjects with a sensitivity similar to the face-to-face version (about 0.9). The TCAB was successful in distinguishing between normal and mildly impaired subjects. The test is designed to be administered by trained professionals and takes between 15 and 20 minutes to complete.

**Telephone Instrument for Cognitive Status (TICS)**
The TICS [13] is an 11-item test adapted from the MMSE. Only 2 of the items are identical, however. In a study involving 100 patients with dementia and a control group comprised mainly of normal spouses, the TICS correlated highly with the MMSE [13]. The TICS had a sensitivity of 94%. A trained interviewer administered the test, but it was unclear whether that individual was a clinician. No information was provided on ease or time of administration. A later study on the TICS found that, as with the MMSE, there was a strong positive correlation between level of education and test score [14]. These authors also found a high correlation between TICS score and occupation, depression, and age. Again, no information was provided on time and ease of administration. The TICS was designed to identify individuals with significant cognitive impairment; subsequent studies indicate that it does not do as good a job in identifying individuals with mild cognitive impairment [15].

**Telephone Instrument for Cognitive Status (Modified) (TICS-M)**
This modified version of the TICS [16] includes a delayed word list recall task as well as the original immediate word recall task; the entire test consists of 21 items with a maximum score of 50 points. The TICS-M consists of the original TICS questions on orientation, memory, calculation, language, repetition, general knowledge, and abstraction; the ability to tap on the telephone 5 times was added to measure verbal comprehension and praxis. Although the original TICS scores are affected by respondent’s level of education, scores on the TICS-M are adjusted to account for this potential bias. The TICS-M was administered to 12,709 individuals who were part of an existing federal registry of aging twins. Unlike most other assessments of screening tools, this was a population-based study in which the prevalence of dementia was presumed to be fairly low. A follow-up dementia questionnaire was then administered by telephone to individuals with TICS-M scores that suggested cognitive problems. Results of this study indicate that the instrument has a sensitivity of greater than 99% and specificity of 86%. No information was provided on how long it took to administer the TICS-M or who administered it.

**Telephone Version of the Mini-Mental Status Examination (ALFI-MMSE)**
The 30-item MMSE is the most widely used screening instrument for cognitive impairment. It consists of tests of orientation, memory registration, attention and concentration, memory recall, and language. Originally designed for face-to-face administration, the MMSE has been adapted for telephone use [17]. The telephonic version omits questions that are complex or require visual input, including following a 3-stage command, reading and obeying a sentence, writing a sentence, and copying an intersecting pentagon. It contains 22 items and is otherwise similar to the original. In a validation study, the ALFI-MMSE instrument correlated highly with both the face-to-face version of the MMSE and with another face-to-face test, the Brief Neuropsychiatric Test. The sensitivity of the MMSE and the ALFI-MMSE were similar (68% versus 67%). Nurses administered the ALFI-MMSE as part of this validation study, but it was unclear whether this is necessary during routine screening. No information on administration time was provided. However, this study did take hearing acuity of the patient into account, an issue that
needs to be addressed in the development of an effective telephone screening instrument. With the ALFI-MMSE, those with self-reported hearing impairment had significantly lower scores on the telephone version.

**Blessed Telephone Information-Memory-Concentration Test (IMC)**
The Blessed IMC [18] is a 27-item mental status questionnaire consisting of a series of memory and orientation questions. In its face-to-face form, the IMC has been used in clinical settings and research studies. It was adapted for telephone administration because it does not rely on visual prompts or written instructions and its administration time is under 10 minutes. In reliability testing of the telephone version, the IMC was found to be highly correlated with the face-to-face version (Spearman’s rank correlation = 0.96) [18]. The test was administered by a registered nurse or a trained psychometrician experienced in evaluating AD patients. Average administration time was 5 minutes, but it is not clear how long it would take when administered by nonclinical personnel. The sensitivity of the test was not reported. The authors discussed some potential limitations of this instrument, including a lack of certainty that subjects were not using clocks or calendars to help in orientation questions and the possibility that caregivers were assisting the subjects.

**Structured Telephone Interview for Dementia Assessment (STIDA)**
The STIDA [19] is a structured telephone interview which through the inclusion of items measuring functional decline is designed to reduce the educational bias associated with instruments that measure cognitive performance alone. It includes items from the MMSE and the Blessed-Orientation-Memory-Concentration Test and consists of 6 subscales, including questions that assess memory, orientation, judgment, community and home activities, and personal care. In a validation study, 2 forms of the STIDA were tested: a subject-only form, which consisted of the subject’s responses to the cognitive abilities and functional status section of the interview, and an informant/subject form, which included cognitive testing of the subject by a trained clinician. Both forms of the STIDA were administered by telephone to 28 patients: 13 normal subjects and 15 with cognitive impairments. The time to administer was 23.7 minutes for impaired subjects and 21.3 minutes for normal subjects. The subject-only form had a sensitivity of 0.8; the informant/subject form had a sensitivity of 0.93. The authors also tested a short STIDA consisting of a telephone cognitive screen section and 6 additional questions on cognitive ability and functional status. The shorter test took about 10 minutes to administer and had a sensitivity of 0.93 with a specificity of 0.77. The authors suggest that the short version be used as an initial screen to be followed by an assessment with the original STIDA.

**Telephone Assessed Mental State (TAMS)**
The TAMS [20] is a 4-item test of orientation, attention, and memory adapted from the MMSE. The instrument was validated by testing 30 probable and definite AD patients with the TAMS and retesting them several days later face-to-face with the MMSE and the Alzheimer’s Disease Assessment Scale (ADAS). A trained psychometrician administered all tests. The TAMS score was strongly correlated with scores from the MMSE and ADAS. The TAMS score was also highly correlated with years of education, which is not surprising since it was adapted from the MMSE. No information was provided on test sensitivity or time to administer.

**Short Portable Mental Status Questionnaire (SPMSQ)**
The SPMSQ [21] is a 10-item standardized test designed to measure the existence and level of cognitive impairment; the original version was developed as a face-to-face interview. Three questions measure orientation to time and place, 4 questions assess memory for personal information, 2 questions measure awareness of current events, and 1 question measures the ability to do serial subtraction. Scores for the SPMSQ decline with increasing dementia. The telephone version of this instrument was evaluated for effectiveness and reliability in a group of outpatients receiving a comprehensive geriatric assessment. A nurse specialist administered all telephone interviews. The telephone version of the SPMSQ was found to correlate highly with the face-to-face version, and both versions correlated significantly with the MMSE. Hearing impairment did not have an impact on either version of the test. Sensitivity and specificity were 0.74 and 0.79, respectively. No information was provided on time to administer the test or whether a nonclinician could administer it.

**Future Directions and Recommendations**
This review of the literature clearly shows that it is possible to conduct a telephonic assessment of cognition in the elderly to identify individuals with cognitive impairment who may have dementia. Most of the instruments reviewed here, however, had 1 or more features that would make them impractical and burdensome for routine use in a large group practice or managed care setting. Many took too long to administer or were designed to be administered by highly trained clinical professionals. A screening tool with either of these features would be too expensive and impractical for routine, large-scale use.

Many of the existing telephonic screens were developed to assist in patient care in the context of a specialized Alzheimer’s clinic or for the purpose of facilitating further
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AD research rather than for the purpose of quickly and cost-effectively identifying at-risk patients in a large multispecialty practice. To be practical in these busy outpatient settings, the tool must be able to be administered by nonclinician staff. In addition, questions measuring AD risk need to be combinable with questions assessing other chronic conditions that would benefit from early intervention. Developing a reliable and economically feasible telephonic health status assessment that includes questions on AD risk would help provide a means of early identification not dependent upon the family or the patient seeing a primary care provider. Regular assessment of large numbers of elderly patients for dementia would help shift the condition from being a “silent epidemic” [22] to one that is routinely diagnosed, discussed, and managed within the group practice setting.

It is unclear whether the existing tests could be combined with other standard telephone assessment tools and administered as part of an ongoing health status interview or whether a new tool must be developed. The development of a brief telephone screen that can be combined economically with other health status questions holds the most promise for managed care. Nonetheless, there is much that can be done in the meantime. Given the evidence summarized in this paper, it is important both in terms of quality of care and economics that Medicare MCOs do a better job in the early identification and management of patients with dementia. Telephonic screening has been shown to be a valid means of achieving early identification of patients at risk for dementia. Screening all elderly patients via telephone interview is an important first step in identifying at-risk patients, and this should be followed by testing, early intervention, and long-term follow-up when appropriate. To support screening programs and help ensure their success, MCOs will undoubtedly need to provide incentives to providers for screening. Such incentives could include bonuses for MMSEs (or other dementia questionnaires) documented in the patient medical record, and bonuses for minimum MMSEs below a certain point that are followed up with subsequent testing, care plans, and case management.

References


