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Article 49

The Four Coins Question: A Brief Cognitive-Functioning Assessment Tool for Counselors

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Demographic shifts and longer life expectancy in the United States have resulted in a rapidly expanding number of senior citizens, many of whom need some type of mental or physical care. It is estimated that 4.5 million Americans currently have Alzheimer's disease and 70% of those with the disease live at home (Wild, Boise, Lundell, & Foucek, 2008) — many cared for by family members. Needs evaluation of many of these seniors is limited to intermittent medical office visits, or missing altogether, as the disease progresses. One way to increase the chances of appropriate care for elderly adults is to provide family counselors and other mental health workers with a fast and easy cognitive appraisal tool that anyone, regardless of training, can use to evaluate changes in cognitive functioning and the concomitant changes in the level of care needed.

As our population ages, more and more older clients, with and without dementia, will seek out counseling to deal with the many physical and emotional demands of aging. Those caring for older adults are also seeking mental health counseling at an increasing rate as the counseling needs of the two demographics, baby boomers and aging parents, converge. Counselors that see older adults need brief assessment tools to monitor the cognitive functioning of their clients so they can give their clients the best care possible as well as help clients that are caring for elderly family members to monitor their loved ones to make sure they are getting the level of care they need (Wild et al., 2008).

The objectives of this article are to describe the use of an assessment tool that involves a single question that asks the person to add the total amount of four coins and to provide evidence of concurrent validity between this “Four Coins” question and the Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975).

Existing Brief Cognitive Functioning Assessment Tools

In geriatric populations, assessment of cognitive functioning ranges from short interviews to extensive radiographic and chemical analyses. The complexity of the tool the clinician chooses depends on the practicality and efficiency for both client and clinician. On the low complexity side, a number of quick and easy cognitive assessment tools have been developed and are used both to detect cognitive impairment and to monitor deterioration. The most widely used of these tests is Folstein’s Mini Mental Status Examination (MMSE). The test detects impairment in several cognitive domains, takes only 5 to 10 minutes to administer, and is helpful in estimating the degree, change, and particular area of cognitive impairment, especially in cases of suspected dementia (Folstein et al., 1975; McDowell, Kristjansson, Hill, & Hébert, 1997).

Other short cognitive assessment tools include the Short Portable Mental Status Questionnaire (Palmer & Meldon, 2003); the Mini-Cog (Borson, Scanlan, Brush, Vitaliano, & Dokmak, 2000); and the Digit Span test (Palmer & Meldon, 2003). Each assessment has useful applications and yields valuable information about a person’s cognitive functioning. Possible limitations these instruments share, however, are that they all require some medical training to interpret, they require answers to several questions, require pencil and paper, or supply varying results based on the person’s education, cultural background, or motor skills (Ostrosky-Solís, López-Arango, & Ardila, 2000).

In order to address some of these limitations, the second author developed the Four Coins question, which involves asking the person to add the total amount of four coins, a quarter, a nickel, a dime, and a penny. If the person answers correctly, it is assumed they have normal cognitive functioning and if they answer incorrectly, it suggests they have a deficit in cognitive functioning that is equivalent to a score in the demented range on Folstein’s MMSE.

After pilot testing of the Four Coins question in a nursing home during routine medication checks, a more formal appraisal of the Four Coins question was done. For the purposes of this investigation, it was assumed that the Four Coins question would provide the same or similar information about cognitive functioning as the somewhat longer, more involved MMSE, but without the stated limitations.

Method

Participants

As part of the routine mental status evaluation given to clients entering a medium-sized skilled nursing facility, a trained clinician gave 120 individuals the MMSE and subsequently asked them the Four Coins question and recorded outcome data for both assessments. The clients had been admitted to the nursing home for reasons ranging in need from partial to total dementia-focused care. They ranged in age from 65 to 95 years old, and the gender split was approximately even.

Instrumentation

MMSE. The Mini-Mental State Examination is an eleven-item questionnaire used to assess orientation, attention, immediate and short-term recall, language, and the ability to follow verbal and written instructions. The resulting score places the client on a continuum of cognitive functioning from normal (scores of 24-30) to demented (scores of 1-22). A score of 20 or less indicates the presence of a mental or physical condition causing cognitive impairment (Folstein et al., 1975). With the exception of low-education individuals, the MMSE has shown good reliability in terms of its ability to discriminate between high and low cognitive functioning (Lopez, Charter, Mostafavi, Nibut, & Smith, 2005).

The Four Coins Question. The Four Coins question is a single question that asks the client to add the total amount of four coins: a quarter, a nickel, a dime, and a penny. The Four Coins question can be presented verbally or in writing, and with or without cues such as holding up four fingers to reinforce the question. The rate, volume, and prosody of asking the question can also be varied. Sometimes clients will request paper and pencil in order to perform the calculation and the examiner's discretion can determine how this provision will affect the assessment outcome. The client's answer is either correct or not correct, making interpretation of the answer by a trained professional unnecessary—anyone in contact with the elderly individual can ask the question and interpret the answer as correct or not correct. If cognitive impairment is noted, a more complex cognitive evaluation can be done.

Analysis

To evaluate the utility of substituting the Four Coins question for the MMSE, a non parametric test of the relationship between the answer on the Four Coins (correct/not correct) and the outcome of the MMSE (impaired/not impaired) was done that yielded a significant correlation ($\phi = .697, \chi^2 = 58.32, df=1, p < .001$). In as much as correlations in the range of .60 to .70 are considered adequate to establish concurrent validity (Gay, Mills, & Airasian, 2006) these results suggest that the Four Coins, along with clinical judgment, could be an acceptable substitute for the MMSE when conditions warrant.

Results

One hundred and twenty seniors were assessed for cognitive impairment using both the MMSE and the Four Coins question. Using both measures (MMSE score and Four Coins answer [either correct or not correct]) resulted in 103 agreements (86%) between the two measures and 17 disagreements (14%). Of the disagreements, three individuals were determined to be not impaired by the Four Coins question (i.e., answered the Four Coins incorrectly) but scored 20 points or more on the MMSE. The remaining disagreements (n=14) were made up of individuals that answered the Four Coins question correctly, but scored 20 points or less on the MMSE (scores ranged from 10 – 20 for these individuals). See Table 1.

Using only Folstein's criterion of a score less than 20 on the MMSE indicating cognitive impairment, 86 seniors were determined to be cognitively impaired (72%) and 34 were determined to not be cognitively impaired (28%). The mean score for the 120 individuals assessed was 15.84 (SD=7.64).

Using only the criterion that an incorrect answer to the Four Coins question indicates cognitive impairment, 75 seniors were determined to be cognitively impaired (62%) and 45 (38%) were determined to be not impaired.

Errors in assessment of the present sample (14%) that were based only on the Four Coins tended to be in the direction of classifying someone as not cognitively impaired when they would have been deemed impaired using the MMSE alone. If this data is representative, it suggests that seniors are more likely to answer the Four Coins correctly when impaired than to answer incorrectly when they are not impaired.

Table 1. Answer on the Four Coins Question by MMSE Score Greater than 20.*

		Mini Mental Status Exam Score		
		Not Cognitively Impaired		Total
		Cognitively Impaired	Cognitively Impaired	
Correct Answer on the Four Coins Question	No	3	72	75
	Yes	31	14	45
Total		34	86	120

Discussion

In addition to providing counselors with general information about the client’s ability to perform calculations, answers to the Four Coins question provide valuable information about irritability, apathy, agitation, aggression, and anxiety—all of which tend to occur in dementia patients (Feil, MacLean, & Sultzer, 2007).

Mood, depressive symptoms, and anxiety can affect cognitive ability ratings; therefore, noting the degree to which the client demonstrates cooperation and receptiveness to answering the Four Coins question provides additional information about their mental processing. Some clients might welcome the opportunity to demonstrate their ability to answer the question and others may get defensive, offer excuses and become guarded, hostile, or hopeless. These behaviors, along with motor mannerisms and facial gestures while they answer the question, provide additional information to the counselor about the client’s emotional state.

An individual’s abstraction abilities can also be assessed by their answer to the Four Coins question. Executive processes involved with this calculation include accessing visual and long-term memory about each coin and its monetary value, 25, 10, 5, and 1 respectively. Next, the individual needs to apply serial, consecutive functions by adding the units while maintaining immediate memory about the task. The inability to process abstract information suggests cognitive impairment and provides valuable clues about long-term memory. Short-term memory can be assessed by waiting five minutes

and asking the client to recall the task and their previous answer to the Four Coins question.

Question-specific insight can also be incorporated into the determination of the client's understanding of why a mental status evaluation is being done. In the case of Alzheimer's disease and other related dementias, while the client may be aware of memory loss, they may not be aware of the associated functional decline of their overall cognitive processing (Borrayo, Goldwaser, Vacha-Haase, & Hepburn, 2007). Awareness of their condition can be assessed by observing if the client shows signs of knowing whether they can do the calculation required to answer the question correctly.

In summary, the Four Coins question, while on the surface appears simple, actually can provide mental health workers with quite a bit of information about the emotions and mental functioning of their clients. In the event that the counselor suspects impaired cognitive functioning, they can refer the client for further evaluation. Counselors can also help caregivers to monitor mental functioning in family members by teaching them how to use the Four Coins question to get information.

Dementia is the leading cause of disability in older adults and early recognition of cognitive decline and appropriate intervention can increase the chances of a higher quality of life for the client and lessen the strain on the caregivers (Feil et al., 2007). One way to identify impairment is to provide counselors (who can teach caregivers and loved ones) with simple, reliable tools to identify the presence and progress of cognitive decline. Several such tools exist, each with varying limitations. The Four Coins question addresses several of these limitations such as education level, the need for motor skills, and reliance on immediate recall. The Four Coins question deals with information that is familiar to most people and the answer (correct or not correct) requires no special instruction to interpret, making it completely accessible to all mental health providers, regardless of training.

While additional studies need to be done to verify the findings of the present study, based on the current results, it appears the Four Coins is a quick, reliable, and efficient tool counselors can use to assess and monitor cognitive related health issues in their clients.

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