



**COMMUNITY-BASED PRACTICE AND CLOX INTERVENTION FOR
MCI**

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ABSTRACT

Current trends in the field of social work health promotion underline community-based practices including various interventions as the effective approach for helping underserved population to change their health and psycho-social behaviors. The aim of this paper is to learn about CLOX screening instrument as an intervention for screening mild-cognitive impairment as known as executive cognitive impairment from a researcher's perspective and clinician's perspective, and to understand the rationale and implications of using this method in health care decision-making processes. To better understand the CLOX intervention, the IRB approved study conducted a cross-sectional quantitative research method, limitations of the interventions, political, social and economic implications used.

Key Words: *Community-Based Practice, CLOX, Intervention, Health, Mild-Cognitive Impairment, Social Work*

OVERVIEW OF COMMUNITY-BASED COGNITIVE SCREENING

Community-based practice has emerged in the last decades as a transformative research and practice paradigm that bridges the gap between science and social work practice through community engagement and social action to increase health equity. Social workers in the field of community development can be found in many areas of practice and a variety of settings. A 1994 survey by the research Committee of the American Neuropsychiatric Association revealed that 58% of psychiatrists and related health care providers employed formal assessment of cognitive status; the Mini-Mental State Examination (MMSE) and neuropsychological testing were the most common techniques (Malloy, 1997, pg., 190). A literature review of common cognitive screening instruments revealed that the MMSE has widespread popularity, is easy to use, and a large body of research demonstrates its sensitivity to common neuropsychiatric disorders (Chodosh, 2000). Cognitive screening can also be used longitudinally to track disease progression or response to treatment.

Using standard instruments for cognitive screening is encouraged for several reasons. Cognitive impairment is often overlooked by health care professionals who do not routinely conduct formal mental status examinations. For example, mild cognitive and behavioral changes after head injury are often underdiagnosed. In addition to the MMSE, a number of widely used and well-researched cognitive screening tests are available, i.e. the Mini-Mental State Examination, Cognitive Capacities Screening Examination, and the Short Portable Mental Status Questionnaire (Pfeiffer, 1975).

A number of relatively common tests that are used to measure dementia, i.e. the Dementia Rating Scale (Matties, 1973), and the Alzheimer Disease Assessment Scale (Devenny, Hill, & Patxot, 1992), can also be considered screening tests. A number of other instruments are

designed for more specific purposes. For example, the Executive Interview (Royall, Mahurin, & Gray, 1992), the Frontal/Subcortical Assessment Battery (Rothlind & Brandt, 1993), and the Clock-Drawing Task (Royall, Cordes, & Polk, 1998) were designed to measure deficits commonly found in association with the frontal lobe. These instruments may be of value when used in combination with general cognitive screening instruments in certain populations.

Most of the general cognitive screening instruments used by health care professionals (a) can be administered by health care providers at all levels of training, (b) require 5 to 15 minutes to administer to most clients, (c) provide samples from all major cognitive domains including orientation, attention/concentration, executive, language, and memory functions, (d) demonstrate adequate test-retest and interrater reliability, and (e) demonstrate acceptable sensitivity to disorders commonly encountered by neuropsychiatric practitioners (Gaugler, Kane, & Langlois, 2000). It is important to remember that cognitive assessment is only one aspect of a thorough evaluation. Medical history, family report, emotional functioning, social behavior, and functioning in activities of daily living must all be included in the neuropsychiatric examination, as well as social workers' evaluations.

Limitations of the MMSE

Folstein's (1975) MMSE requires approximately 12 minutes to administer to most clients and contains items designed to assess a reasonably wide range of functions, including (a) orientation to time and place, (b) attention and concentration, (c) language functions (following a three-step command, repeating a difficult phrase, naming high-frequency items, reading and following a written command and writing a sentence), (d) construction, (e) verbal learning, and (f) short-delay recall. However, the MMSE has a number of limitations in content: (a) it does not directly assess executive or frontal lobe functions and may, therefore, be insensitive to disorders

such as Pick's disease, in which other cognitive domains are frequently intact, (b) assessment of most abilities are limited to single items with no graded scoring (for example, the relatively complex intersecting pentagon drawing is simply scored either correct or incorrect), (c) administration is not well standardized, resulting in variability across examiners, and (d) the MMSE presents relatively modest intellectual challenges and is insensitive to mild cognitive changes (Malloy et al., 1997).

Rationale for Using Clock Drawing Task

Royall and Espino (2002) held that the Clock-Drawing Test is less vulnerable to linguistic, cultural, or educational bias than traditional dementia screening instruments. Prior studies found that both CLOX 1 (an executive test that asks clients to draw a clock face showing 1:45) and CLOX 2 (a constructional test—copy a clock that shows 1:45) have good internal consistency (both Cronbach alphas 0.82). Cultural demographic variables had little effect on the clock scores. Although language had a significant effect on CLOX 1 failure rates, this was not mediated by age, education, acculturation, or income (Royall et al., 2003). The executive demands of clock-drawing are shared with independent living skills, i.e., cooking, dressing, using restroom, shopping and medical treatment compliance (making and keeping appointments, taking medications as prescribed, etc). In this sense, clock-drawing performance may mirror the performance of more functionally relevant behaviors that are also under executive control. Executive dyscontrol is associated with cortical and subcortical frontal system lesions (Royall et al., 2002).

Failure to detect cognitive impairment can result in a domino effect of medical and psychosocial problems. The Folstein MMSE (1975) is a good step in evaluating cognitive impairment, but it is designed to assess gross cognitive functioning and may not detect early

dementia. It is also insensitive to impairments in executive functioning, such as planning, organizing, abstract thinking, sequencing, and judging. Finally, it is not a good screen for individuals with less than a ninth grade education (Royall, 2000).

There are several ways to compensate for these weaknesses. Adding a clock drawing test to the preliminary assessment is useful because it provides basic information regarding planning and organizational skills. A number of clock drawing tests are available and scoring schemes vary widely (Royall & Espino, 2002). Royall and colleagues recommend the clock tests because they differentiate between executive and constructional impairments (Royall, Cordes, & Polk, 1998). Isolating problems with executive impairment is crucial in assessing the patient's functional capacities. Like the Folstein, however, a clock drawing test may not be as reliable with poorly educated clients. If the client is in the hospital, the hospital should be asked if a social worker or a nurse can complete ongoing daily mental status exams.

Evaluating the client at several points in the day will help determine whether cognitive status is fluctuating over time or relatively stable. It is important to remember that normal on the Folstein MMSE does not mean that they are also normal in the clock-drawing task because MMSE does not detect executive cognitive impairment. Therefore, more specific testing is needed to determine if, for example, failure on the MMSE is caused by depression, executive function impairment, dementia, or the result of a combination of any of these factors. Sometimes, there will be normal results on Folstein's (1975) MMSE and the clock drawing test, but functional assessment will continue to suggest subtle cognitive problems. When in doubt, social workers and other health care professionals should refer clients for more specific neuropsychological testing. However, in reality, the neuropsychological testing is expensive and the referral system might not be working due to the lack of awareness of executive cognitive

dysfunction issues in the primary care settings. As I mentioned earlier in this chapter, we need to work collaboratively with other health care professionals so that we can create more effective ways to detect dementia in earlier stages.

SOCIAL WORK’S ASSESSMENT OF EXECUTIVE COGNITIVE FUNCTIONING

When cognitive impairment is identified, the social worker and other health care professionals need to be aware of clients’ functioning in their daily lives. We could ask ourselves if this client can safely (a) spend (look for evidence that finances are handled responsibly), (b) cook (ask if the client has left the stove on or the water running), (c) operate a car (ask about driving accidents and incidents), (d) take medications (check to see if medications are taken as prescribed), (e) perform everyday activities of daily living (assess safety in ambulating, dressing, toileting, and showering), and (f) make rational decisions (determine competence for safety-related decisions and judgments).

It is important that the client have the capacity to make sound safety-related decisions, particularly in reaction to crises. For example, the client can be asked, “What would you do if you ran out of medicine?”, “What would you do if there was fire in the house?”,

Table 1. Indicators of Executive Cognitive Functions

<i>Safety</i>	<i>Executive Cognitive Function Indicator</i>
Spend	Look for evidence that finances are handled responsibly
Cook	Ask if the client has left the stove on or the water running
Operate a car	Consider referral for driving evaluation. Ask about driving accidents and incidents
Take medication	Check to see if medications are taken as prescribed
Perform Activities of Daily	Assess safety in ambulating, dressing, using restroom, and

Living	showering
Make Rational Decisions	Determine competence for safety-related decisions and judgments

or “Where is the fire extinguisher and how do you use it?” Decision-making requires judgment, executive functioning (ability to organize and follow steps), and memory. Be sure that clients responses are reasonable and reflect the level of independence necessary for their living situations. Prior studies suggest that clients with early dementia may be able to respond appropriately to these questions and learn cognitive tasks over time (McArthur, Hoover, & Bacellar, 2004). Social workers and other health care professionals should always discuss the safety concerns with family members and friends who can provide information about the client’s real functioning. Always through the lens of maximizing client autonomy, health care social workers need to make recommendations to ensure that the client is safe. When the causes of the client’s cognitive impairment are identified, it can be tempting to overlook immediate safety concerns; however, until there is evidence of normal cognitive functioning, safety should remain a primary concern (Gaugler, Kane, & Langlois, 2000).

Social Support and Social Work Indicators

Social work intervention can be multifaceted, and we can help our clients most effectively by bridging social services and services delivered to their homes. For mild executive cognitive functioning clients, a combination of in-home programs might be acceptable. For example, visiting nurses can assist with medications and personal hygiene while the family provides limited supervision. Careful assessment is always an important aspect of developing an appropriate supportive plan (Emlet, 1997). In some cases, the degree of impairment will make it

unsafe for the client to be alone. When the client cannot be left alone and the family is unable to provide the needed level of supervision, nursing home placement or adult foster care may be considered. In this situation, social workers need to provide consultation to find the least restrictive environment for each client's level of functioning. Unfortunately, executive cognitive functioning issues are not seen as traditional social work interventions nor are they reactive for many other professionals' concern. However, all health care professionals need to be aware of the needs for services and support networking (Emlet, 1997).

Assistance at any level is often difficult for the client and the family to accept. For individuals accustomed to the freedom of independent living, personal losses associated with cognitive decline can be devastating. Loss of privacy, loss of control over daily routine, and loss of freedom are some painful adjustments with which clients struggle. Social workers and other health care professionals must be prepared to deal with all possible types of reactions to behavioral restrictions, including anger, grief, and a sense of betrayal. The client's feelings should be acknowledged and the reasons for the adjustment explained. One of social work's roles is to educate families about disease processes and suggest helpful coping skills (Poindexter, 2000).

CLOCK ASSESSMENT OF EXECUTIVE COGNITIVE FUNCTION IN INDIVIDUALS OVER 50

There is scant research on HIV/AIDS in the older adult population and their levels of executive cognitive functioning, even though the deterioration of these functions causes some of the most pressing problems for adults as they age. Executive functioning is a cognitive process that orchestrates complex, goal-directed activities (Royall, 2004). These activities include functions such as cooking, dressing, and housework. Traditionally, executive control function

impairment has been associated with conditions such as major depression, Alzheimer's disease, subcortical vascular disease, adult-onset diabetes mellitus, and normal aging (Royall, 2004).

Despite the number of older adults contracting HIV, little attention has focused on how people with this disease are aging. The aging process and HIV infection each exert unique physiological effects on the nervous system that affect cognitive functioning; combined, they may be particularly damaging to both cortical and subcortical regions of the brain. Cortical regions include the outer layer of the brain such as the frontal and temporal lobes that are responsible for language and higher thought processes. Subcortical regions include structures, such as the basal ganglia and substantia nigra which are responsible for smooth motor movement and the ability to initiate and sustain action and thought (Caparros-Lefebvre, Pecheux, Petit, Duhamel, & Petit, 1995; Pugh & Lipsitz, 2002). Cortical and subcortical changes in the brain have been observed in aging persons *and* in those with HIV. Although dementia is well known for its profound impairment in cognitive ability, subtle cognitive declines associated with normal aging are also well-known in the literature (Fry & Hale, 1996; Korten et al., 1997; Schaie, 1996).

The history of executive control functioning during normal aging cannot be easily derived from the existing literature, partially because popular screening measures such as the MMSE do not pick it up. The clock drawing test, however, has been extensively used in studies of cognitive impairment and as a companion to more conventional measures such as the MMSE (Royall et al., 1998 & 2004).

The clock drawing test is a screen for cognitive impairment. In addition to dressing, for example, executive control functions also include cognitive tasks that lead up to dressing, i.e. planning; or recognizing the need to be dressed in a certain way by a certain time; selective attention, i. e. deciding what to wear; and self monitoring the plan, or determining that the

clothes are appropriate and adequate. Royall and colleagues suggested that all of these abilities are required by clock drawing (Royall, Cordes, & Polk, 1998). In addition, clock drawing tests have been found to correlate significantly with traditional cognitive measures and to discriminate healthy from demented elderly clients (Royall, Cordes, & Polk, 1997). Also, persons with impaired clock drawing skills are more likely to have problems with self-management of a complex medical regimen.

THE EXECUTIVE FUNCTION CLOCK DRAWING TASK

The clock drawing procedure was administered in one way (draw a clock that says 1:45), but scored two different ways, one that produces an acknowledged clinical score (Borson, Scanlan, Brush, Vitaliano, & Dokmak, 2000), and one that is research based (Royall, 1998).

Clinical CLOX scoring ranges from 0 to 4 with lower scores reflecting greater impairment (Table 4). For example, if clients drew closed circles but could not place numbers in their proper positions or place the hands properly, their scores would be 1 (Royall, 1998).

Research CLOX scoring ranges from 0 to 14. As with the clinical scoring, lower scores reflect greater impairment. For example, if clients' clinical drawings accomplish only the first three tasks but no more, their scores would be only 3. Clearly, the *research* scoring system is more discrete than *clinical* scoring (Royall, 1998).

The Research CLOX instructions can be repeated until they are clearly understood, but once the subject begins to draw no further assistance is allowed. The participant is presented only with a blank surface and no further guidance regarding the task. The Research CLOX reflects performance in various ways. Clients are responsible for choosing the clock's overall form (a digital or analog face, alarm clock, wrist watch, or wall clock, etc.), its size, position on the paper,

elements (hands, numbers, date, indicators), and the forms of these elements (hands as arrows, relative lengths, Roman versus Arabic numerals, etc.). Furthermore, the subject must also initiate and persist in clock drawing through a sequence of constructional actions (usually drawing the outer circle, followed by placing the numbers, followed by setting the time).

Finally, the Clock form and its verbal instructions have been designed to distract the subject with strongly associated but irrelevant cues. The survey instructions use the words *hand* and *face* because they are more strongly associated with body parts than clock elements and may trigger semantic intrusions from their more common meanings. Moreover, the number 45 does not appear on a typical clock face and may intrude into the client's construction in the form of a digital image (1:45)

THE CLINICAL CLOX AND RESEARCH CLOX CONUNDRUM

There are at least four threads to this conundrum: (a) the ethical/political dilemma, (b) scoring choices, (c) recommendations for training, and (d) practice based evidence.

The Ethical/Political Dilemma

Establishing the cutoff points can be hotly debated as this decision affects how clients are viewed and whether they are appropriately treated, and the decision can be manipulated based on economic factors. For example, if a clinic is short-staffed and short-funded, they can move the cutoff point down (lower functioning) so that only those with the most severe cognitive impairment (i.e. zero scores) are treated. On the other hand, if the clinic is overstaffed or not reaching the population stipulated by their funding sources, the cut point (to treat/not) can be moved up so that those with even the slightest impairment would be identified as executive cognitively impaired and served. On paper, therefore, the latter scenario could look as though

such a clinic was serving large numbers of cognitively impaired people, when in reality, the clinic down the street may have moved their cut point in the other direction and actually be serving individuals with much more severe impairment.

Another conundrum is the ethical push/pull between erring, on one hand, on the side of ethical caution, establishing cutoff points very high to be sure that if there is any cognitive impairment, you identify it and provide appropriate services. The other side of that coin, however, is that with limited resources, you may need to ration them to serve only the most severely impaired clients, knowing that you simply do not have staff or funds to serve those with lesser problems. This dilemma is similar to the western (American? Liberal?) tradition of preferring to let 10 criminals go free rather than incarcerate 1 innocent person. In other words, in the hearts of social workers probably lies the desire to lean in this direction: do our best to identify even the earliest indication of impairment and provide services. We typically do not like to take the position on the other side of the coin: limit services to only the most severely impaired.

Scoring Choices

Perhaps the most useful result of this work is seeing and understanding the performance of both the Clinical and Research CLOX. Recall that these two scores are based on one very simple-to-use-and-score procedure: simply ask clients to *draw a clock that says 1:45. Put the numbers and hands on the face so that even a child can read it* (Royall, 1998). If implementing this protocol in a clinic or practice setting, the Real-Time Research methodology can be employed, in which the drawing is simply a part of the practice experience, even while the client is waiting to be seen.

The more serious researcher type of practitioner, not to mention hard core researchers, will want to use the scoring protocol from the 14-item Research CLOX which demonstrated a reliability of .745. Perhaps more importantly, however, it yielded a sensitivity rating of .85, a specificity of .92, a positive predictive value of .59, and a negative predictive value of .97. If, on the other hand, the social worker's time is extremely limited and the only interest is in getting a handle on the client's level of executive cognitive impairment, the 4-item Clinical CLOX may be more appealing (reliability .59). Either way, practitioners will have some indication of whether their clients see clocks as most of us do and can immediately adjust treatment and referrals.

FURTHER RESEARCH

Future research must focus on what to do once clients are identified as having executive cognitive impairments. I suggest that social work practitioners use the clock drawing test and whichever scoring model they prefer, then move the knowledge base to the next level by learning how to treat clients with such impairments. Surely our clients deserve no less.

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REFERENCES

- Caparros-Lefebvre, D., Pecheux, N., Petit, V., DuHamel, A., Petit, H. (1995). Which factors predict cognitive decline in Parkinson's disease? *Journal of Neurology, Neurosurgery, and Psychiatry*, 58, 51-55.
- Chodosh, J. (2000). Cognitive screening tests: Mini-mental state exam. In M. D. Mezey (ed.). *The encyclopedia of elder care: The comprehensive resource on geriatric and social care* (pp. 142-144). New York: Springer.
- Devenny, D. A., Hill, A. L., Patxot, O., et. al. (1992). Alzheimer disease assessment scale: Useful for both early detection and staging of dementia of the Alzheimer type. *Alzheimer Disease Association Disorder*, 6, 89-102.
- Emler, C. A. (1997). HIV/AIDS in the elderly: A hidden population. *Home Care Provider*, 2, 69-75.
- Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, 12, 189-198.
- Fry, A. F., & Hale, S. (1996). Processing speed, working memory, and fluid intelligence: Evidence for a developmental cascade. *Psychological Science*, 7, 237-241.
- Gaugler, J. E., Kane, R. A., & Langlois, J. (2000). Assessment of family caregivers of older adults. In R. L. Kane & R. A. Kane (eds.). *Assessing older persons: Measures, meaning and practical applications* (pp. 320-359). New York: Oxford University Press.
- Malloy, P. F., Cummings, J. L., Coffey, C. E., Duffy, J., Fink, M., Lauterbach, E. C., Lovell, M., Royall, D. R., & Salloway, S. (1997). Cognitive screening instruments in Neuropsychiatry: A report of the committee on research of the American neuropsychiatric association. *The Journal of Neuropsychiatry and Clinical Neurosciences*, 9, 189-197.
- Mattis, S. (1973). *Dementia rating scale professional manual*. FL: Psychological Assessment Resources.
- McArthur, J. C., Hoover, D. R., & Bacellar, H. (2004). Dementia in AIDS patients: incidence and risk factors. *Neurology*, 43, 2245-2252.

- Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *Journal of the American Geriatrics Society*, 23, 433-441.
- Poindexter, C. C. (2000). Common concerns: Social and psychological issues for persons with HIV. In V. J. Lynch (ed.). *HIV/AIDS at year 2000: A sourcebook for social workers* (pp. 18-31). Boston: Allyn and Bacon.
- Pugh, K. G., & Lipsitz, L. A. (2002). The microvascular frontal-subcortical syndrome of aging. *Neurobiology of Aging*, 23, 421-431.
- Rothlind, J. C., & Brandt, J. (1993). A brief assessment of frontal and subcortical functions in dementia. *Journal of Neuropsychiatry Clinical Neuroscience*, 5, 73-77.
- Royall, D. R. (2000). Executive cognitive impairment: A novel perspective on dementia. *Neuroepidemiology*, 19, 293-299.
- Royall, D. R., Cordes, J. A., & Polk, M. (1997). Executive control and the comprehension of medical information by elderly retirees. *Experimental Aging Research*, 23, 301-313.
- Royall, D. R., Cordes, J. A., & Polk, M. (1998). CLOX: an executive clock drawing task. *Journal of Neurology, Neurosurgery, and Psychiatry*, 64(5), 588-594.
- Royall, D. R., & Espino, D. (2002). Not all clock-drawing tasks are the same. *Journal of the American Geriatrics Society*, 50(6), 1166-1167.
- Royall, D. R., Espino, D. V., Polk, M. J., Palmer, R. F., & Markides, K. S. (2004). Prevalence and patterns of executive impairment in community dwelling Mexican Americans: Results from the Hispanic EPESE study. *International Journal of Geriatric Psychiatry*, 19, 926-934.
- Royall, D. R., Espino, D. V., Polk, M. J., Verdeja, R., Vale, S., Gonzales, H., Palmer, R. R., & Markides, K. P. (2003). Validation of a Spanish translation of the CLOX for use in Hispanic samples: The Hispanic EPESE study. *International Journal of Geriatric Psychiatry*, 18, 135-141.
- Royall, D. R., Mahurin, R. K., & Gray, K. F. (1992). Bedside assessment of executive cognitive impairment: The executive interview. *Journal of the American Geriatrics Society*, 40, 1221-1226.
- Royall, D. R., Palmer, R., & Chiodo, L. K. (2004). Declining executive control in normal aging predicts change in functional status: The freedom house study. *Journal of the American Geriatrics Society*, 52(3), 346-352.

Schale, K. W. (1996). *Intellectual development in adults: the Seattle Longitudinal Study*. New York: Cambridge.