Assessing the Clinical Value of Cognitive Appraisal in Adults Aging with HIV

The development of highly active antiretroviral therapy, which is effective in suppressing and controlling viral replication, means that HIV has become—for many—a chronic condition. This advance in medical treatment means that more adults infected with this disease will be surviving and living into old age (Vance & Robinson, 2004). In 2001, 65,655 adults age 50 and older in the United States were living with HIV; in 2004, this number increased to 104,260, representing an increase of 59% in only 3 years (Centers for Disease Control and Prevention, 2006). Adults age 50 and older constitute approximately one in six adults with HIV (Mack & Ory, 2003). The number of older adults with HIV is expected to grow as the population ages and as a consequence of new, later-life infections. Although it is encouraging to know that people are now aging with this disease, a unique challenge emerges in caring for those with HIV. The synergism of aging with HIV means that some individuals may be at risk for conditions in which both aging and HIV exert influence.

Both aging and HIV have been shown to affect cognitive functioning independently—pathologically, as in Alzheimer’s disease or HIV dementia, and nonpathologically, such as mild memory problems and declines in processing speed (Hinkin, Castellon, Atkinson, & Goodkin, 2001; Valcour, Shikuma, Watters, & Sacktor, 2004; Vance, Woodley, & Barrage, 2007). Combined, aging and HIV represent an increased risk for development of cognitive impairments (Becker, Lopez, Dew, & Aizenstein, 2004; Justice et al., 2004). Cherner et al. (2004) examined neuropsychological functioning in older and younger adults with HIV. They found that viral burden (the amount of virus in the cerebrospinal fluid) and age predicted neuropsychological impairment. This kind of impairment was found in a number of cognitive domains, including abstraction, attention/working memory, learning, motor skills, and verbal fluency. However, few studies have focused on the role of metacognitive abilities.

The purpose of this article is to review how metacognitive abilities may be compromised in older adults with HIV. To accomplish this, the role of metacognitive abilities in everyday functioning will be defined and explained. Research focused on metacognitive declines in aging and HIV will be

ABSTRACT

HIV and normal aging can each negatively affect executive functioning, attention, memory, and, ultimately, metacognitive abilities, which are important for internally monitoring neuropsychological performance. Some individuals who are aging with HIV may experience severe changes in their metacognitive abilities. They may be unaware of their neuropsychological functioning and may not be accurately monitoring their cognitive abilities. Nurses who rely on patients’ self-reports of cognitive status should exercise caution regarding the accuracy of these reports and consider confirming and validating such responses when impairments are suspected. A flowchart for monitoring patients with suspected metacognitive impairments is provided.

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described and synthesized, with special emphasis on metacognitive declines associated with aging with HIV. The neurological and cognitive underpinnings of such loss will be explored, leading to possible interventions and implications for nursing practice and research.

**METACOGNITION**

Metacognition is the ability to think about one’s thinking. Specifically, it refers to the ability to control, direct, and monitor one’s cognitive functioning (Nelson & Narens, 1990). The obvious importance of metacognition lies in the ability to control one’s cognitive abilities to accomplish a goal, direct existing cognitive resources to maximize overall cognitive functioning, and monitor cognitive functioning for deficits and problems. In controlling and directing one’s cognitive abilities, metacognition is paramount in using cognitive resources to accomplish a goal. For example, consider someone who is having a conversation but has temporarily lost the ability to filter out distracting thoughts and external stimuli, along with the ability to redirect attention skills. Such losses may result in broken streams of thought, losing one’s place in the conversation, or digression from the conversation topic. Many times, this behavior may appear as loss of memory, disjointed or disorganized speech, or tangential stories.

Something that may also contribute to these neurological sequelae is the inability to accurately monitor one’s cognitive abilities. In the above example, the speaker may or may not be aware that he or she has strayed from the topic of the conversation. A person who is aware that he or she experienced a momentary lapse can correct this by asking, “Where was I?” or “What were we talking about?”. Individuals who monitor such events may seek medical advice, concerned about the development of neurological problems. However, individuals with metacognitive impairments may not have monitored a lapse in their neuropsychological abilities and thus may develop further problems for which no recollection is noted. In such cases, medical consultation is not sought, and the problem may worsen.

Those who are experiencing metacognitive problems may concurrently be experiencing other neuropsychological difficulties. The ability to report these difficulties may be compromised because of aging and HIV. As the literature suggests, those aging with HIV may be more at risk for developing cognitive deficits compared with the general population.

**AGING AND METACOGNITION**

Metacognitive declines have been observed with aging. De Beni, Palladino, Borella, and Lo Presti (2003) examined Italian older adults on reading comprehension and metacognitive abilities related to reading comprehension. They found that age-matched older adults with good reading comprehension had better metacognitive abilities compared with those of adults with poor reading comprehension. In addition, they found that older-old adults engaged in more metacognitive strategies to compensate for poor reading comprehension than did younger-old adults. This finding indicates that metacognition is important in redi-
recting cognitive resources to successfully complete a cognitive task. The study demonstrated that those with better reading comprehension used metacognitive abilities to maximize their cognitive skills and to compensate for problems. The study also indicates that as people begin to lose their metacognitive skills, they develop poorer monitoring and integration of the existing cognitive abilities needed to complete a task.

In another metacognitive study, Souchay and Isingrini (2004) administered a readiness-recall task to 30 younger adults and 35 older adults. The task required participants to adjust the amount of time they needed to memorize a list of words. In general, older adults took more time to memorize the list of words. Even though both groups were allowed to take as long as they wanted, when asked to recall the list of words, the older adults recalled significantly fewer words than did the younger adults. From this finding, the researchers purported that older adults had poorer metacognitive abilities in judging that they could recall the word list, when, in fact, they could not. The researchers also found metacognitive declines in older adults compared with younger adults. Such declines were associated with executive ability, suggesting that strengthening that ability could result in improved metacognition.

**HIV AND METACOGNITION**

The relationship between metacognition and cognitive functioning is complicated in adults with HIV. In the literature, self-reports of cognitive functioning sometimes correspond to observable cognitive functioning, and sometimes they do not. Vance, Ross, and Downs (2008) examined the relationship between metacognitive ability (i.e., self-ratings of cognitive ability) and global cognitive performance in 50 adults with HIV. They discovered that depression was associated with self-ratings of cognitive health. Self-ratings of cognitive health were similarly related to actual cognitive performance, albeit to a lesser extent. Adults with HIV who report declines in cognitive ability may be experiencing depression along with cognitive declines.

In a similar study, Carter, Rourke, Murji, Shore, and Rourke (2003) found that adults with HIV were able to accurately report on their cognitive ability. These researchers examined 160 adults with HIV and discovered that their cognitive performance matched their level of cognitive complaints. Adults with HIV who reported fewer cognitive complaints and anomalies exhibited fewer objective cognitive impairments when tested. Likewise, adults who reported difficulties with thinking, memory, and reasoning also performed more poorly than did those who did not report such problems. In this respect, adults who experienced difficulty with their cognitive ability were aware of it, as was found in the Vance et al. (2008) study.

Such self-reports of cognitive functioning may be valid, but other studies cast doubt on the veracity of such statements. Hinkin et al. (1996) assessed 46 adults with HIV and found close to half of the sample reported high to moderate levels of cognitive complaints. However, such reports were unsubstantiated by actual, objective cognitive performance, especially in the domain of memory. Three groups emerged: 26% underreported the level of cognitive impairment that was actually present, 37% overreported their actual level of cognitive impairment, and 37% reported accurate cognitive ability. Nearly two thirds of the adults with HIV verbalized difficulty in reporting their cognitive ability that matched their actual measured ability. This finding indicates the presence of metacognitive problems.

**AGING WITH HIV AND METACOGNITION**

The synergistic effects of aging with HIV may facilitate declines in metacognitive abilities beyond the level of those who are younger with HIV and those who are older without HIV. Many older adults with HIV may be at risk of not being able to accurately rate their level of cognitive functioning. Consequently, clinicians must be aware of such decrements in cognitive self-monitoring, which can lead to further declines in cognitive functioning, reduced everyday functioning, and lower quality of life.

Given the dearth of information in this area, additional studies are needed to determine the extent to which older adults with HIV fail to accurately report their cognitive functioning. For additional study, the Cognitive Failures Questionnaire (Broadbent, Cooper, FitzGerald, & Parkes, 1982) and the Metamemory in Adulthood scale (Dixon & Hultsch, 1984) can be used in both clinical and research environments to quantify the degree of cognitive complaints.

In conjunction with a neuropsychological test battery, information derived from these two instruments can be used to examine the pattern of cognitive complaints, or lack thereof, to determine whether cognitive self-monitoring is a problem. For example, no complaints in executive and reasoning ability may be reported in a cognitive complaint questionnaire, but an accompanying neuropsychological test battery may reveal pronounced impairments. Executive functioning is related to metacognitive abilities, indicating that metacognitive problems may emerge in monitoring other cognitive systems such as attention, memory, and speed of processing. This finding may signal the onset of additional neuropsychological problems that may develop, affecting everyday functioning and quality of life. Additional studies are required to determine how metacognition, in conjunction with other cognitive impairments, influences everyday functioning and quality of life in older adults with HIV.

**NEUROLOGICAL UNDERPINNINGS OF METACOGNITION**

Anosognosia (lack of awareness of cognitive status) is often observed in diseases that damage the neocortex.
and subcortical structures (Starkstein, Fedoroff, Price, Leiguarda, & Robinson, 1993), and HIV can manifest as a neurological, subcortical disease. Subcortical structures, such as the substantia nigra and basal ganglia, have been observed to experience damage in adults with HIV. This damage is even more observable with a progression to AIDS. In untreated adults with HIV, 30% to 40% eventually develop subcortical dementia (Kolson, Lavi, & González-Scarano, 2002).

These neural substrates are important for executive functions, including perseveration (i.e., unconsciously repeating behaviors or thoughts) and initiation (i.e., problems with starting a new behavior or thought). As a result, such thoughts and behaviors become repetitive or blocked altogether and, in rarer cases, begin to parallel another subcortical dementia, Parkinson’s disease (Vance, 2004). To compensate for problems with perseveration and initiation, the cognitive resources needed to correct for such mental operations are taxed, leaving fewer cognitive resources for metacognitive abilities (Vance & Crowe, 2006). HIV can affect a person’s ability to accurately monitor cognitive states. Metacognitive abilities may be further compromised and obfuscated with aging.

**IMPLICATIONS FOR NURSING PRACTICE**

Cognitive impairment and corresponding cognitive complaints may be mitigated by psychological, medical, and lifestyle changes designed to improved neuronal integrity (Vance & Burrage, 2005, 2006). Reliable and valid assessments of cognitive functioning remain a vital part of determining overall health. For this reason, inquiring about patients’ mental abilities may be insufficient for nurses and other health care professionals to obtain valid information on neuropsychological functioning because of possible impairments in metacognitive abilities. It is important to rely on other sources of information, such as caregivers, neuropsychological testing, or problems with instrument.

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**Figure. Flowchart for assessing neuropsychological functioning with possible metacognitive impairments.**

Assess presence of cognitive complaints

Validate cognitive complaints:
- Caregivers
- Problems with instrumental activities of daily living
- Clinical observation

Determine Reporting

Underreporting

Overreporting

Accurate reporting

May be experiencing problems with metacognition

Experiencing cognitive complaints

Not experiencing cognitive complaints

No problem

Determine possible causes:
- Substance use
- Stress, anxiety, depression
- Poor sleep hygiene
- Comorbidity and medications
- Advanced HIV or aging

Use information to make referral to psychiatric nurse, occupational therapist, psychologist, psychiatrist, or neurologist

Reassess at a later time

Possible questions:
- Are you forgetting appointments?
- Are you having trouble remembering things?
- Does your thinking seem fuzzy?
- Are you having trouble concentrating and paying attention?
- Do you feel you are not thinking as sharply as you normally do?
- Are people you know concerned about your memory or thinking?
tal activities of daily living (IADLs) to determine whether neuropsychological impairments exist. Nurses must be aware that both older adults and individuals with HIV, especially those aging with the disease, may be more susceptible to metacognitive declines.

Assessment
A flowchart for assessing neuropsychological functioning with possible metacognitive impairments is provided in the Figure. This flowchart, although specific for older adults with HIV, can be used as a guideline for older adults without HIV and for younger adults with HIV. Although the steps in the flowchart may be too specific to follow on a daily basis, the general tenor of the chart provides a basic overview of the “common sense” approach in being aware of and monitoring cognitive and metacognitive difficulties.

The first step of the model is to assess the presence of cognitive complaints. To develop an idea of the patient’s ability, asking a direct question about memory failure on an everyday task (e.g., “Are you forgetting appointments?”) and a question on self-assessment of one’s cognitive abilities (e.g., “Do you feel you are not thinking as sharply as you normally do?”) is recommended.

Validating the cognitive complaints with caregivers, problems with IADLs, and clinical observation is the next step. This step often requires familiarization with the patient over time to develop a clinical sense of whether such cognitive problems are emerging.

From this step, health care professionals can determine whether cognitive self-assessments are reflective of actual performance. On the basis of Hinkin et al.’s (1996) research, these assessments may be grouped into overreporting, underreporting, or accurate reporting of the level of cognitive functioning. Individuals who accurately report the level of cognitive functioning either are not experiencing cognitive complaints or are experiencing cognitive complaints. If patients who report accurately are not experiencing cognitive complaints, this outcome is not a problem, and intervention is not warranted. However, patients who report inaccurately and are experiencing cognitive complaints should seek intervention. Those who are overreporting or underreporting their cognitive abilities may be experiencing metacognitive difficulties and may require monitoring or intervention.

Intervention
Intervention should begin by determining possible causes of neurological impairment, including substance use; mood disturbances such as stress, anxiety, and depression; poor sleep hygiene; comorbidity and medications; and even advanced HIV or age-related phenomena (Vance & Burrage, 2006). On the basis of this information, health care professionals can work with the care team to determine the appropriate course of action, whether it is to monitor health status, change medications, or recommend a referral to an advanced psychiatric practice nurse, occupational therapist, psychologist, psychiatrist, or neurologist. Many lifestyle and pharmaceutical interventions (e.g., donepezil [Aricept®]) to restore cognitive functioning (Vance & Burrage, 2006) are available, along with cognitive remediation therapies proven to be effective for older adults (Vance, Ball, Moore, & Benz, 2007) in improving cognitive vitality and everyday functioning in adults aging with HIV.

Neundorfer et al. (2004) used Spaced Retrieval in 17 older adults with HIV. Spaced Retrieval is a cognitive technique whereby information is consolidated into long-term memory by recalling the information over progressively longer periods using a stair-step approach. In Neundorfer et al.’s (2004) study, older adults with HIV were taught this technique, which helped them remember to take their medication and adhere to doctors’ appointments. Other cognitive remediation therapies may also be effective in improving neuropsychological functioning.

Ball et al. (2002) developed a reasoning training protocol that required 705 community-dwelling older adults to solve logic problems and use executive functioning ability. After ten 1-hour training sessions, 75% of participants exhibited reliable improvements in this cognitive domain compared with baseline performance. In fact, improvements were durable for a 2-year period. Because executive functioning is so important for metacognitive ability, such training may also be effective in improving this ability in older adults with HIV.
Follow Up

As shown in the Figure, the efficacy of these interventions must be monitored over time and reassessed periodically to ensure patients have received proper care. In many cases, problems with cognitive functioning may be a simple matter of poor nutrition, such as with a thiamine (vitamin B$_1$) deficiency (Riedel, Jorissen, & Hogervorst, 2003), which can be easily corrected. In other instances, decreases in metacognitive abilities may signal declines in an aging immune system, signaling a progression toward AIDS and possibly AIDS dementia complex (Valcour et al., 2004). For this reason, reassessing patients remains an important component of treatment.

CONCLUSION

Older adults with HIV may be at risk of developing problems in monitoring their cognitive abilities; thus, reliance on self-assessments may be problematic. Nurses’ direct proximity to patients places them in a key position to clinically observe and document changes (e.g., awareness, cognitive complaints, missed appointments) that may indicate the development of further neuropsychological problems. Environment, lifestyle, and cognitive remediation therapies may improve both cognitive functioning and everyday functioning, such as medication adherence, IADLs, and ADLs in older adults with HIV, resulting in improved quality of life.

REFERENCES


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