

Speech-Language and Cognitive Findings in Patients with HIV/AIDS

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Abstract

Background. Few adult patients with HIV/AIDS are screened regularly for speech-language and cognitive disorders even though they may manifest communication difficulties. No comprehensive studies assessing the broad range of speech-language and cognitive disorders of adults with HIV/AIDS appear in the literature. As such, clinicians may be unfamiliar with the types of communication disorders that may be manifested. This study assessed the prevalence of speech-language and cognitive disorders in adults with HIV/AIDS using a broad inventory of speech, language, and cognitive skills.

Methods. A cross-sectional design was used to investigate communication disorders in a convenience sample of patients living with HIV/AIDS. Adult patients from a general internal medicine clinic in Wichita, Kansas were recruited as they presented for medical appointments. Each participant received a speech-language and cognitive test battery consisting of 10 assessments.

Results. The primary outcomes were: (1) presence of any speech-language or cognitive disorder, and (2) degree of communication disorder, as measured by the number of positive results. Eighty-two adults with HIV/AIDS were evaluated for communication disorders. Prevalence was 95%; 78 out of 82 participants manifested abnormal findings on at least one assessment in the test battery. Test results revealed a variety of cognitive and language issues, mostly related to integrating information on the picture description task (45%), timed word generation (44%), and memory-related story retelling (35%). Two participants revealed abnormal results on all ten assessments.

Conclusions. Speech-language and cognition deficits are common in adult patients with HIV/AIDS. Every patient with HIV/AIDS should be assessed to determine the impact of these communication deficits on their daily living skills.

KS J Med 2015; 8(3):101-107.

Introduction

Approximately one in six Americans will experience some form of a communication disorder during his or her lifetime.¹ Although medical and non-medical treatments have advanced significantly for many individuals with communication disorders, progress has been minimal for those who have Human Immunodeficiency Virus/Acquired Immuno-

deficiency Syndrome (HIV/AIDS) and a communication disorder. Several explanations may account for this lack of progress.

First, from our experience, few adult patients with HIV/AIDS are screened regularly for speech-language and cognitive disorders even though they may manifest communication difficulties. For example, in our general medicine clinic, referrals for

speech-language and cognitive assessments are made infrequently and only if a specific patient requests it or if a communication or cognitive deficit is an obvious problem to the attending physician. Patients with HIV/AIDS are not common in the caseloads of speech-language pathologists.

Second, no comprehensive studies of the prevalence of speech-language and cognitive disorders of adults with HIV/AIDS appear in the literature. As such, clinicians are unfamiliar with the types of communication disorders that may manifest. Researchers have focused on the prevalence of limited and specific speech-language and cognitive disorders in adults with HIV/AIDS. HIV dementia, for example, is seen in approximately 3% of patients.² Cognitive changes may be seen early in the course of the infection even in patients who are otherwise asymptomatic.³⁻⁵ Common cognitive changes include problems with abstract reasoning, learning difficulties, slow information processing, and retardation of the spontaneity of speech. A large US study found 52% of HIV patients had neuropsychological impairment.⁶ A Swiss study found only 16.6% of HIV subjects had completely normal neurocognitive testing.⁷

Few studies have examined speech errors (i.e., voice, fluency, or intelligibility deficits) with HIV patients. One small Indian study reported a variable pattern of voice, swallowing, and oral motor function in HIV patients.⁸ Nevertheless, what remains unknown is the prevalence of a wide range of speech-language and cognitive disorders in a cohort of individuals with HIV/AIDS. Accordingly, the purpose of this study was to measure a broad inventory of speech, language, and cognitive disorders in a sample of adults with HIV/AIDS.

Methods

A cross-sectional design was used to investigate communication disorders in a

convenience sample of patients living with HIV/AIDS. The study was approved by the KU School of Medicine's Institutional Review Board.

Participants. Eighty-two adult, English-speaking patients from a general medicine clinic in Wichita, Kansas, with a large population of patients with HIV/AIDS, were recruited for the study as they presented for medical appointments. These patients were diagnosed with HIV-1, but not subtyped. Each received a small stipend for their participation.

Procedures. Each participant received an evaluation of speech-language and cognitive skills. All speech-language and cognitive assessments were conducted by one of two licensed speech-language pathologists. Table 1 lists the speech, language, and cognitive assessments and the domains assessed. The battery consisted of 10 assessments and took approximately one hour. A brief description of the test battery follows:

- The speech-language-hearing interview (patient history) obtained information related to speech-language deficits from the patient's perspective and history. The format of the interview was similar to that described by Duffy.⁹ Disclosure of a speech-language, hearing, or cognitive problem was recorded. Any report of a past or current speech-language, cognitive, or hearing deficit or treatment was considered a positive (i.e., abnormal) result.
- The Modified HIV Dementia Scale^{10,11} consists of four subtests. The memory-registration subtest asks the subject to recall four common words in four seconds after the examiner says them. The psychomotor speed subtest asks the patient to write the alphabet in upper case letters and the time to perform the task is recorded. The memory-recall subtest asks the subject to recall the four common words presented during the memory-

Table 1. Summary of speech-language assessments for each measure in the test battery and the domain examined.

Speech-Language Protocol	Domain Examined			
	Speech	Language	Cognition	Structure/Function
Speech-Language-Hearing History	X	X	X	X
Modified HIV Scale			X	
Cookie Theft Description	X	X	X	
Lost Wallet Retelling			X	
Oral Mechanism Exam				X
Assessment of Intelligibility of Dysarthric Speech	X			
Grandfather Passage	X			
Boston Naming Test		X	X	
Word Generation Task		X	X	
Dysphagia Questionnaire				X

registration task. The construction subtest asks the subject to copy a line drawing of a cube and time to perform the task is recorded. A score was assigned to each subtest and a total score was used to determine severity of dementia. Any score of less than 7.5 was a positive result.

- The Cookie Theft picture description task¹² permits the subject to distinguish between relevant and irrelevant detail, to integrate information across the picture, and to draw inferences about the events depicted.¹³ Picture descriptions were recorded and scored for the total number of concepts identified, as well as number of literal and interpretative concepts. The more concepts identified during the picture description, the higher the score. A score of less than 18 total concepts was a positive result.
- The Lost Wallet story¹⁴ was read aloud to the subject, who then was asked to retell the story immediately. The number information units recalled out of 17 in the story was scored. A score less than 14 was a positive result.

- The Oral Speech Mechanism Screening Examination Revised¹⁵ provided a standardized template for review of oral structure and function. Structural deviations were recorded. Any structural deviation of the oral mechanism important for speech production was considered a positive result.
- The Assessment of Intelligibility of Dysarthric Speech¹⁶ quantified single-word and sentence intelligibility. The subject read ten multi-syllabic words and five five-word sentences. The percent of intelligible words was scored. Any score below 90% was considered a positive result.
- The Grandfather Passage includes all the phonemes of English.⁹ The passage was read aloud by the subject and timed. A miscue analysis assessed mispronunciations and repeated or omitted words.¹⁷ Reading time and the number of miscues were scored. Any score of greater than three miscues was considered a positive result.

- The Boston Naming Test¹², short version, identifies word retrieval deficits. Twenty-five line drawings were used to elicit words of varied familiarity. The number of pictures identified correctly was scored. Any score below the aged-normed mean score for normal adults was considered a positive result.
- For the word generation task, subjects named as many animals as they could in 60 seconds. The number of different animals named was scored.¹⁸ Any score below the age-normed 50th percentile was a positive result.
- The dysphagia questionnaire determined swallowing abilities by subject report.⁹ Responses were scored as either positive or negative for swallowing difficulties. The report of any difficulty chewing or swallowing was a positive result.

The primary outcomes were: (1) presence of a speech-language or cognitive disorder as signified by a positive result from any of the exams performed within the complete test battery, and (2) degree of disorder, positive results on a greater number of exams indicated a higher degree of the communication disorder.

Results

The average age of the 82 participants was 46 years (SD = 10; range 20-67). Sixty-seven percent (n = 55) were white; 74% (n =

61) were male. Forty-five percent (n = 37) completed college. The average year of HIV/AIDS diagnosis was 1999. At time of diagnosis, 18 subjects (22%) had AIDS, defined as a CD4 count less than 200/mm³ and an AIDS indicator condition²; 18 (22%) were symptomatic with positive HIV serology (symptoms attributed to HIV infection), and 46 (56%) were asymptomatic or had an acute HIV infection. At the time of the study, however, 66 subjects (80%) were asymptomatic and 16 (20%) were symptomatic. None had AIDS. Nine (11%) took no HIV-related medications. Thirty-five participants (43%) took three or more HIV-related medications (combination drugs were counted as one medication).

The prevalence of communications disorders was 95%. The test battery showed 78 of 82 participants had at least one positive finding (see Figure 1). Thus, in a relatively healthy sample of subjects diagnosed with HIV, only four were evaluated within normal range on all the assessments. Sixty-two participants (75.6%) had three or more positive assessments; 33 (40%) had four or more positive assessments. Two subjects revealed abnormal results on all 10 assessments.

Table 2 reveals the percentage of participants who evaluated positive (i.e., indicating the presence of a communication disorder or deficit) on each of the speech-

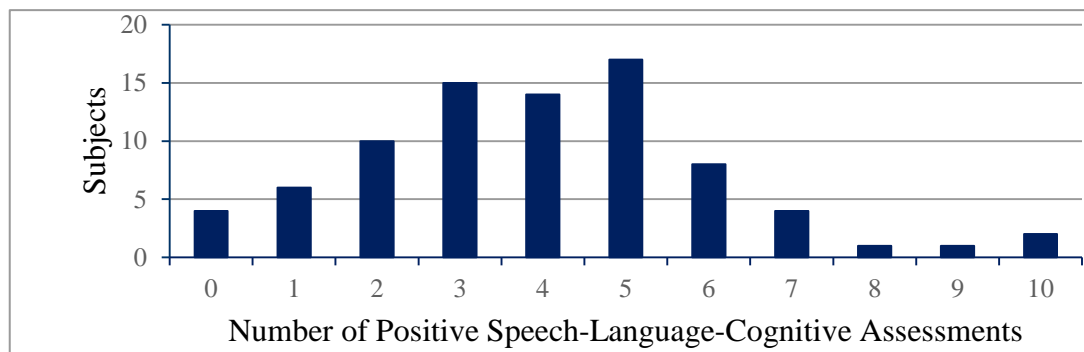


Figure 1. The number of positive speech-language-cognitive assessments by the number of subjects.

Table 2. Percentages demonstrating the presence of speech-language-cognitive deficit for each assessment in 82 subjects.

Assessment	Percentage with Deficit (n)
Speech-Language-Hearing History	78% (64)
Oral Mechanism Exam	70% (57)
Picture Description	45% (37)
Word Generation	44% (36)
Story Retelling	35% (29)
Dysphagia Questionnaire	35% (29)
Speech Intelligibility; Reading Miscues	28% (23)
Word Retrieval	28% (23)
Modified HIV Dementia Scale	24% (20)
Speech Intelligibility; Words/Sentences	9% (7)

language-cognitive assessments. The speech-language-hearing history revealed 78% of subjects had a history of a communication or cognitive disorder. Some were related to the HIV infection and its consequences (e.g., HIV dementia); some were not (e.g., work-related hearing loss). Seventy percent of subjects ($n = 57$) had oral mechanism deviations, most notably dental abnormalities ($n = 53$). Although a few subjects had notable speech distortions, none of the oral mechanism deviations caused speech to be unintelligible. A variety of cognitive and language issues were detected mostly related to integrating information on the picture description task (45%), timed word generation (44%), and memory-related story retelling (35%). The Modified HIV Dementia Scale showed the possibility of dementia for 20 (24%) participants.

Discussion

Positive speech-language-cognitive assessment findings are common in patients with HIV/AIDS. Our subjects were a broad cross-section of patients with HIV/AIDS. They were relatively healthy at the time of assessment. Yet, the proportion of subjects

with all test findings in the normal range was remarkably low (5%). Conversely, the proportion with at least one identified area of concern related to communication was high (95%). This result was concerning as only 17% of the general population experience communication disorders over a lifetime.¹ The observational study design, along with co-morbidities, education levels, and socioeconomic factors, however, made it difficult to determine if HIV was the direct cause of the communication disorders. Regardless, clinicians should be aware of the high prevalence of communication disorders in patients with HIV/AIDS.

All of the test protocols administered in this battery showed the ability to identify certain aspects of speech, language, and cognitive function that may be affected in patients with HIV/AIDS. The picture description task and the verbal fluency tasks were the most useful at identifying deficits, mostly subtle language and cognitive deficits that would go unnoticed in a medical office. These deficits, however, have the potential to impact daily living and employment. An oral mechanism examination is most likely to be impacted by

problems with the teeth. This issue may be related to lack of ability to afford good dental care. Poverty can limit access to health care.¹⁹ In addition, those who cannot afford the basics in life may end up in circumstances that increase their HIV risk.

Communication disorders compromise physical health and affect the emotional, social, recreational, educational, and vocational aspects of life.¹ They affect families and social networks, including those at work and school. No direct connection between our study results and

HIV/AIDS status was made; however, physicians should consider this possibility in their examination of patients. Based on our sample, issues related to speech-language and cognition should be expected, therefore, evaluated in every patient with HIV/AIDS.

Acknowledgements

This study was funded by the Wichita Center for Graduate Medical Education through a grant from the Kansas Biosciences Authority.

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Keywords: HIV, communication disorders, cognitive disorders, hearing disorders, prevalence