Preliminary examination of progression of Alzheimer’s disease in a rural Southern African American cohort

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Abstract

African Americans are at significantly increased risk for the development of Alzheimer’s disease (AD), yet are seriously underrepresented in research trials. Preliminary experiences on a large scale, multi-site, 5-year longitudinal trial investigating the psychometric expression and progression of AD targeting an aging Southern rural cohort of African Americans are reported. Sixty-five participants, ranging from asymptomatic to severely demented, underwent extensive individual diagnostic and psychometric evaluation. Results indicated that cultural factors strongly influenced the data. Recruitment with asymptomatic volunteers were found to have greater educational attainment than other participant groups. Psychomotor measures showed greater impairment in African Americans compared to Caucasians suggesting increased cerebrovascular burden. African Americans’ performance on the Boston Naming Test and the Wechsler Test of Adult Reading tests were significantly different than performance of Caucasian groups. The findings demonstrated that a better understanding of sociocultural factors associated with AD in the African American population may facilitate the development of primary and secondary preventions, especially when considering the role of cerebrovascular comorbidity which is a modifiable risk factor.

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The Alzheimer’s Association has identified Alzheimer’s disease (AD) as an emerging public health crisis for African Americans with a prevalence ranging from 14% to 100% greater than Caucasians. While it is well known that AD is associated with advanced age, there is mounting evidence that cerebrovascular disease may be a key mechanism in triggering the manifestation of AD (Breteler, Clauss, Grobbee, & Hofman, 1994; Hofman et al., 1997; Skoog et al., 1996). The African American population that resides in South Carolina has disproportional risk factors with a very high incidence of cerebrovascular disease, and thus, represents a unique cohort to examine the potential confounding role of cerebrovascular disease in the development and progression of Alzheimer’s dementia. However, this group has been seriously underrepresented in large trials. This is a problem because genetic differences and response to drugs vary significantly by race and ethnicity. For these and other reasons, a large scale, longitudinal, cohort study of the expression of dementia in the elderly African American population has been initiated.

The coastal region of SC (often referred to as the “Low Country”) offers a remarkable and unique opportunity to conduct such a study. First, this region of the country has a population where there are a disproportional number of aging African Americans. In addition, African Americans in the Low Country have maintained a remarkable degree of genetic and cultural homogeneity. Charleston is in the heart of the Low Country and historically emerged as one of North America’s major slave ports during the Transatlantic slave trade (Franklin & Moss, 1994). From this trade, many slaves from the western coast of Africa were brought to Charleston and then transported to the rest of the state. The result is a strong local African community that still exists today (Franklin & Moss, 1994). An example of this culture is captured in the life and culture of the African American Gullah population that is over 300 years old (Dewig, 1998). The language, music, art, spiritual practices, culinary and medicinal customs, and other practices of this culture are still present today (Avery Research Center, 2003). For the state’s teaching hospital an important relationship exists between the medical community and the African American community with several longitudinal studies completed or underway.

Numerous studies suggest that dietary patterns of African Americans, especially rural African Americans, differ from those of Caucasians (Block, Rosenberger, & Patterson, 1988; Kayrooz, Moy, Yanek, & Becker, 1998; Madan et al., 2002; Vitolins, Quandt, Bell, Arcury, & Case, 2002). Although not consistently observed in every study, in general, African Americans consume more high-fat foods (in particular, red meat) and fewer raw vegetables and fish than Caucasians (Block et al.; Gillum, Mussolino, & Madans, 1996; Madan et al.; Vitolins et al.). This dietary pattern of African Americans is associated with an increased risk for high cholesterol, increased insulin resistance, and cerebrovascular disease. Indeed, this region of the country is often referred to as the “stroke belt” and the Low Country has been referred to as being located on the buckle of the stroke belt (Lanska, 1993; Lanska & Kryscio, 1994). However, the relationship between ethnicity and diet is complicated by socioeconomic status and education (Lu, Samuels, & Huang, 2002), as well as by geographic proximity to good sources of nutrition (Morland, Wing, & Diez Roux, 2002).

Cerebrovascular disease is associated with cognitive impairment and dementia (Breteler et al., 1994; Hofman et al., 1997; Skoog et al., 1996). The high prevalence rate of cerebrovascular disease among African Americans highlights the importance of early detection and adequate cognitive screening. Even after controlling for the confounding factors of education, cerebrovascular disease and diabetes, recent research has demonstrated that for African Americans there is a higher incidence of Alzheimer’s disease (Green et al., 2002; Tang et al., 2001). Identifying of dementia is another problem. There are concerns that neuropsychological tests are not culturally sensitive (Jones, 2003; Manly, Byrd, Touradji, & Stern, 2004) and do not take into account level of acculturation and assimilation (Manly, 2005; Miles, 2002) and, therefore, may be inappropriate for use with African Americans if the tests do not contain appropriate norms. In particular, performance may be biased against African Americans with low educational attainment (Ginsberg, 2003; Manly, Jacobs, Touradji, Small, & Stern, 2002). Further, African Americans demonstrate less awareness about the facts of AD and indicate less of a perceived threat about having the disorder (Roberts et al., 2003).

Further, recent studies have suggested that the treatment of vascular risk factors in African Americans may reduce the likelihood of age-associated cognitive impairment or dementia (Richards et al., 2000). Cardio/cerebrovascular risk factors and high cholesterol are now recognized as playing a potentially pivotal role in the deposition of beta amyloid in the brain, and subsequently, an increased risk of AD. A variety of risk factors linked to cardiovascular disease, including blood pressure, homocysteine levels, APOE genotype, and elevated cholesterol levels, may be linked to the risk of AD (Breteler, 2000; Haan, Shemanaski, Jagust, Manolio, & Kuller, 1999; Seshadri et al., 2002). Evans et al. (2000) have reported a relationship among total cholesterol, APOE genotype, and risk of AD in African Americans. These results suggest that cerebrovascular risk factors, especially total cholesterol, may play an especially important role in the risk of cognitive decline and ultimately dementia in African Americans.
In the current sample, the unique advantages of SC’s African American population are utilized (i.e., relatively stable genetic background, relatively homogeneous cultural background, and established increased risk for cerebrovascular disease and probable AD) to study this cohort. These advantages should aid in better delineating the multi-factorial links between environmental, behavioral, and genetic factors that cause AD.

The issue of culturally appropriate norms and diagnostics is of paramount significance in the study of mild cognitive impairment (MCI). The term “mild cognitive impairment” has been given to patients that meet a specific clinical criteria that falls somewhere in between asymptomatic and dementia (Petersen, 2001; Petersen et al., 1999; Petersen, Stevens, & Ganguli, 2001). The term “amnestic MCI” has been further refined to denote those at specific imminent risk for the development of dementia of the Alzheimer’s type.

One general problem with the Peterson criteria (Petersen, 2001; Petersen et al., 1999; Petersen et al., 2001) has been that it may fail to identify other individuals at risk for dementia, particularly with comorbid cerebrovascular risk. Another general problem is that the diagnosis of MCI relies heavily on self-report of memory problems. Both issues are particularly problematic for an African American population because of cultural issues and delays associated with seeking health care as racial and ethnic minorities in the US are less likely to seek healthcare than Caucasians (US Department of Health and Human Services, 2001). Further, racial and ethnic minorities are also prone to delay treatment until they experience severe symptoms (US Department of Health and Human Services). There are a number of factors that likely contribute to this situation (Brawley & Tejeda, 1995; McAdoo, 1993; McNeill et al., 2000; Sinclair et al., 2000). To help combat some of these problems, the Peterson criteria have also been refined using neuropsychological tests. However, the use of such measures in minority populations has not been reported and is poorly understood.

The objective of this study was to better understand the expression of dementia in this underserved cohort. As a preliminary investigation, we examined several primary outcome variables. Specifically, we sought to investigate whether cultural trends may influence study subject recruitment. In this unique cohort at extremely high risk for vascular disease, cerebrovascular burden was operationalized and studied using psychomotor measures as a marker of cerebrovascular burden. We also examined whether educational achievement, literacy or dysphasia may play a role in detection of cognitive impairment; the specificity of a confrontation naming test (Boston Naming Test) and published norms was investigated in this rural African American cohort. Because the early detection of dementia requires a method to compare current cognitive abilities with premorbid abilities, we examined whether the reading test (Wechsler Test of Adult Reading) can be used to detect early change.

1. Method

1.1. Participants

Asymptomatic and symptomatic older African Americans from a diverse racial and ethnic background who are at risk for dementia and/or dementia progression were identified and recruited for the longitudinal study. This is a multi-center, multi-disciplinary project. Six recruitment sites in South Carolina were chosen to represent the Low Country. Both symptomatic and control participants were recruited by word of mouth, presentations to cultural leaders and churches, newspaper advertisements, and flyers. Potential participants were evaluated for the inclusion/exclusion criteria. Inclusion criterion was age 60 or older; exclusion criteria were presence of significant developmental delay, alcohol/drug dependence, active major psychiatric illness, significant medical problem, or interfering sensory impairment. Site directors determined whether participants had the decision capacity to provide informed consent. Consent was provided by the patient’s legal representative according to SC state law for participants deemed to be without decision capacity.

To determine diagnoses, each study investigator presented a potential participant at a bimonthly video consensus conference to determine clinical diagnosis. A multidisciplinary team including neurologists and coordinators from each of the six sites, neuropsychologists, psychiatrists and nurses, attended this conference. Participants were classified according to standardized clinical criteria determined at a consensus conference. The diagnostic criteria used included: AD–NINCDS/ADRDA criteria (McKhann et al., 1984), vascular dementia—California criteria (Chui et al., 1992), mixed vascular/AD dementia—California criteria (Chui et al), Lewy body dementia—consensus DLB criteria (McKeith et al., 1996), frontotemporal dementia—consensus FTP dementia criteria (Neary et al., 1999), mild cognitive impairment—amended Petersen criteria (Petersen et al., 2001). The Hachinski Ischemia Scale (HIS) as modified by Rosen (Rosen, Terry, Fuld, Katzman, & Peck, 1980) was used as a marker of cerebrovascular burden (Moroney et al.,
The Clinical Dementia Rating scale (CDR) was used on each participant to stage symptom severity (Cohen-Mansfield et al., 1996) with the score determined at the video consensus conference. The CDR is a well-established, reliable, and valid diagnostic and staging measure for dementia of the Alzheimer type (Morris, 1997; Morris et al., 1989). As participants were entered into the study, they were assigned to annual longitudinal one-year follow-up exams.

1.2. Materials

Extensive demographic, educational, dietary, medical history and neurological exam data were collected on each participant. In addition, all participants had neuropsychological data collected, which is the focus of this paper. The measures used are listed below.

The Wechsler Test of Adult Reading (WTAR; Wechsler, 2001) measure was used in an attempt to estimate premorbid intellectual functioning and is valid for individuals up to 89 years. Unlike many intellectual and memory abilities measures, the WTAR assesses reading recognition, which is relatively stable in the presence of the cognitive declines associated with normal aging or brain injury, providing our rationale for its use. Further, the WTAR was included to examine the stability of the so-called “hold” function over time as a function of individual disease progression.

The Consortium to Establish a Registry for Alzheimer Disease neuropsychological battery (CERAD; Morris et al., 1989) was chosen because of its national and international popularity (Morris et al.). In addition, the CERAD has been validated as culturally fair with established reliability in multiple ethnic populations (Unverzagt et al., 1999; Unverzagt et al., 1996). In fact, education and age only affected test performance to a relatively small degree (less than 15% of the variance) and gender accounted for less than 2% of the variance in community dwelling, elderly African Americans (Unverzagt, Hall, Hui, & Hendrie, 2004).

Other cognitive measures included Digit Span and Digit-Symbol from the Wechsler Adult Intelligence Scale-III (WAIS-III; Wechsler, 1997a), Logical Memory from the Wechsler Memory Scale-Revised (WMS-R; Wechsler, 1987), Orientation and Mental Control from the Wechsler Memory Scale-III (WMS-III; Wechsler, 1997b), Rey Complex Figure Test and Recognition Trial (Meyers & Meyers, 1995), Controlled Oral Word Association Test (Spreen & Strauss, 1998), Delis–Kaplan Executive Function System-Sorting subtest (Delis, Kaplan, & Kramer, 2001), Grip Strength Test, Grooved Pegboard Test, Finger Tapping Test, Trail Making Test-Parts A&B (Reitan & Wolfson, 1985), and the Boston Naming Test (Kaplan, Goodglass, Weintraub, & Segal, 1983). The Alzheimer Disease Awareness Interview was used to measure metacognition (Wagner, O’Connell, & Bachman, 1997; Wagner, Spangenberg, Bachman, O’Connell, 1998; Wagner, Rayls, & Bachman, 1999).

The Neuropsychiatric Inventory (NPI; Cummings et al., 1994) is a caregiver rating scale that assesses 12 neuropsychiatric disturbances common in dementia (Cummings et al., 1994; Cummings, 1997). The Informant Questionnaire

<table>
<thead>
<tr>
<th>Area of cognition</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention/working memory</td>
<td>WAIS-III Digit-Symbol, WAIS-III Digit Span, WMS-III Mental Control, Trails A</td>
</tr>
<tr>
<td>Processing speed</td>
<td>Trails A &amp; B (psychomotor speed), WAIS-III Digit-Symbol (psychomotor speed), Grooved Pegboard (motor speed), Finger Tapping Test (motor speed), Grip strength (motor), WAIS III- Symbol Search (visuomotor speed)</td>
</tr>
<tr>
<td>Memory</td>
<td>WMS-R Logical Memory (prose recall), CERAD Word Lists &amp; Constructional Praxis Recall/Recognition, Rey Complex Figure Test and Recognition Trial</td>
</tr>
<tr>
<td>Language</td>
<td>CERAD Animal Naming (Fluency), Controlled Oral Word Association-FAS &amp; Fruits and Vegetables (Fluency), CERAD Boston Naming 15 item, Boston Naming Test, WASI Vocabulary, WTAR</td>
</tr>
<tr>
<td>Reasoning/Problem-solving</td>
<td>WASI Matrix Reasoning (novel problem-solving), Delis–Kalpan Sorting Test, Trails B (mental flexibility)</td>
</tr>
<tr>
<td>Spatial Reasoning/Construction</td>
<td>WASI Matrix Reasoning (visuospatial), CERAD-Praxis (constructional praxis), Trails B (visuospatial sequencing)</td>
</tr>
<tr>
<td>Orientation</td>
<td>MMSE-First 10 items, WMS-III Information and Orientation</td>
</tr>
<tr>
<td>Metacognition</td>
<td>Alzheimer Disease Unawareness Interview, Delis–Kaplan Sorting Test, NEO</td>
</tr>
<tr>
<td>Other Report</td>
<td>Neuropsychiatric Inventory, Informant Questionnaire on Cognitive Decline in the Elderly</td>
</tr>
</tbody>
</table>

on Cognitive Decline in the Elderly (IQCODE) was completed by the caregiver (Jorm, 2004). The Geriatric Depression Scale (GDS; Yesavage et al., 1983) is used to detect and rate depression severity. Lastly, for those capable of self-rating, the 60-item NEO Personality Inventory (Costa & McCrae, 1992) was used in an effort to understand personality traits of those who might volunteer for such a study as well as a measure of self-reflection/metacognition.

In addition to standard norms that are available to interpret raw test scores, we also employed the newly Revised Comprehensive Norms for an Expanded Halstead-Reitan Battery: Demographically Adjusted Neuropsychological Norms for African American and Caucasian Adults Scoring Program (Heaton, Miller, Taylor, Grant, & PAR Staff, 2004). However, these norms were not used to interpret the BNT results because they provided information on only one BNT index. Since four BNT indices were used and to maintain normative consistency, the Tombaugh and Hubley (1997) norms were used. Please see Table 1 for a summary of the different areas of cognition being assessed and the specific measures being used to assess these areas.

2. Design and procedure

All participants completed a standard clinical assessment after enrolment. The basis for this standard clinical assessment was the practice parameter: Diagnosis of Dementia (an evidence-based review), Report of the Quality Standards Subcommittee of the American Academy of Neurology (Knopman et al., 2001). Within 60 days of consent, participants completed a neuropsychological evaluation. A postdoctoral fellow who traveled to each site administered the battery for this evaluation. Efforts were made to capture multiple cognitive domains, meta-cognition, motor and psychomotor function, neuropsychiatric symptomatology, and personality traits.

All participants received annual follow-up evaluations and quarterly telephone calls with a special interest in confirmation of diagnosis, characterization of disease progression, and monitoring asymptomatic cases at risk for conversion. The participants who do not convert also were intensively studied as “successful agers.” The yearly assessments permit frequent follow up of participants and maintenance of meaningful contact, yet allow enough time to elapse to permit the assessment of meaningful change.

3. Results

To date, 65 participants have been enrolled in this study. Participants were 78.5% African American (n = 51) and 21.5% Caucasian (n = 14). Age ranged from 61 to 95 years (M = 74.7, SD = 8 years). Participants’ level of education ranged from 4 to 21 years (M = 11.9, SD = 3.8). African Americans and Caucasians did not significantly differ in terms of age and education. Breakdown of diagnoses was as follows: 33.8% controls (n = 22), 23.1% MCI (n = 15), 33.8% dementia due to Alzheimer’s disease (n = 22), 4.6% vascular dementia (n = 3), and dementia due to mixed Alzheimer’s disease and vascular etiology (n = 3). Dementia severity as categorized by CDR rating was CDR = 0 (32%), CDR = 0.5 (10%), CDR = 1 (16%), CDR = 2 (16%), and CDR = 3 (26%).

To test the hypothesis that cultural trends may influence study entry behavior, we examined dementia severity as a function of education. Participants with CDR = 0 (i.e., asymptomatic controls) had achieved a significantly higher level of education (M = 13.8, SD = 4.0) than participants with CDR = 1, 2, or 3 (i.e., mild, moderate and severe dementia; M = 10.3, SD = 3.8), t = −2.24, p = .03.

To test the idea that African Americans might have greater cerebrovascular burden independent of a diagnosis of vascular dementia, we used psychomotor measures as an indicator of burden. While there was a clear trend for the African Americans to score higher on the Hachinski Ischemia Scale, there were too few participants to analyze the data statistically. On psychomotor measures, however, African Americans did perform significantly more poorly than Caucasians on dominant hand (DH) Grip Strength, t (46.9*) = −2.9, p = .005, nondominant hand (NDH) Grip Strength, t (29.1*) = −2.5, p = .02, and Finger Tapping (DH: t (54) = −2.8, p = .007; NDH: t (55) = −4.2, p = .001). There was a trend for African American participants to perform more poorly than Caucasian participants on the DH Grooved Pegboard Test, t (58) = −1.8, p = .08. There was not a significant difference in NDH group performances, t (58) = −1.1, p = .28 (see Table 2).

In terms of expressive language, African American controls scored significantly lower than the standardization sample on the Boston Naming Test (BNT): Spontaneous (SR) + Stimulus Cued (SC) responses, t (18) = −4.8, p = .001; Raw Mean = 46.1, SD = 9.14. Compared to Caucasians, African American participants performed significantly more poorly on this BNT measure, t (57) = −2.5, p = .01. To determine whether these unexpected discrepancies were due
Table 2
Mean psychomotor raw scores for African Americans and Caucasians

<table>
<thead>
<tr>
<th></th>
<th>African Americans M (SD)</th>
<th>Caucasians M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip Strength: Dominant Hand</td>
<td>26.2 (12.8)</td>
<td>28.4 (10.5)</td>
</tr>
<tr>
<td>Grip Strength: Nondominant Hand</td>
<td>24.5 (12.9)</td>
<td>25.8 (10.9)</td>
</tr>
<tr>
<td>Finger Tapping: Dominant Hand</td>
<td>28.7 (11.7)</td>
<td>39.9 (6.2)</td>
</tr>
<tr>
<td>Finger Tapping: Nondominant Hand</td>
<td>25.0 (9.7)</td>
<td>35.8 (3.9)</td>
</tr>
<tr>
<td>Grooved Pegboard: Dominant Hand</td>
<td>244.5 (236.4)</td>
<td>130.6 (127.6)</td>
</tr>
<tr>
<td>Grooved Pegboard: Nondominant Hand</td>
<td>259.0 (282.6)</td>
<td>153.9 (173.3)</td>
</tr>
</tbody>
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Table 3
Mean Boston Naming Test raw scores for African Americans and Caucasians

<table>
<thead>
<tr>
<th></th>
<th>African Americans M (SD)</th>
<th>Caucasians M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR + SC</td>
<td>32.1 (17.0)</td>
<td>45.9 (12.6)</td>
</tr>
<tr>
<td>Multiple choice</td>
<td>44.6 (16.1)</td>
<td>56.8 (6.5)</td>
</tr>
<tr>
<td>(SR + SC)/multiple choice</td>
<td>0.72 (0.18)</td>
<td>0.80 (0.17)</td>
</tr>
</tbody>
</table>

Note: SR: number of correct spontaneous responses, SC: number of correct SR + additional number correct with stimulus cue.

to dysphasia, the following analyses using the BNT Multiple Choice subtest were done. African participants scored significantly lower than Caucasian participants on the BNT Multiple Choice domain, \( t(50^*) = -4.2, p = .001 \). However, a better measure of naming using the BNT might be interpretation of SR plus SC responses in light of multiple choice response score. Dividing the sum of spontaneous and stimulus cued responses by the sum of spontaneous, stimulus cued, phonemic cued, and multiple choice responses yielded ratios that were not significantly different for African American versus Caucasian groups, \( t(60) = 1.3, p = .19 \) (see Table 3) \((^*) = d.f. were modified due to unequal variances between groups). To identify a decline from premorbid functioning, a reliable and valid measure of previous cognitive abilities is needed. The Wechsler Test of Adult Reading (WTAR) was assessed as a measure of premorbid functioning for the South Carolina African American participants. The WTAR significantly underestimated premorbid IQ for African American controls (\( M = 89.2, SD = 8.0 \)) when compared with Wechsler Abbreviated Scale of Intelligence (WASI) 2-subtest Full Scale IQ scores (\( M = 95.2, SD = 13.6 \)), \( t(18) = 2.5, p = .02 \). Additional participants are needed to determine if a similar pattern exists for Caucasian participants.

4. Discussion

This study highlights our initial efforts to investigate AD and related dementias in a genetic and culturally homogeneous cohort of aging African American at high risk for comorbid cerebrovascular disease. In addition to recruitment issues and comorbid cerebrovascular disease or risk, this study also highlights the particularly challenging neuropsychological issues related to the use of established norms potential associated with the confounding effects of cultural and/or educational variables.

The preliminary results suggest that it is highly likely that this cohort has significant co-morbid cerebrovascular disease. One major challenge has been determining the degree of cerebrovascular burden in this cohort. Self-report was problematic in reliably obtaining Hachinski scores on all study participants. Additionally, because the cost of individual MRI scans is prohibitive, we attempted to address this issue by loading the neurocognitive battery with measures of psychomotor function. The rationale was that pure AD is associated with little motor or psychomotor involvement, especially in the early stages of the disease (Lezak, Howieson, & Loring, 2004). On the other hand, small vessel angioplasty is associated with greater motoric involvement (Lezak et al.). The preliminary examination of the data showed that African Americans tend to perform more poorly than Caucasians on tests of psychomotor functioning and cognitive functioning. Data was interpreted using the extended HRB norms. We had no reason to doubt that the extended norms from the HRB were colored by the cultural factors. However, in addition to the possibility that this finding represents cerebrovascular burden, peripheral neuropathy might be another possible explanations for these findings. If identified differences in psychomotor functioning are in fact a true difference, these results would argue...
that there is increased cerebrovascular burden affecting the South Carolina African American participants. Differences in diet, utilization of health care resources, and genetically transferred medical problems could be modifiable risk factors and this has received a great deal of attention in the recent literature (for review see Skoog, Kalaria, & Breteler, 1999) and might serve as a target for future prevention efforts.

Another finding that has become quite evident during the first year of this study had to do with the use of vocabulary as a predictor of premorbid intelligence. This is a critical issue in determining degree of cognitive loss and is vital in defining MCI. In the current data, it would appear that not only amount, but also quality of education is confounding this cohort’s psychometric performance on both the BNT and WTAR. In terms of differential language ability, African American participants had greater difficulty than Caucasians with vocabulary. Level of acculturation and assimilation, are factors that Miles (2002) and Manly and Jacobs (2002) have reported are associated with test performance bias in African Americans. It would seem that the best approach to this problem is to develop specific local norms.

This was illustrated in our examination of the BNT. More specifically, the normative data for the BNT seemed to lack specificity for this sample. Interestingly, when naming was interpreted in terms of correct multiple-choice responses, a different pattern emerged—African American performance was not significantly different from Caucasian performance. If group differences disappear when naming is interpreted as a function of general fund of vocabulary, original differences are more likely a product of different educational opportunities rather than evidence of cognitive impairment.

This issue has been discussed by Heaton et al. (2003) who found that demographic variables such as age, education, gender and ethnicity do influence the interpretation of standardized scores and therefore requires corrections in standardized norms to compensate for these confounding influences. However, Manly and her collaborators have extended this idea arguing that among ethnic minorities, literacy level is a better predictor than was years of education (Manly, Schupf, Tang, & Stern, 2005; Manly et al., 2002; Manly et al., 1998; Manly et al., 2004). Literacy is often operationally defined as reading proficiency level which is thought to be a better reflection of quality of education rather than years of education. Indeed, Manly (Manly, Miller, Walden, et al.) has shown that accounting for acculturation of African Americans does seem to improve the diagnostic accuracy of certain neuropsychological tests. Therefore, one approach to the problem of poor specificity of cognitive norms among ethnic minorities has been to develop separate ethnic group norms. Manly (2005) has discussed the pros and cons of this approach.

Curiously in this data, the validity of the norms associated the WTAR vocabulary test as a measure of premorbid intelligence in the southern African American population was questionable. The WTAR underestimated premorbid IQ for African American controls suggesting that the norms for this measure of language may not be the best predictor of premorbid ability.

Overall, the preliminary data analysis for this study clearly suggested that some of the normative data used to interpret test results for this African American cohort needs to be re-examined. Further study of this group with larger sample sizes and longitudinal follow-up will help unravel some of these issues. To this end, we are in the process of developing new normative data for this rural Southern geriatric African American cohort by using our asymptomatic controls as the reference group and verifying absence of disease by longitudinal confirmation of stable psychometric scores.

In this same vein, we are also most interested in what measures will predict conversion to dementia in the MCI group. MCI has been defined as subjective memory complaints, and ideally, also by psychometrically defined standard deviation decline in episodic memory. However, even when using this criterion, the risk of conversion to AD dementia is often misdiagnosed. We fully anticipate this problem to be magnified in the current cohort and we are beginning to unravel the question with longitudinal data. Specifically, unless premorbid IQ can be more accurately defined individually, it is our opinion that a simplistic definition of standard deviation decline in memory will fail to accurately detect those at risk for conversion because of excessive variance. Efforts are underway to develop better norms for estimating premorbid IQ and we are also investigating the notion of changes in metacognition as the first sign of MCI and have several case examples in the current data set that seem to support this notion. To our knowledge, these issues have never been studied in this specific cohort.

In terms of recruitment, an interesting trend is beginning to emerge that highlights a national problem in conducting this type of culturally fair research. It appears to be the case that well educated African Americans are volunteering as asymptomatic controls. Conversely, it would appear that lesser educated African Americans are coming forth to participate, but only after dementia is fairly advanced. We have likewise noted this trend in the clinics.
This trend is concerning for several reasons. First, the group of intense interest for therapeutic trials is the preclinical AD population. Prevailing thought is that this is the stage where interventions will likely have the greatest impact. A challenge for any intervention trial is to recruit those at imminent risk of AD. Therefore, it is ideal if the cohort sample were skewed toward the less impaired. Secondly, it is likely that the better educated African Americans also have a lifestyle and diet that is associated with less cerebrovascular burden. Because of this possible factor, the MCI participants that convert to AD may not allow the degree of opportunity we envision to study comorbid cerebrovascular burden.

By systematic neuropsychological investigation of this unique cohort, we are beginning to understand the possible changing structure of the neurocognitive expression of AD as a function of premorbid education and cerebrovascular burden. We also are beginning to understand trends that we have observed in the clinic that parallel what we are seeing in study recruitment patterns. Further study of longitudinal data will likely offer greater insight in understanding this nationally under-represented cohort.

References


