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Prevalence estimates of depression in elderly community-dwelling African Americans in Indianapolis and Yoruba in Ibadan, Nigeria

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Abstract

Background—This is a community-based longitudinal epidemiological comparative study of elderly African Americans in Indianapolis and elderly Yoruba in Ibadan, Nigeria.

Method—A two-stage study was designed in which community-based individuals were first screened using the Community Screening Interview for Dementia. The second stage was a full clinical assessment, which included use of the Geriatric Depression Scale, of a smaller sub-sample of individuals selected on the basis of their performance in the screening interview. Prevalence of depression was estimated using sampling weights according to the sampling stratification scheme for clinical assessment.

Results—Some 2627 individuals were evaluated at the first stage in Indianapolis and 2806 in Ibadan. All were aged 69 years and over. Of these, 451 (17.2%) underwent clinical assessment in Indianapolis, while 605 (21.6%) were assessed in Ibadan. The prevalence estimates of both mild and severe depression were similar for the two sites ($p = 0.1273$ and $p = 0.7093$): 12.3% (mild depression) and 2.2% (severe depression) in Indianapolis and 19.8% and 1.6% respectively in Ibadan. Some differences were identified in association with demographic characteristics; for example, Ibadan men had a significantly higher prevalence of mild depression than Indianapolis men ($p < 0.0001$). Poor cognitive performance was associated with significantly higher rates of depression in Yoruba ($p = 0.0039$).

Conclusion—Prevalence of depression was similar for elderly African Americans and Yoruba despite considerable socioeconomic and cultural differences between these populations.

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Keywords

late life depression; cross-cultural; African Americans; Yoruba

Introduction

Depression represents a major international public health problem for both developed and developing countries. Unipolar depressive disorders appear high on the list of conditions associated with disease burden for both comparatively low income and high income countries in an analysis of the Disease Control Priorities Project (Lopez *et al.*, 2006). Reported prevalence of mood disorders have varied between countries, with Nigeria having relatively low rates (Demyttenaere *et al.*, 2004). A recent review of affective disorders in sub-Saharan Africa, including Nigeria, has suggested, however, that depressive symptoms are relatively common in that region (Tomlinson *et al.*, 2006).

There is less information on late life depression internationally but certainly it is recognized as common and as a major public heath problem, at least in the United States (Steffens *et al.*, 2006) across ethnic groups (Blazer, 2003) and in Europe (Copeland *et al.*, 2004). Recent studies have indicated that late life depression is also common in other countries (Papadopoulos *et al.*, 2005; Chen *et al.*, 2006). Two prior studies of elderly populations in Nigeria have concluded that depression is common in a rural community (Uwakwe, 2000) and in a primary care clinic (Sokoya and Baiyewu, 2003).

The Indianapolis–Ibadan project, a longitudinal study comparing rates of dementia between the two communities and identifying risk factors for dementia, also included measurement of depression symptoms using the Geriatric Depression Scale (GDS). In this paper the comparative prevalence of depression in the two communities is reported, as well as the association of the depressive symptoms with age, gender and cognitive performance.

Method

The Indianapolis–Ibadan research project has been ongoing since 1992 when two community-based cohorts were assembled and subjects without dementia were evaluated in 1994, 1997 and 2001. Details on methodology have been published previously (Hendrie *et al.*, 1995; Hall *et al.*, 1996; Hendrie *et al.*, 2001). This particular study deals with the 2001 wave of the study. At both sites, the cohort consisted of those participants without dementia from the original cohort and an enrichment sample added in 2001. All subjects enrolled in the study were aged 69 or older. A summary of the procedure utilized in this wave is given below.

Ibadan sample

In Ibadan, the study was carried out in Idikan and adjacent wards of the city. Ibadan is located in the southwestern part of Nigeria and is home to people of predominantly Yoruba origin. Date of birth was estimated from a table of historical landmarks, which is a well-tested, longstanding practice in Nigeria to obtain ages of adults (Ogunniyi and Osuntokun, 1993).

Indianapolis sample

The geographical study area used in this study consisted of 29 contiguous census tracts in which African Americans represented 80% of the population in the 1990 U.S. census. According to the U.S. census, the distributions of age, sex, and socioeconomic status of the residents of these tracts are representative of all African Americans in Indianapolis and the state of Indiana.

First-stage interview

All community residents in the study were evaluated in their homes in both sites using the Community Screening Interviews for Dementia (CSI-D) (Hall *et al.*, 1996). The CSI-D consists of a cognitive assessment of the subject and an informant interview if possible to assess daily functioning. Information is combined into a total score, which is used to determine selection for the Clinical Assessment Phase. This total score, a discriminant score, is derived from logistic regression models with dementia as the outcome variable and cognitive and informant scores as the independent variable. Based upon extensive prior published work with the CSI-D (Hall *et al.*, 1993), cut-off scores were used to characterize each subject as having a low, medium, or high probability of having dementia. All subjects with a high probability of dementia (poor cognitive performance i.e. low CSI-D scores), 75% of those with medium probability of dementia (intermediate cognitive performance) and 2.5% of those with low probability of dementia (good cognitive performance) were selected for the Clinical Assessment Phase. In addition to this sampling scheme, all subjects who were diagnosed with mild cognitive impairment in the previous wave were selected for the Clinical Assessment Phase. All clinically assessed subjects were administered the 30-item GDS (Yesavage *et al.*, 1982) along with the Consortium to Establish a Registry for Alzheimer Disease (CERAD) (Morris *et al.*, 1989) and an informant interview.

Geriatric Depression Scale (GDS)

The GDS is a 30-item scale developed specifically for use in elderly populations (Yesavage *et al.*, 1982). It has been used extensively in the United States, including with African Americans (Kurlowicz *et al.*, 2005) as well as in other countries (Ganguli and Hendrie, 2005). Cut-off scores of 11 or greater are generally considered to represent significant mild depression and scores of 21 and higher severe depression.

In Ibadan, the GDS was back translated into the Yoruba language by a nurse and a social worker until an acceptable format was obtained, ensuring that the translation conveyed appropriate concepts to the subject. In a previous study in Ibadan (Sokoya and Baiyewu, 2003), κ agreement between GDS cut-off scores of 11 and clinically derived ICD-10 diagnosis of depression was 0.645.

The GDS is generally self-administered but because of low literacy rates in Ibadan, the GDS was administered by a trained psychometrician interviewer. In order to maintain consistency, the same system of GDS administration was used in Indianapolis.

Statistical analysis

Descriptive statistics were calculated for all variables. T-tests and χ^2 tests were used to compare the participants with GDS from each site on the basis of their demographic characteristics. Because the participants evaluated during this wave were not administered the GDS due to the sampling scheme for dementia described above, in order to get accurate estimates of the GDS prevalence for the two populations we derived weighted proportions and 95% confidence intervals of mild and severe depression. Sampling weights were calculated for each site separately. Sampling weight for each subject was derived as the number of subjects who were evaluated for dementia at the first stage divided by the number of subjects who were both screened and had the GDS data within each cognitive performance group. According to our research design, all who had received a diagnosis of mild cognitive impairment from the previous wave were expected to have a clinical assessment, and so they were included in the poor cognitive performance group. Depression was classified as mild or severe based upon the GSD cut-off scores of 11–20 for mild depression and 21–30 for severe depression. Rao-Scott χ^2 tests were used to compare the prevalence estimates of mild and severe depression at the two sites, both overall and within various demographic subgroups. Weighted logistic regression

models were used to determine the association between demographic characteristics and any depression or severe depression at each site separately. Analyses were performed with the sampling survey procedures in SAS version 9.1, which used the appropriate weights and sampling scheme.

Results

At the first stage, using the CSI-D, 2806 subjects in Ibadan and 2627 subjects in Indianapolis were evaluated. Of these, 605 (21.6%) people in Ibadan and 451 (17.2%) in Indianapolis had been clinically evaluated and thus had GDS scores. Table 1 shows the demographic characteristics of the subjects who completed the GDS. The cohort in Indianapolis was significantly older and had a higher proportion of males ($p < 0.0001$ for both). About half of the participants at both sites were in the poor cognitive performance group, but for Indianapolis, more of the remaining participants were in the intermediate performance group compared to those in Ibadan ($p < 0.0001$). Ibadan participants had significantly higher mean GDS scores ($p = 0.0083$).

Table 2 presents the estimated overall prevalence estimates of mild and severe depression as well as a breakdown by gender, age group and cognitive performance group. Overall, the mild and severe depression prevalence estimates were similar between the two sites ($p = 0.1273$). In addition, the mild depression prevalence estimates were similar between the two sites in females, both age groups, and the good and intermediate cognitive performance groups ($p > 0.05$ for all). In males and in those in the poor cognitive performance group, however, Ibadan participants had significantly higher mild depression prevalence estimates compared to the respective Indianapolis participants ($p < 0.0001$, and $p = 0.0258$, respectively). There were no significant differences between the sites in prevalence estimates of severe depression overall or in the various groups.

Table 3 shows the results from the weighted logistic regression models. For Ibadan, being in the poor group was significantly associated with a higher occurrence of any depression compared to the good cognitive performance group ($p = 0.0039$). This variable was also marginally significant when comparing those with severe depression to those with mild and no depression ($p = 0.0642$). In Indianapolis, being female was significantly associated with any depression compared to no depression ($p < 0.0001$). No variables were significantly associated with severe depression.

Discussion

The work reported here represents the first comparative study of the prevalence of late-life depression among populations of African origin in both a developed and developing country setting. Our results indicate that depression, particularly mild depression, is common in the two African American and Yoruba communities. Indeed, the prevalence of mild depression is somewhat higher although not significantly so among Yoruba than African Americans (19.8% and 12.3%, respectively).

The similarity of prevalence of depression in the two communities may be a little surprising in view of the results from the WHO cross-national study where the prevalence of depression for Nigerians (0.8%) was amongst the lowest recorded and much lower than the prevalence in the United States (9.6%) (Demyttenaere *et al.*, 2004). The WHO study, however, included a much wider age range of participants. Our current findings from an elderly Yoruba population are similar to those found by Uwakwe (2000) – who reported a prevalence of depression of 19% – and somewhat higher than the rate reported by Sokoya and Baiyewu (2003) of 7.4%. It

is consistent with the opinion of (Tomlinson *et al.*, 2006) that depressive symptoms are common in sub-Saharan Africa.

It is difficult to compare our estimates with those of other studies which use differing assessments but they do seem comparable with other population rates from Europe (Copeland *et al.*, 1986) and the United States (Blazer, 2003). They are also similar to the rates of depression (12%) reported from an elderly Greek population using the GDS (Papadopoulos *et al.*, 2005) The finding that mild depression is much more common than severe depression is consistent with the findings of most other surveys (Papadopoulos *et al.*, 2005; Chen *et al.*, 2006).

In most studies, women are reported to have a higher prevalence of depression than men (Cole and Dendukuri, 2003; Copeland *et al.*, 2004). In our analysis, however, while African American women had a higher prevalence of depression than African American men (significantly so for mild depression) this was not the case for the Yoruba where the prevalence of both mild and severe depression was similar for men and women. When the gender-associated prevalence of depression between the two sites is compared, it is notable that the prevalence estimates of depression in the two groups of women were similar while Yoruba men had much higher rates of mild depression than African American men. There are many socio-demographic and medical risk factors for depression including levels of poverty, access to health care, social engagement, medical comorbidity, functional disability, and pain (Blazer, 2003), which were not included in our analysis. In subsequent studies we will be administering the GDS to all participants and include measurements of these and other putative risk factors which will hopefully allow us to create a model that will better explain our findings.

Age and cognitive impairment have been associated with increased risk of depression in the elderly in some reports – Valvanne *et al.* (1996) and Bergdahl *et al.* (2005) for age, and Steffens *et al.* (2006) for cognitive impairment. In our study age was not significantly associated with increased prevalence of depression in either Yoruba or African Americans, although elderly African Americans did have somewhat higher rates of severe depression. It may be that our study included too few subjects aged 90 or over to detect age differences. There was some evidence in our study supporting the link between poor cognitive performance and depression. Yoruba participants in the poor cognitive performance category had significantly higher rates of any depression than participants in the good performance category ($p = 0.0039$). In African Americans there was no significant relationship between cognitive performance and rates of mild or severe depression but poor cognitive performers did have somewhat higher rates of mild depression than did good cognitive performers.

It has been suggested that international comparisons of psychiatric disorders, including depression, conducted by questionnaires are suspect because of cultural differences which may influence responses to specific items in these instruments. (Jorm, 2006). This process was illustrated well in the Indo-U.S. study where traditional beliefs regarding appropriate end-of-life behavior (the primacy of peace and contentment) appeared to influence the elderly Indians responses to items in the GDS involving emotional responsiveness and activation (Ganguli *et al.*, 1999). The authors suggest that these culturally determined responses may influence GDS cut-off scores indicating depression. The translation and harmonization process of the GDS into the Yoruba language also provided examples of how item response is influenced by culture and language. For example, the meaning of the words “hopelessness” and “helplessness” were difficult to convey in the Yoruba language. The questions had to be expanded to explain these concepts more fully. One of the strengths of this study, however, is that as part of the process of the development of the GDS, a validation study was conducted by comparing GDS scores of > 11 with ICD-10 diagnoses of depression derived from a clinician-administered GMS with subsequent AGECAT classification. The derived κ was a respectable 0.645.

There are a number of limitations to this study. The design was cross-sectional and relied on the GDS rather than clinical assessment to assess depression. It has been suggested that rates of depression are generally higher in studies using cut-off points derived from questionnaires than in studies using clinically defined studies with standard diagnostic criteria (Cole and Dendukuri, 2003). The number of risk factors considered was limited and did not include major factors such as disability and social support. The study and the screening process were designed primarily to detect and diagnose dementia.

In summary, the rates of depression were similar for elderly Yoruba and African Americans. This is somewhat surprisingly considering the major socioeconomic and cultural differences between these two communities (Hendrie *et al*., 1995; Hall *et al*., 1996; Hendrie *et al.*, 2001). However, the relationship between gender and depression did differ between the populations, suggesting perhaps that some sociocultural differences, not captured by this study, did influence depression rates.

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Table 1

Demographics of study participants from each site

	Ibadan (n = 605)	Indianapolis (n = 453)	p - value
Age, years (mean ± SD)	78.8 ± 6.2	80.3 ± 6.1	< 0.0001
Age group, n (%)			< 0.0001
69–79 years	399 (66.0%)	241 (53.4%)	
80+ years	206 (34.0%)	210 (46.6%)	
Attended school (Ibadan), n (%)	48 (8.0%)	9.8 ± 3.1	N/A
Years of education (Indianapolis), (mean ± SD)			
Female, n (%)	484 (80.0%)	290 (64.3%)	< 0.0001
Cognitive performance group, n (%)			< 0.0001
Good	126 (20.8%)	48 (10.6%)	
Intermediate	144 (23.8%)	153 (33.9%)	
Poor	335 (55.4%)	250 (55.4%)	
GDS score (mean ± SD)	7.9 ± 5.5	7.1 ± 5.2	0.0083

Table 2

Estimated mild and severe depression prevalence estimates for Ibadan and Indianapolis

	Ibadan		Indianapolis		
	Prevalence (%)	**95% CI (%)**	**Prevalence (%)**	**95% CI (%)**	**p - value**
Mild depression					
Overall	19.8	14.4–25.1	12.3	5.3–19.3	0.1273
By gender					
Female	19.8	14.2–25.5	16.1	6.3–25.8	0.5319
Male	20.5	6.5–34.4	3.6	2.2–5.0	<0.0001
By age group					
69–79	18.0	11.8–24.1	11.6	2.1–21.2	0.3226
80+	24.6	14.2–35.1	13.6	3.7–23.6	0.1566
By cognitive performance group					
Good	18.3	11.4–25.1	10.4	1.6–19.2	0.2145
Intermediate	16.7	10.5–22.8	15.7	9.9–21.5	0.8189
Poor	29.9	24.9–34.8	21.6	16.5–26.7	0.0258
Severe depression					
Overall	1.6	0.3–2.8	2.2	0.0–5.4	0.7093
By gender					
Female	1.8	0.2–3.3	2.8	0.0–7.5	0.6199
Male	0.7	0.1–1.4	0.6	0.0–1.2	0.8071
By age group					
69–79	1.4	0.0–3.1	0.6	0.2–1.0	0.2056
80+	2.2	0.9–3.5	3.9	0.0–11.1	0.5564
By cognitive performance group					
Good	0.8	0.0–2.4	2.1	0.0–6.2	0.4785
Intermediate	3.5	0.5–6.5	2.6	0.1–5.2	0.6671
Poor	4.8	2.5–7.1	2.4	0.5–4.3	0.1362

Table 3

Weighted logistic regression results of any depression and severe depression for each site

	Any depression			Severe depression		
	OR	**95% CI**	**p - value**	**OR**	**95% CI**	**p - value**
Ibadan						
Female vs. male	0.98	0.41–2.35	0.9587	1.34	0.39–4.55	0.6417
Age 80+ vs. age 69–79	1.37	0.64–2.90	0.4152	1.06	0.37–3.04	0.9125
Cognitive performance group:						
Poor	2.15	1.28–3.60	0.0039	6.17	0.90–42.40	0.0642
Intermediate	1.04	0.56–1.92	0.9015	4.56	0.58–35.58	0.1481
Good	ref			ref		
Indianapolis						
Female vs. male	5.08	2.37–10.89	< 0.0001	3.45	0.63–19.07	0.1553
Age 80+ vs. age 69–79	1.18	0.33–4.26	0.7960	5.61	0.71–44.09	0.1014
Cognitive performance group:						
Poor	2.39	0.96–5.97	0.0617	0.99	0.10–9.94	0.9926
Intermediate	1.86	0.73–4.72	0.1907	1.46	0.18–12.12	0.7235
Good	ref			ref		

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