



Epidemiology of major depressive disorder in elderly Nigerians in the Ibadan Study of Ageing: a community-based survey

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Summary

Background The growing populations of elderly people in sub-Saharan Africa are exposed to social changes with potential adverse effects on mental health. Our aim was to estimate the occurrence and effect of major depressive disorder in a large and representative community sample of elderly Africans.

Methods Face-to-face interviews with a representative sample of people aged 65 years and older (n=2152) were obtained by a multistage stratified sampling of households in the Yoruba-speaking areas of Nigeria (about 22% of the national population). Major depressive disorder was assessed with the WHO composite international diagnostic interview and diagnosed with the Diagnostic and Statistical Manual of Mental Disorders, fourth edition.

Findings Lifetime and 12-month prevalence estimates of major depressive disorder were 26.2% (95% CI 24.3–28.2) and 7.1% (5.9–8.3) respectively. Female sex (odds ratio [OR] 1.9) and increasing levels of urbanisation of residence (OR 1.4) were associated with this disorder. People with major depressive disorder had impaired quality of life and functioning in home, work, and social roles. Independent ratings of symptom severity confirmed the presence of clinically significant depression in 96.9% of those with diagnosis, and increasing symptom severity was associated with greater disability and poorer quality of life. Only about 37% of lifetime cases had received any treatment, and there was a mean delay of 5 years from onset of depression to receipt of first treatment. Low economic status (0.3) and rural residence (1.0) predicted no treatment.

Interpretation Major depressive disorder is common in elderly Nigerians and its occurrence is related to urbanisation. This disorder is a seriously disabling illness in this group but only a few sufferers have ever received treatment. Health-care services need to invest in effective treatment programmes for major depressive disorder.

Introduction

Studies done in western Europe and North America suggest that depression is a common and often debilitating illness in elderly people. Depression is associated with functional impairment, decreased quality of life, and increased mortality. It is regarded as a major public-health concern¹ and is projected to become the second most common cause of disability by 2020.² Little is known about the occurrence and effects of depression in elderly people in sub-Saharan Africa. Although the growth in the proportion of elderly people in African populations is one of the fastest in the world,³ the health of this group has been little researched.

Depression in elderly people often has social origins. Many studies, mostly done in western Europe and North America, suggest that depression in older individuals is associated with low socioeconomic status, low social support, and poor physical health.^{4,5} Such social factors are also common in many African countries. Nigeria, the most populous African country, is undergoing social change that could have detrimental effects on the lives of elderly people. Although Nigeria is rich in land and mineral resources, it is one of the poorest countries and has one of the fastest rates of urban growth in the world.⁶ Many of Nigeria's cities are characterised by squalor and daily hardship. The unemployment rate is more than 40%, and urban migration is usual for young educated people seeking a

better life. The country's health service is poor,⁷ and access to services for people with mental illness is especially small, with only about 10% of patients receiving any form of treatment.⁸ However, since overall life expectancy in Nigeria is about 48 years for men and 50 years for women,⁹ people who survive to the age of 65 years or older probably represent a resilient subgroup. For example, although healthy life expectancy at birth in Nigeria is 41 years for men and 42 years for women, men and women who live until the age of 60 years can expect another 9 and 10 years, respectively, of healthy life.⁹

We used data from a large community-based study to estimate the prevalence of major depressive disorder (MDD) in people aged 65 years and older, who live in the Yoruba-speaking parts of Nigeria. We report the effects of this disorder on functioning and quality of life and the factors predicting receipt of treatment.

Methods

Patients

The Ibadan Study of Ageing (ISA) is a community-based survey of mental and physical health status and functioning or disability of elderly people (aged 65 years and older) residing in the Yoruba-speaking areas of Nigeria, consisting of eight neighbouring states in the south-western and north-central regions (Lagos, Ogun, Osun, Oyo, Ondo, Ekiti, Kogi, and Kwara). These states

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account for about 22% of the Nigerian population (around 25 million people). The survey was done between Nov 3, 2003, and Aug 27, 2004.

Respondents were selected by a multiple-stage probability-sampling of households stratified by area. In households with more than one eligible person, the

Kish table selection method was used to select one respondent.¹⁰ Whenever necessary, age eligibility was assessed with a previously validated list of historical events¹¹. Respondents were informed about the study, invited to participate, and assured of their right to decline. All participants provided signed or verbal consent before interviews were done; most participants gave verbal consent, because of either illiteracy or personal preference. On the basis of this selection procedure, face-to-face interviews were done with 2152 of 2908 respondents, giving a response rate of 74%. Non-response was predominantly caused by non-availability after repeated visits (407 of 2908, 14%), interviewers unable to trace original address (116 of 2908, 4%), death (87 of 2908, 3%), physical incapacitation (57 of 2908, 2%), and rarely, because of refusal (57 of 2908, 2%).

The survey was approved by the University of Ibadan and University College Hospital, Ibadan joint ethical review board.

	Unweighted	Weighted	National census*
Age (years)			
65-69	747 (35%)	723 (33%)	174 240 (33%)
70-74	483 (22%)	676 (31%)	158 400 (30%)
75-79	300 (14%)	254 (12%)	63 360 (12%)
80+	622 (29%)	499 (23%)	137 280 (26%)
Sex			
Male	995 (46%)	1129 (53%)	259 472 (50%)
Female	1157 (54%)	1023 (48%)	264 528 (50%)

*UN 2000 projections from the 1991 Nigerian National Census.³

Table 1: Demographic distribution of the respondents compared with the general population by post-stratification variables

	Unweighted	Lifetime MDD (n=498)	12-month MDD (n=134)
All respondents	1897	26.2% (1.0)	7.1% (0.5)
Sex			
Male	885	20.6% (1.6)	6.2% (0.9)
Female	1012	33.4% (1.6)	9.3% (1.2)
Age (years)			
65-69	644	25.3% (2.3)	8.5% (1.6)
70-74	449	23.8% (2.3)	6.2% (1.3)
75-79	257	30.7% (3.0)	9.3% (2.1)
80+	547	25.3% (1.9)	5.2% (1.3)
Marital status			
Married	968	22.8% (1.7)	6.5% (0.9)
Widowed/separated/divorced	929	31.2% (1.8)	9.3% (1.4)
Education			
None	1034	26.9% (1.7)	6.8% (0.7)
Primary	478	26.0% (2.4)	9.1% (1.9)
Secondary	238	25.6% (3.4)	7.9% (2.5)
Tertiary	147	18.7% (4.3)	6.1% (2.6)
Economic status			
<3 (low)	580	21.7% (1.9)	6.5% (1.1)
3-5 (low-average)	664	21.0% (1.8)	5.3% (1.1)
6-10 (high-average)	448	30.8% (2.5)	8.9% (1.8)
>10 (high)	205	33.3% (3.6)	10.9% (2.8)
Floor			
Hard	533	30.8% (2.1)	9.2% (1.7)
Earth	1364	23.1% (1.2)	6.5% (0.6)
Location			
Urban	488	29.5% (2.2)	10.6% (2.2)
Semi-urban	763	25.8% (1.3)	7.3% (1.1)
Rural	646	22.9% (2.0)	5.2% (1.7)

Data are weighted proportion (SE).

Table 2: Prevalence of 12-month and lifetime major depressive disorder (MDD) by sociodemographic characteristics

Procedures

Depression was assessed with the World Mental Health Survey section of WHO composite international diagnostic interview (WMH-CIDI), a fully structured diagnostic interview.¹² Diagnosis was made on the basis of the criteria of the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV).¹³ DSM-IV exclusion rules were imposed for diagnosis of depression. Judgments about what disorders could cause major depressive disorder were made by a psychiatrist after clinical review of all questionnaires that had endorsements of depressive features. We excluded from the analysis anybody with probable dementia that had been diagnosed by a previously validated cognitive screen.¹⁴ The WMH-CIDI is a user-friendly version of the CIDI, with simplified questions and structure. Diagnosis was made with the same algorithm as in our earlier study,¹⁵ in which we used WMH-CIDI.

Major depressive disorder is characterised by depressed mood, fatigue, morbid thoughts, greatly diminished interest or pleasure, change in appetite and weight, and change in quantity of sleep that persists for at least 2 weeks. Diagnosis is made when symptoms cause substantial distress or impairment and they are not explained by a medical disorder, medication, or bereavement. Although major depressive disorder is not the only form of depression (dysthymia and minor depression are other examples), it is the most severe. Also, it can be concurrent with other common mental disorders, such as anxiety disorders. However, neither comorbidity nor other forms of depression are reported in this paper.

We rated symptom severity in the worst month of depression in patients who had major depressive disorder in the previous 12 months using the quick inventory of depressive symptomatology self-report

(QIDS-SR).¹⁶ QIDS-SR is fully structured and does as well as the clinician-administered inventory of depressive symptom and the Hamilton rating scale for depression.^{17,18} As previously proposed,¹⁸ we classified depression by severity (none, mild, moderate, severe, and very severe) by conversion of QIDS-SR scores to equivalent Hamilton scale ranges.

All respondents were assessed for functional limitations in six activities of daily living (bathing, dressing, toileting, arising and transferring, continence, and eating)¹⁹ and seven instrumental activities of daily living (climbing a flight of stairs, reaching above the head to carry something weighing about 4.5 kg, stooping, gripping small objects with hands, shopping, and activities such as sweeping the floor with a broom or cutting grass).²⁰ Each of the activities in the two domains was rated: (1) can do without difficulty; (2) can do with some difficulty; (3) can do only with assistance; (4) unable to do activity. We classified as disabled any respondent with a rating of 3 or 4 on any item. A subgroup of 37 respondents was assessed twice, about 7 days apart, to assess test-retest reliability of these disability markers. Agreement was generally very good to excellent, with a κ range of 0.65–1.0.

We also did a specific assessment of role impairment due to depression with the Sheehan disability scale²¹ for people with major depressive disorder for 12 months. The Sheehan scale was used to assess the extent to which work, household activities, relationships, and social roles were affected by depression in the worst month in the past year. A visual analogue scale was used to score responses as: none (0); mild (1–3); moderate (4–6); severe (7–9); and very severe (10).

All respondents also completed WHO quality of life assessment instrument, brief version (WHOQoL-Bref).²² WHOQoL-Bref was developed as an instrument, applicable across many cultures, for subjective assessment of health-related quality-of-life.²³ It was designed in diverse cultural settings, including in sub-Saharan Africa,²³ and has been validated as a measure of quality of life in elderly people.²⁴ In our study, this instrument had excellent reliability (Cronbach $\alpha=0.86$). The lower the score on the WHOQoL-Bref, the poorer the quality of life.

All instruments were translated with iterative back-translation methods. As part of the translation process, all instruments used underwent cultural adaptation. For example, in describing 4.5 kg in the functional assessment, a tuber of yam (a local staple food) of equivalent weight was used.

The interviews were done by 24 trained interviewers, all of whom had at least 12 years (high school) education. Many interviewers had previously done field surveys and had experience of face-to-face interviews. Interviewers had 2-weeks training, consisting of an initial 6-day training done by one of the authors (OG) (which included item-by-item description of questionnaires and role play), followed by a further 2 days of debriefing and review after

every interviewer had done two practice interviews in the field. Six supervisors, all of whom were university graduates and had survey experience, underwent the same level of training and monitored the day-to-day implementation of the survey.

Data analysis

To account for the stratified multistage sampling procedure and the associated clustering, we derived and applied weights to the rates presented in this report. Also, we adjusted for differences between the sample and the total Nigerian population (according to 2000 UN projections) by post-stratification to the target sex and age range (table 1). The derived weights were adjusted to normal values to reset the sum of weights back to the original sample size of 2152. We excluded 255 individuals who had a diagnosis of probable dementia from this total sample, thus leaving 1897 respondents for analysis.

We examined the association of major depressive disorder with the sociodemographic variables: age, sex,

	Lifetime* MDD (n=498)	p value	12-month* MDD (n=134)	p value
Sex				
Male	1.0		1.0	
Female	1.9 (1.5–2.4)	0.001	1.5 (1.0–2.3)	0.026
Age (years)				
65–69	1.0		1.0	
70–74	0.9 (0.6–1.3)	0.652	0.7 (0.3–1.4)	0.292
75–79	0.9 (0.6–1.4)	0.952	1.1 (0.6–2.0)	0.743
80+	1.01 (0.7–1.4)	0.948	0.6 (0.2–1.2)	0.200
Marital status				
Married	1.0		1.0	
Widowed/separated/divorced	1.5 (1.1–2.0)	0.005	1.5 (0.9–2.2)	0.072
Education				
None	1.6 (0.8–3.0)	0.149	1.1 (0.4–2.8)	0.830
Primary	1.5 (0.7–3.0)	0.227	1.5 (0.6–3.7)	0.354
Secondary	1.4 (0.6–3.4)	0.332	1.3 (0.3–4.6)	0.669
Tertiary	1.0		1.0	
Economic status				
Low	0.5 (0.3–0.8)	0.002	0.7 (0.4–1.4)	0.452
Low-average	0.5 (0.3–0.8)	0.009	0.4 (0.2–0.9)	0.032
High-average	0.8 (0.6–1.3)	0.545	0.5 (0.2–1.2)	0.127
Highest	1.0		1.0	
Floor				
Hard	1.0		1.0	
Earth	0.6 (0.5–0.8)	0.003	0.6 (0.4–1.0)	0.068
Site				
Rural	1.0		1.0	
Semi-urban	1.2 (0.8–1.5)	0.250	1.4 (0.7–2.6)	0.245
Urban	1.4 (1.0–1.9)	0.024	2.1 (1.0–4.4)	0.036

* Data are OR (95% CI).

Table 3: Odds ratio of 12-month and lifetime major depressive disorder (MDD) by sociodemographic characteristics

	Men (n=194)	Women (n=304)	Total (n=498)
Age at onset (years)	51.0 (16.47)	51.0 (19.49)	51.0 (18.31)
Number of lifetime episodes	2.1 (1.71)	2.0 (1.49)	2.1 (1.57)
Age at first treatment	57.5 (15.66)	56.0 (17.24)	56.7 (16.49)
Treated*	82 (42.1%)	98 (32%)	181 (37%)
Hospital admission	18 (9%)	13 (4%)	31 (6%)
History of depression in first-degree relative	6 (2%)	10 (3%)	16 (3%)
Felt worthlessness	78 (40%)	116 (38%)	194 (39%)
Felt guilty nearly everyday	53 (27%)	113 (37%)	166 (32%)
Thought a lot about own or others death	101 (52%)	152 (50%)	253 (51%)
Felt that they wanted to die	61 (31%)	125 (41%)	186 (37%)
Thought a lot about suicide	10 (5%)	22 (7%)	32 (6%)
Made suicide plan	6 (2%)	10 (3%)	16 (3%)
Attempted suicide	5 (2%)	10 (3%)	15 (2%)

Data are mean (SD) or number (%). *p<0.05.

Table 4: Age at onset, course, and treatment for lifetime major depressive disorder

	12-month MDD†	No 12-month MDD†	p value
Physical	12.4 (11.7-13.2)	14.9 (14.8-15.1)	0.0001
Psychological	13.5 (12.9-14.2)	15.6 (15.5-15.7)	0.0001
Social	13.5 (12.8-14.2)	13.5 (13.3-13.7)	0.9078
Environmental	13.9 (13.3-14.4)	14.2 (14.1-14.3)	0.2024
Total scores	80.2 (76.9-83.5)	88.3 (87.6-89.0)	0.0001

*Measured by WHOQOL-Bref domain. †Data are mean (95% CI).

Table 5: Quality of life* of people with and without 12-month major depressive disorder (MDD) (n = 134)

education, and economic status. Economic status was assessed by taking an inventory of 21 specified household and personal items such as chairs, clock, bucket, radio, television set, fans, stove or cooker, car, or telephone. Such an inventory is a standard and validated method of estimating economic wealth of elderly people in low income settings.²⁵ Respondents' economic status was categorised by relating each respondent's total possessions to the median number of possessions of the entire sample. Thus, economic status was rated low if its ratio to the median was 0.5 or lower; low-average if the ratio was 0.5-1.0; high-average if it was 1.0-2.0; and high if it was higher than 2.0. Additionally, the quality of house flooring was categorised (concrete or earth) as another proxy of economic status. Residence was classified as rural

(less than 12 000 households), semiurban (12 000-20 000 households), and urban (greater than 20 000 households).

Our analysis accounted for the complex sample design and weighting. Thus, we used the jackknife replication method implemented with STATA version 7.0 to estimate SEs for proportions. Demographic correlates were explored with logistic regression analysis²⁶ and estimates of SEs of odds ratio (OR) obtained were made with STATA. All reported confidence intervals were adjusted for design effects.

Role of the funding source

The sponsor of this study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Lifetime and 12-month prevalence estimates of major depressive disorder were 26.2 (95% CI 24.3-28.2) and 7.1% (5.9-8.3), respectively (table 2). Women had higher lifetime and 12-month rates of depression than men; people who were widowed, separated, or divorced; people of higher socioeconomic status; and urban dwellers, also had high rates of depression. Female sex significantly increased the risks for both lifetime and 12-month major depressive disorder, and being widowed, separated, or divorced was associated with increased lifetime risk (table 3). There was a trend for lower incomes to be associated with reduced risk of lifetime but not 12-month major depressive disorder. Compared with people living in rural areas, the risks for both lifetime and 12-month major depressive disorder were significantly raised for people residing in urban areas.

The distribution of economic status significantly differed according to place of residence: 221 of 646 (34.2%) rural dwellers were in the low economic group compared with 162 of 763 (21.2%) semi-urban dwellers, and 67 of 488 (13.7%) urban dwellers. Whereas 78 of 488 (15.9%) urban dwellers were in the high economic group compared with 39 of 763 (5.1%) semi-urban residents and 13 of 646 (2.0%) rural residents (χ^2 test=30.04, $p<0.0001$). We therefore examined the possibility that the relation between depression and poverty might be confounded by

	None	Mild	Moderate	Severe	Very severe
Home	18 (16%) (9.3-23.1)	9 (8%) (3.7-14.8)	34 (31%) (22.1-39.2)	37 (33%) (24.6-42.1)	13 (12%) (5.7-17.7)
Work	13 (11%) (5.5-17.2)	6 (5%) (1.9-11.1)	27 (24%) (15.9-31.5)	48 (42%) (33.0-51.2)	20 (18%) (10.6-24.5)
Relationship	27 (24%) (16.0-31.8)	22 (19%) (12.2-26.8)	31 (27%) (19.2-35.7)	28 (25%) (16.8-32.7)	5 (4%) (1.4-10.0)
Social	26 (23%) (15.1-30.5)	26 (23%) (15.1-30.5)	24 (21%) (13.6-28.5)	30 (26%) (18.2-34.4)	8 (7%) (3.0-13.4)

Data are number (%) (95% CI).

Table 6: Severity of role impairment associated with 12-month major depressive disorder (n=134) assessed by the Sheehan disability scale

	Mild (n=47)	Moderate (n=47)	Severe (n=35)	Very severe (n=5)	Total (n=134)*
Symptom severity	46 (34%) (26.2-42.0)	46 (34%) (26.2-42.0)	34 (25%) (18.1-32.6)	5 (4%) (1.1-8.2)	131
Correlates of symptom severity					
WHOQoL-Bref†	87.6 (84.5-90.2)	77.7 (75.0-81.7)	71.7 (68.6-75.1)	71.0 (68.1-72.9)	79.3 (76.2-82.4)
Had disability‡	8 (17%) (7.6-30.8)	8 (17%) (7.4-30.7)	12 (34%) (19.1-52.2)	4 (80%) (28.4-99.5)	32 (23%) (16.1-30.2)
Role impairment§	15.6 (13.8-17.4)	23.1 (21.3-24.9)	28.3 (26.6-30.0)	35.6 (34.8-36.4)	23.6 (21.6-25.7)

Data are number (%) (95% CI) or mean (95% CI). *Total is number confirmed by QIDS-SR. †Mean total score on the WHOQoL-Bref (F=5.61, p=0.0005). ‡Mean total score on the WHOQoL-Bref (F=5.61, p=0.0005). §Mean total score on the four subscales of the Sheehan disability scale (F=14.3, p=0.0003).

Table 7: Pattern and correlates of symptom severity of 12-month major depressive disorder

place of residence, and did multiple logistic regression analyses, in which both variables were entered simultaneously. For lifetime prevalence, living in a house with a mud floor was associated with a reduced risk for lifetime depression (OR 0.7, 95% CI 0.5-0.9, p=0.012) but location was not (semiurban 1.1, 0.8-1.4; urban 1.2, 0.9-1.8). For 12-month prevalence, even though the trend for higher risks in semiurban (1.3, 0.7-2.5) and urban (2.0, 0.9-4.2) residents persisted, neither location nor living in mud house (0.7, 0.5-1.1) showed a significant association.

Mean age at onset of major depressive disorder was 51 years for both men and women (table 4). The mean number of lifetime episodes was about two, also with little difference between the sexes. Slightly more than a third had received treatment. Treatment was defined as any consultation to a health-care provider (orthodox, traditional, or religious), specifically for major depressive disorder. More men than women received treatment. On average, there was a 5-year delay between the onset of illness and receipt of treatment, with overall mean age at first treatment at around 57 years. High proportions of people felt worthless, or wanted to die, and had thought of suicide (table 4). People with 12-month major depressive disorder had lower overall quality of life than those without (table 5). Although elderly individuals with no 12-month major depressive disorder scored a mean of 88.3 on WHOQoL-Bref, those with the disorder scored 80.2, a significant difference (p=0.0001). People with 12-month major depressive disorder were more impaired in the domains of physical and psychological functioning than those without. However, no significant difference was noticed in the environmental and social domains.

More evidence of impairment related to major depressive disorder is provided by the results of the analysis of the Sheehan disability scale. In people with 12-month major depressive disorder, work-related activities were mostly affected, with 95 (83.2%) reporting at least moderate impairment (table 6), 68 (59.6%) reported either severe or very severe impairment, and 20 (17.5%) very severe impairment. Doing home activities was the next most commonly affected domain, with 84 (75.6%) of people having at least moderate impairment, and 13 (11.7%) being very severely affected.

Social role was the least affected, but more than half of individuals with 12-month major depressive disorder had at least moderate impairment.

The presence of clinical depression during the worst month of symptom experience was confirmed in 96.9% of people with 12-month major depressive disorder by the QIDS-SR (table 7). Of those, 87 (62.9%) had at least clinically moderate depression, and 40 (28.9%) had severe or very severe depression. Quality of life

	Lifetime treatment	p value
Sex		
Male	1.0	0.026
Female	0.6 (0.4-0.9)	
Age (years)		
65-69	1.0	
70-74	0.7 (0.4-1.0)	0.103
75-79	0.5 (0.3-0.9)	0.033
80+	0.6 (0.4-1.0)	0.081
Marital status		
Married	1.0	
Widowed/separated/divorced	0.6 (0.4-0.8)	0.001
Education		
None	0.9 (0.4-1.9)	0.906
Primary	1.0 (0.4-2.2)	0.896
Secondary	0.9 (0.4-2.2)	0.912
Tertiary	1.0	
Economic status		
Low	0.3 (0.1-0.6)	0.001
Low-average	0.4 (0.2-0.7)	0.003
High-average	0.6 (0.3-1.1)	0.162
Highest	1.0	
Floor		
Hard	1.0	
Earth	0.6 (0.4-0.8)	0.70
Site		
Rural	1.0	
Semi-urban	1.2 (0.8-1.8)	0.311
Urban	3.0 (1.9-4.8)	0.001

Data are OR (95% CI).

Table 8: Bivariate sociodemographic predictors of lifetime treatment among respondents with lifetime major depressive disorder (n=498)

impairment was linearly related to severity; mildly depressed elderly people had the least impaired quality of life and very severely depressed persons had the worst. The rates of any functional disability and the intensity of role impairment, as measured on the Sheehan disability scale, were also linearly related to severity of 12-month depression.

Treatment of major depressive disorder included any consultation with a health provider, either orthodox or complimentary (table 8). Women were significantly less likely than men to have ever received treatment, and people who were widowed, separated, or divorced were less likely to have treatment than married people. Compared with people in the highest economic group, those in the lower groups were less likely to have received treatment, and those in the low and low-average economic categories were significantly less likely to receive treatment. Location was related to receipt of treatment: compared with people residing in rural areas, those in urban areas were three times more likely to have received treatment.

Discussion

Our results show that, in 2003–04, about 7% of elderly people in the Yoruba-speaking regions of Nigeria had had a major depressive disorder in the previous 12-months and about a quarter had had one in their lifetimes. This disorder was associated with substantial impairment. Compared with people in the highest economic group, those in the lower groups were less likely to have received treatment; the difference was significant for those in the low and low-average categories. Most were at least moderately impaired in work-related activities or in home duties. One limitation of our report is that it deals only with major depressive disorder as defined in DSM-IV.³³ Other forms of depression exist and might have different profiles and correlates in our sample. Caution is also needed in interpretation of the results because incidental findings could have resulted from multiple significance testing.

Rates of depression ranging from a low of 0.7% to a high of 15.5% have been reported in elderly individuals²⁸ and the best method to measure depression in elderly people is controversial.²⁸ In a review of community prevalence studies, most done in western Europe and North America, a weighted average prevalence of 1.8% was reported.²⁹ However, most of the studies had used substantially different diagnostic procedures from those we used in our survey. A study in the USA, in which the diagnostic interview schedule, a forerunner of the CIDI, was used to diagnose major depressive disorder, noted a point prevalence of 3.8% and a lifetime prevalence of 15.8%.³⁰ Our rates are therefore substantially higher than previously reported. In our study, people who were diagnosed with major depressive disorder did indeed have a clinically significant disorder: almost all of those with 12-month diagnosis were confirmed by an

independent clinical assessment of symptom severity with nearly two-thirds of them rated as having at least moderate depression and around 30% as severely or very severely depressed.

The mean age of onset of major depressive disorder was about 51 years in this population, which is much older than reported in studies done in western Europe and North America where the mean age of onset of major depressive disorder is about 30 years.³¹ In a previous report, based on data derived from the Nigerian Survey of Mental Health and Well-being,¹⁵ a general population survey, we noted a median age of onset for depression of about 45 years. The delayed age of onset provides a plausible explanation for the low prevalence of 1% seen in the general adult population in that study¹⁵ but only a part explanation for the substantially higher prevalence in elderly people reported here, even though both studies were done in the same setting and with identical diagnostic instruments.

In the general population study, even though people aged 65 years and older constituted only about 6% of the weighted sample, there was a clear trend for higher rates of major depressive disorder in these individuals. Thus, although the overall prevalence estimates of lifetime and 12-month rates of this disorder were 3% and 1%, respectively, the respective estimates for people aged 65 years and older were over 5% and almost 2%. We believe that several factors could account for the high rates of major depressive disorder in elderly people. One possibility is that elderly people might be more likely to endorse symptoms of depression in a survey interview. This could be because of a less stigmatising attitude to mental illness by elderly people than by younger individuals.³² Another possibility is that the harsh social and economic situation in Nigeria could be especially harmful for elderly people with few personal resources to help them cope. With failing physical health—much of which might go without adequate medical care, increased experience of loss, and dwindling traditional support and social status—old age might be an especially risky period for depression.

Despite the late onset of major depressive disorder, the findings of a mean number of episodes of about 2.1 and a ratio of 12-month prevalence to lifetime prevalence of about 30%, suggest that major depressive disorder in this sample shows the same pattern of chronicity and recurrence that has often been reported.³³ The symptom pattern also shows that features suggestive of clinically significant depressive disorder were present in this sample and could be identified in the local culture. Indeed, symptoms such as ideas of worthlessness and of guilt, and suicidal thoughts, all indicative of moderate to severe depression, were common. Thus, even though the predictive validity of DSM-IV-defined major depressive disorder remains to be established in an African setting, our findings do suggest that those who receive diagnosis do have a depressive disorder.

Sociodemographic correlates of both lifetime and 12-month disorders were generally few. We noted higher rates of major depressive disorder in people of higher economic status. The effect was stronger for current prevalence than for lifetime prevalence, suggesting a trend for a worse course in such individuals. Previous studies have often suggested that poverty might raise the risk for major depressive disorder.³⁴ Several reasons might account for our finding. On the one hand, people with lower economic status might have a tendency to deny symptoms of the disorder, in which case our finding is an artifact. On the other hand, it could be that social protective factors are strengthened in poor elderly people, possibly by retention of traditional social networks and availing themselves of the buffer that religious affiliations might offer. The significant association of major depressive disorder with urbanicity disappeared once economic status was controlled for, in view of the overlap between the two variables. Nevertheless, the trend was revealing; compared with rural dwellers, increased risk was noted in semiurban residents whereas urban dwellers had the highest risk. This dose-response association suggests that there are indeed some features of urban living that increase the risk of elderly Nigerians becoming depressed. The rate of urbanisation in Nigeria, one of the highest in the world,⁶ is clearly a major issue for the health and wellbeing of elderly people in that country. We speculate that the attenuation of extended family support in the city might be stripping away the protective buffers that elderly people enjoy in traditional African settings.

Elderly people with major depressive disorder had poorer overall quality of life and specifically lower quality of life in the physical and psychological domains, which lends support to the association between poor physical functioning and depression in the elderly.³⁵ The finding that 62.9% of those with 12-month major depressive disorder were independently rated to have at least a moderate disorder and that increasing severity of disorder was associated with worse quality of life, higher rates of functional disability, and higher role impairment, are all indicative of the substantial burden of depression. These findings also further support the clinical validity of major depressive disorder in this population and argue against any notion that rates might be attributable to so-called category fallacy.³⁶

Our findings emphasise high unmet need for treatment of depression in this population. In this survey, only about 37% of elderly people with lifetime depression had ever received any form of treatment, either from orthodox or traditional health providers, for their disorder, with men more likely to have received treatment. In view of the predominant urban distribution of health facilities and out-of-pocket payments for health services in Nigeria, the associations of low economic status and of rural dwelling with reduced likelihood of treatment for major depressive disorder are not

surprising. Previous studies done in more developed western countries suggest that, even though undertreatment is a common problem, when treatment is given, depressed elderly patients commonly respond.³⁷ The level of impairments that elderly people with major depressive disorder have speaks directly to the need for scaling up of effective treatment for those affected.³⁸

Contributors

The idea for this paper was developed by O Gureje. Data analysis was done by E K Afolabi. O Gureje and L Kola produced the first draft. All authors contributed to the subsequent drafts and had full access to all the data in this study and has full responsibility for the decision to submit for publication.

Conflict of interest statement

We declare that we have no conflict of interest.

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References

- 1 Ustun TB, Ayuso-Mateos JL, Chatterji S, Mathers C, Murray CJL. Global burden of depressive disorder in the year 2000. *Br J Psychiatry* 2004; **184**: 386–92.
- 2 Murray C, Lopez A. The global burden of diseases: A comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Boston, Harvard School of Public Health: World Health Organization and World Bank, 1996.
- 3 World Health Organization. Health futures: <http://www.who.int/hpr/expo1999> (accessed Nov 30, 2005).
- 4 Wilson KC, Chen R, Taylor S, McCracken CF, Copeland JR. Socio-economic deprivation and the prevalence and prediction of depression in older community residents: the MRC-ALPHA Study. *Br J Psychiatry* 1999; **175**: 549–53.
- 5 Cole MG, Dendukuri N. Risk factors for depression among elderly community subjects: a systematic review and meta-analysis. *Am J Psychiatry* 2003; **160**: 1147–56.
- 6 UN Population Division. Population, health, and human well-being: Nigeria, 2003.
- 7 WHO. The World Health Report 2000: Health systems: improving performance. Geneva: WHO, 2000.
- 8 Gureje O, Lasebikan VO. Use of mental health services in a developing country: results from the Nigerian survey of mental health and wellbeing. *Soc Psychiatry Psychiatr Epidemiol* 2006; **41**: 44–49.
- 9 WHO. World Health Report 2004: Changing History. Geneva: World Health Organization, 2004.
- 10 Kish L. Survey Sampling. New York: John Wiley, 1965.
- 11 Ogunniyi AO, Osuntokun BO. Determination of ages of elderly Nigerians through historical events: validation of Ajayi-Igun 1963 listing. *West Afr J Med* 1993; **12**: 189–190.
- 12 Kessler RC, Ustun TB. The World Mental Health (WMH) Survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004; **13**: 93–121.
- 13 American Psychiatric Association. DSM-IV: Diagnostic and statistical manual of mental disorders, 4th edn. Washington DC: American Psychiatric Association, 1994.
- 14 Gureje O, Ogunniyi A, Kola L. The profile and impact of probable dementia in a sub-Saharan African community: results from the Ibadan Study of Aging. *J Psychosom Res* 2006; **61**: 327–33.
- 15 Gureje O, Lasebikan VO, Kola L, Makanjuola VA. Lifetime and 12-month prevalence of mental disorders in the Nigerian Survey of Mental Health and Well-being. *Br J Psychiatry* 2006; **188**: 465–71.
- 16 Rush AJ, Gullion CM, Basco MR, Jarrett RB, Trivedi MH. The inventory of depressive symptomatology (IDS): psychometric properties. *Psychol Med* 1996; **26**: 477–86.
- 17 Hamilton M. Development of a rating scale for primary depressive illness. *Br J Soc Clin Psychol* 1967; **6**: 278–96.

- 18 Rush AJ, Trivedi MH, Ibrahim HM, et al. The 16-item quick inventory of depressive symptomatology (QIDS), clinician rating (QIDS-C), and self report (QIDS-SR): a psychometric evaluation in patients with chronic major depression. *Biol Psychiatry* 2003; **54**: 573-83.
- 19 Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. *JAMA* 1963; **185**: 914-19.
- 20 Nagi SZ. An epidemiology of disability among adults in the United States. *Milbank Memorial Fund Quarterly. Health Soc* 1976; **54**: 439-67.
- 21 Sheehan DV, Hammett-Sheehan K, Raj BA. The measurement of disability. *Int Clin Psychopharmacol* 1996; **11** (suppl 3): 89-95.
- 22 The WHOQoL Group. WHOQoL-BREF: field trial version. Program on mental health. Geneva: World Health Organization, 1996.
- 23 The WHOQoL Group. Development of the World Health Organization Quality of life assessment WHOQoL-BREF. *Psychol Med* 1998; **28**: 551-58.
- 24 Naumann VJ, Byrne GJA. WHOQoL-BREF as a measure of quality of life in older patients with depression. *Int Psychogeriatr* 2004; **16**: 159-73.
- 25 Ferguson BD, Tandon A, Gakidou E, Murray CJL. Estimating permanent income using indicator variables. In: Murray CJL and Evans DB (eds.) *Health systems performance assessment: debates, methods and empiricism*. Geneva: World Health Organization 2003.
- 26 Hosmer DW, Lemeshow S. *Applied logistic regression*. New York: John Wiley & Sons, 2000.
- 27 Henderson AS, Jorm AF, Mackinnon A, et al. The prevalence of depressive disorders and the distribution of depressive symptoms in later life: a survey using draft ICD-10 and DSM-III R. *Psychol Med* 1993; **23**: 719-29.
- 28 Knauper B, Wittchen H. Diagnosing major depression in the elderly: evidence for response bias in standardized diagnostic interviews. *J Psychiatr Res* 1994; **28**: 147-64.
- 29 Beekman ATF, Copeland JR, Prince MJ. Review of community prevalence of depression in later life. *Br J Psychiatry* 1999; **174**: 307-11.
- 30 Steffens DC, Skoog I, Norton MC, et al. Prevalence of depression and its treatment in an elderly population. The Cache County Study. *Arch Gen Psychiatry* 2000; **57**: 601-07.
- 31 Kessler RC, Berglund P, Demler O, Jin R, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005; **62**: 593-602.
- 32 Gureje O, Lasebikan VO, Ephraim-Oluwanuga O, Olley BO, Kola L. Community study of knowledge of and attitude to mental illness in Nigeria. *Br J Psychiatry* 2005; **186**: 436-41.
- 33 Kessler RC, Berglund P, Demler O, et al. The epidemiology of major depressive disorder. *JAMA* 2003; **289**: 3095-105.
- 34 Chen R, Wei L, Hu Z, Qin X, Copeland JRM, Hemingway H. Depression in older people in rural China. *Arch Intern Med* 2005; **165**: 2019-25.
- 35 Beekman ATF, Penninx BWJH, Deeg DJH, de Beurs E, Geerlings SW, van Tilburg W. The impact of depression on the well-being, disability and use of services in older adults: a longitudinal perspective. *Acta Psychiatr Scand* 2002; **105**: 20-27.
- 36 Kleinman A. Depression, somatization, and the new cross-cultural psychiatry. *Soc Sci Med* 1977; **11**: 3-10.
- 37 Colé MG, Bellavance F, Mansour A. Prognosis of depression in elderly community and primary care populations: a systematic review and meta-analysis. *Am J Psychiatry* 1999; **156**: 1182-89.
- 38 Stein DJ, Gureje O. Depression and anxiety in the developing world: is it time to medicalise the suffering? *Lancet* 2004; **364**: 233-34.