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EPIDEMIOLOGY OF MAJOR DEPRESSIVE DISORDER IN THE IBADAN STUDY OF AGEING

Oye Gureje, Lola Kola, and Ebenezer Afolabi

Department of Psychiatry, University of Ibadan, Ibadan, Nigeria

Abstract

BACKGROUND: The growing elderly populations in Sub-Saharan Africa are exposed to social changes with potential adverse effects on health. To our knowledge, no study has examined the occurrence and impact of major depressive disorder in a large and representative community sample of elderly Africans.

METHODS: Face-to-face interviews with a representative sample of persons aged 65 years and over ($n = 2152$) derived through a multi-stage stratified sampling of households in the Yoruba-speaking areas of Nigeria (representing about 22% of the national population). Major depressive disorder (MDD) was assessed using the World Health Organization's Composite International Diagnostic Interview and diagnosed with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV).

FINDINGS: Lifetime and 12-month prevalence estimates of DSM-IV MDD were 26.2 (95% confidence interval, 24.3 – 28.2) and 7.1 % (95% confidence interval, 5.9 – 8.3) respectively. Female gender and increasing levels of urbanization of residence were associated with MDD. Persons with MDD had impaired quality of life and functioning in home, work, and social roles. Independent ratings of symptom severity confirmed 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 to receipt of first treatment. Low economic status and rural residence predicted lack of treatment.

INTERPRETATION: MDD is common among elderly Nigerians and its occurrence is related to urbanization. MDD is a seriously disabling illness in this group but only a minority of its sufferers has ever received any treatment.

INTRODUCTION

Studies conducted in Western Europe and North America suggest that depression is a common and often debilitating illness in old age. Its occurrence is associated with functional impairment, decreased quality of life and increased mortality. Projected to become the second most common cause of disability by 2020, depression is now regarded as a major public health concern. Little is known about the occurrence and impact of depression among the elderly in sub-Saharan Africa. Indeed, even though the growth in the proportion

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.

CONFLICT OF INTEREST STATEMENT

Oye Gureje: None. Has full access to all the data in this study and has full responsibility for the decision to submit for publication.

Lola Kola: None.

Ebenezer Kolawole Afolabi: None

of elderly persons in African populations is among the fastest in the world, 3, the health of elderly persons living in Africa has received little research attention

Depression among the elderly often has strong social origins. Many studies, mostly conducted in Western Europe and North America, suggest that depression in older persons is associated with low socioeconomic status, low social support as well as poor physical health^{4,5}. Such social factors are indeed also common in many countries in Africa. Nigeria, the most populous country in Africa, provides an example of a place where social changes of potential deleterious effect on the lives of elderly persons are on-going. Rich in land and mineral resources, the country is nevertheless among the poorest countries in world. Its rate of urban growth is among the fastest in the world ⁶. Many of its cities are characterized by squalor and tough daily existence. Unemployment is over 40% and urban migration is the norm for young educated persons looking for a better life. The country's health service is poor ⁷ and access to persons with mental illness is particularly limited with only about 10% of those with such illness receiving any form of treatment ⁸. However, given that life expectancy in Nigeria is currently about 48 years for men and 50 years for women,⁹ it is probable that persons who survive to the age of 65 years and older may represent a constitutionally resilient subgroup. For example, although the healthy life expectancy at birth in the country is 41 years for men and 42 years for women, men and women who live till the age of 60 years can expect to have another 9 and 10 years, respectively, of healthy life expectancy⁹.

In this paper, drawing on data from the first large community-based study of its type in sub-Saharan Africa, we present estimates of the prevalence of major depressive disorder (MDD) among persons aged 65 years and over living in the Yoruba-speaking parts of Nigeria. We report on the impact of MDD on role functioning and quality of life and on the correlates of receipt of treatment.

METHODS

Sample

The Ibadan Study of Aging (ISA) is a community based survey of the mental and physical health status as well as the functioning and disability of elderly persons (aged 65 years and over) residing in the Yoruba-speaking areas of Nigeria, consisting of eight contiguous states in the south-western and north-central regions (Lagos, Ogun, Osun, Oyo, Ondo, Ekiti, Kogi and Kwara). These states account for about 22% of the Nigerian population (approximately, 25 million people). The survey was conducted between November 2003 and August 2004.

Respondents were selected using a multi-stage stratified area probability sampling of households. In households with more than one eligible person (aged 65 years and fluent in the language of the study, Yoruba), the Kish table selection method was used to select one respondent¹⁰. Whenever necessary, age eligibility was determined using a previously validated list of historical events. Respondents were informed about the study, invited to participate, but also assured of their right to decline. Participants were those who provided consent, mostly verbal, either because of illiteracy or by choice, or signed, before interviews were conducted. On the basis of this selection procedure, face-to face interviews were carried out on 2152 respondents, giving a response rate of 74.2%. Non-response was predominantly due to non-availability after repeated visits (14%), interviewers unable to trace the original address (4%), death (3%), and physical incapacitation (2%) and rarely due to refusal (2%).

The survey was approved by the University of Ibadan/University College Hospital, Ibadan Joint Ethical Review Board.

Measures

Diagnostic Assessment—Depression was assessed using the World Mental Health Survey version of the WHO Composite International Diagnostic Interview (WMH-CIDI), a fully structured diagnostic interview¹¹. Diagnosis was based on the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*¹². *DSM-IV* organic exclusion rules were imposed in making the diagnosis of depression. Judgements about which organic conditions could explain a co-occurring MDD was made during clinical reviews (by a psychiatrist) of all questionnaires in which endorsements of depression features were made. We excluded from the analysis all persons with probable dementia diagnosed using a cognitive screen that has been previously validated in our setting¹³. The WMH-CIDI is a more user-friendly version with simplified probes and structure. Diagnosis was derived using the same algorithm as in our earlier study in which the WMH-CIDI was used.¹⁴ MDD is as an episode of illness, lasting at least two weeks, characterized by, among other features, depressed mood, markedly diminished interest or pleasure, change in appetite and weight, change in quantity of sleep, fatigue, and morbid thoughts. Diagnosis is made when symptoms cause significant distress or impairment and they are not better accounted for by a medical condition, medication, or by bereavement. Even though MDD is not the only form of depression, dysthymia and minor depression being other examples, it is the most severe. Also, it may co-occur with other common mental disorders, such as anxiety disorders. However, neither comorbidity nor these other forms of depression will be a focus of this paper.

Symptom Severity—Symptom severity during the worst month was rated among those with 12-month MDD with the use of the Quick Inventory of Depressive Symptomatology Self-Report (QIDS-SR)¹⁵. A fully structured rating, the QIDS-SR has been shown to perform as well as the clinician-administered Inventory of Depressive Symptomatology and the Hamilton Rating Scale for Depression^{16,17}. As previously proposed¹⁷, we derived severity categories of none, mild, moderate, severe, and very severe by converting QIDS-SR scores to equivalent HRSD ranges.

Functional Disability—All respondents were assessed for functional limitations in six activities of daily living (bathing, dressing, toileting, arising and transferring, continence, and eating)¹⁸ and seven instrumental activities of daily living (climbing a flight of stairs, reaching above the head to carry something as heavy as 10 pounds, stooping, gripping small objects with hands, shopping, and activities such as sweeping the floor with a broom or pruning the grass around the yard)¹⁹. 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, or 4) unable to do. In this report, any respondent with a rating of 3 or 4 on any item was classified as disabled. A sub-group of 37 respondents was assessed twice, about 7 days apart, to determine test-retest reliability of the disability items. Agreement was generally very good to excellent, ranging from a kappa of 0.65 to 1.0.

A specific assessment of role impairment due to depression was also conducted. This was done with the Sheehan Disability Scale (SDS)²⁰ for persons with 12-month MDD. The SDS 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: none (0), mild (1-3), moderate (4-6), severe (7-9) and very severe (10).

Quality of Life—All respondents also completed the World Health Organization Quality of Life assessment instrument, WHOQOL-Bref²¹. The WHOQOL-Bref was developed to be a cross-culturally applicable tool for the subjective evaluation of health-related quality of

life²². Designed in diverse cultural settings, including one in Sub-Saharan Africa²², it has been shown to be a valid measure of quality of life in the elderly ²³. In the current sample, it has an excellent internal reliability (Cronbach alpha = 0.86).

All the instruments were translated using iterative back-translation method. As part of the translation process, all the instruments used were subjected to cultural adaptation. Thus, for example, in describing 10 lbs in the functional assessment, a tuber of yam (a local staple) of such weight was used.

Training and Quality Control

The interviews were conducted by 24 trained interviewers, all of whom had at least a high school education. Many had been involved in field surveys and were experienced at conducting face-to-face interviews. Interviewers received a two-week training consisting of an initial six-day training conducted by OG (which included item-by-item description of questionnaires and role play) followed by a further 2 days of debriefing and review after each of them had conducted two pilot interviews in the field. Six supervisors, all of whom were university graduates with survey experience, underwent the same level of training and monitored the day-to-day implementation of the survey.

Data analysis

In order to take account of the stratified multistage sampling procedure and the associated clustering, weights have been derived and applied to the rates presented in this report. Also, post-stratification to the target sex and age range were made to adjust for differences between the sample and the total Nigerian population (according to 2000 United Nations projections). (Table 1 presents the profile of the respondents and the results of the post-stratification adjustments). The weight so derived was normalized to reset the sum of weights back to the original sample size of 2152. We excluded 255 persons with a diagnosis of probable dementia from this total sample, thus leaving a sample of 1897 for analysis.

In this report, we have examined the association of MDD with socio-demographic variables of age, sex, education, and economic status. Economic status was assessed by taking an inventory of household and personal items such as chairs, clock, bucket, radio, television set, fans, stove or cooker, car, telephone, etc. The list was composed of 21 such items. This is a standard and validated method of estimating economic wealth of elderly persons in low income settings²⁴. Respondents' economic status is categorized by relating each respondent's total possessions to the median number of possessions of the entire sample. Thus, economic status is rated low if its ratio to the median is 0.5 or less, low-average if the ratio is 0.5 – 1.0, high-average if it is 1.0 – 2.0, and high if it is over 2.0. Also, the quality of house floor was categorized into two (concrete vs. earth) as another proxy of economic status. Residence was classified as rural (less than 12,000 households), semi-urban (12,000 – 20,000 households) and urban (greater than 20,000 households)..

The analysis has taken account of the complex sample design and weighting. Thus, we used the jackknife replication method implemented with the STATA statistical package to estimate standard errors for proportions ²⁵. Demographic correlates were explored with logistic regression analysis ²⁶ and the estimates of standard errors of the Odds Ratio (OR's) obtained were made with the STATA. All of the confidence intervals reported are adjusted for design effects.

Role of the funding source

The Wellcome Trust was not involved in any aspect of study design, data collection, analysis, or interpretation of the data.

RESULTS

Lifetime and 12-month prevalence estimates of DSM-IV MDD were 26.2 (95% confidence interval, 24.3 – 28.2) and 7.1 % (95% confidence interval, 5.9 – 8.3) respectively (Table 2). Women had higher lifetime and 12-month rates and so did persons who were widowed, separated, or divorced; persons of higher socio-economic status; and urban dwellers.

Sociodemographic Correlates

Female gender and being widowed, separated or divorced were associated with significantly higher lifetime and 12-month risks of MDD (Table 3). There was a trend for lower incomes to be associated with reduced risk of lifetime but not 12-month MDD. Compared to persons living in rural areas, the risks for both lifetime and 12-month MDD were significantly elevated among persons residing in urban areas.

The distribution of economic status was significantly different according to place of residence: 34.2% of rural dwellers were in the low economic group compared with 21.2% of semi-urban dwellers and 13.7% of urban dwellers while on the other hand 15.9% of urban dwellers were in the high economic group compared to 5.1% of semi-urban residents and 2.0% of rural residents (chi square = 30.04, $p < 0.001$). We therefore examined the possibility that the relationship between depression and poverty might be confounded by place of residence by conducting multiple logistic regression analyses in which both variables were simultaneously entered. For lifetime prevalence, living in a house with mud floor was associated with a reduced risk for lifetime depression (OR 0.7, 95% CI 0.5 – 0.9, $p = 0.012$) but residence was not (OR for semi-urban 1.1, 95% CI 0.8 – 1.4; for urban 1.2, 95% CI 0.9 – 1.8). For 12-month prevalence, even though the trend for higher risks among semi-urban (OR 1.3, 95% CI 0.7 – 2.5) and urban (OR 2.0, 95% CI 0.9 – 4.2) residents persisted, neither residence nor living in mud house (OR 0.7, 95% CI 0.5 – 1.1) showed a significant association.

Onset and Course MDD

Mean age at onset was 51.0 years with close similarity between men and women (Table 4). The mean number of lifetime episodes was 2.1, also with no significant difference between the sexes. Just over one-third had received any treatment for MDD. Treatment was defined as any consultation to a health provider (orthodox, traditional, or religious) that was specifically for MDD. Men were more likely to have received treatment than women. On average, there was a 5-year delay between the onset of illness and the receipt of treatment, with the mean age at first treatment being 56.7 years. The table also shows that 38.7% of the sample had felt worthless, 36.7 had wanted to die, and 6.1% had thought of suicide. Just over 2% had attempted suicide.

Impact of 12-month IMDD on role functioning and quality of life

Table 5 shows that persons with 12-month MDD had lower overall quality of life than those without. While elderly persons with no 12-month MDD scored a mean of 13.6 on the WHOQOL-Bref, those with MDD scored 12.3, a statistically significant difference. Persons with 12-month MDD were specifically more impaired in the domains of physical and, not surprisingly, psychological functioning. However, no statistically significant difference was noticed in the environmental and social domains.

More evidence of impairment relating to MDD is provided by the results of the analysis of the Sheehan Disability Scale (SDS). Among persons with 12-month MDD, Table 6 shows that work-related activities were mostly affected, with 83.2% reporting at least moderate impairment, 59.6% either severe or very severe and 17.5% very severe. Performance of

home activities was the next most commonly affected, with 75.6% with at least moderate impairment, 11.7% being severely affected. Social role was the least affected but even here more than half of persons with 12-month MDD had at least moderate impairment.

Correlates of Symptom Severity

The presence of clinical depression during the worst month of symptom experience was confirmed in 96.9% of those with 12-month CIDI/DSM-IV by the QIDS-SR (Table 7). Of this, 62.9% were classified as having at least clinically moderate depression, 28.9% severe or very severe depression. Quality of life impairment was linearly related to severity, with mildly depressed elderly persons having the least impaired quality of life and very severely depressed persons having the worst. The rates of any functional disability as well as the intensity of role impairment, as measured on the SDS, were also linearly related to severity of 12-month depression.

Lifetime Treatment

Table 8 presents the results of the examination of predictors of lifetime treatment for MDD. Treatment included any consultation to a health provider, either orthodox or complimentary. Females were significantly less likely to have ever received treatment and so were those who were widowed, separated or divorced. There was a progressively reduced likelihood of ever receiving treatment as economic status fell: compared with persons in the highest economic group, those in the lower groups were less likely to have received treatment and this was a meaningful (statistically significant) decrease for those in the low and low average categories. Residence was related to receipt of treatment: compared with persons residing in rural areas, those in urban areas were three times as likely to have received treatment.

COMMENT

To our knowledge, this is the first large community-based study of MDD in elderly persons in Sub-Saharan Africa in which replicable ascertainment procedures have been used. Our results suggest that, in the period 2003/2004, about 7% of elderly persons in the Yoruba-speaking areas of Nigeria had experienced DSM-IV MDD in the prior 12-months and 26.2% had done so in their lifetimes. MDD was associated with considerable impairment. Compared with persons without MDD, those with 12-month diagnosis had a worse overall quality of life. Most were at least moderately impaired in work-related activities (83.2%) or in home duties (75.6%). One limitation of our report is that it deals only with MDD as defined in the DSM-IV¹². Other forms of depression exist and may have different profiles and correlates in our sample. Caution is also required in interpreting the results as incidental findings might 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 among the elderly²⁷ and there have been controversies about the best way to measure depression in the elderly²⁸. In a review of community prevalence studies, most conducted in Western Europe and North America, a weighted average prevalence of 1.8% was reported²⁹. However, most of the studies had used substantially different ascertainment procedures than we used in our survey. A study in the US in which the Diagnostic Interview Schedule, a forerunner of the CIDI, was used to ascertain DSM-IV MDD found a current (point) prevalence of 3.8% and a lifetime prevalence of 15.8%³⁰. Our rates are therefore considerably higher than commonly reported. In the current study, persons who received a diagnosis of MDD did indeed have a clinically significant disorder: 96.9% of those with 12-month diagnosis were confirmed by an independent assessment of clinical rating of

symptom severity with 62.9% of them rated as having at least moderate depression and 28.9% as severely or very severely depressed.

The mean age of onset of MDD was about 51 years in this sample. This is much later than reported in studies conducted in Western Europe and North America where, typically, the mean age of onset of MDD is about 30 years³¹. In a previous report, using data derived from the Nigerian Survey of Mental Health and Well-being, a general population survey, we found a median age of onset for depression of about 45 years¹⁴. The delayed age of onset provides a plausible explanation for the low prevalence of 1.0% found in the general adult population in that study¹⁴ but only a partial explanation for the considerably higher prevalence among elderly persons reported here, even though both studies were conducted in the same setting and with identical ascertainment tools. It is important to note that in the general population study, even though persons aged 65 years and over constituted only about 6.1% of the weighted sample, there was a clear trend for higher rates of MDD among them. Thus, while the overall prevalence estimates of lifetime and 12-month MDD were 3.0% and 1.0% respectively, the respective estimates among persons aged 65 years and over were 5.3% and 1.5%. We believe that several factors may account for the high rates of MDD among the elderly. One possibility is that elderly people may be more likely to endorse symptoms of depression in a survey interview. This may reflect a less stigmatizing attitude to mental illness by elderly persons³². Another possibility is that the harsh social and economic situation in Nigeria may be particularly pathogenic for elderly people with few personal resources to cope. With failing physical health, much of which may go without adequate medical care, increase in the experience of loss to which older persons are susceptible, and dwindling traditional support and social status, old age may constitute a particularly risky period for depression.

In spite of the late onset of MDD, the observations 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 MDD in this sample shows the same pattern of chronicity and recurrence that have often been reported³³. The symptom pattern also shows that features indicative of clinically significant depressive disorder were present in this sample and could be identified in the culture. Indeed, symptoms such as ideas of worthlessness and of guilt, as well as suicidal thoughts, all indicative of moderate to severe depression, were relatively common. Thus, even though the predictive validity of DSM-IV defined MDD remains to be determined in an African setting, our findings do indicate that, cross-sectionally, those who receive the diagnosis do have a “disorder”.

Sociodemographic correlates of both lifetime and 12-month disorders were generally few. We found higher rates of MDD among persons of higher economic status. The effect was stronger for current than lifetime prevalence suggesting a trend for a worse course among such persons as well. Previous studies have often suggested that poverty might elevate the risk for major depressive disorder³⁴. Several reasons might account for our finding. Persons of lower economic status might have a tendency to deny symptoms of MDD, in which case our finding is an artifact. On the other hand, it could be that social protective factors are stronger among poor elderly persons, possibly by retention of traditional social networks and availing themselves of the buffer that religious affiliations might offer. The significant association of MDD with urbanicity disappeared once economic status was controlled for in view of the overlap between the two variables. Nevertheless, the trend of the was revealing: compared with rural dwellers, increased risk was found among semi-urban residents while urban dwellers had the highest risk. This “dose response relationship” suggests that there is indeed some features of urban living that increase the risk of elderly Nigerians becoming depressed. The rate of urbanization in Nigeria, among the highest in the world⁶, is clearly a major issue for the health and wellbeing of the elderly in

the country. We speculate that the attenuation of the extended family support in the city might be stripping away the protective buffers that elderly persons enjoy in traditional African settings.

Elderly persons with MDD had poorer overall quality of life and specifically lower quality of life in the physical and psychological domains, confirming the association between poor physical functioning and depression in the elderly³⁵. The observations that 62.9% of those with 12-month CIDI/DSM-IV MDD 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 levels of role impairment are all indicative of the considerable burden that depression connotes. These findings also further support the clinical validity of MDD in this population and argue against any notion that rates might be attributable to “category fallacy”³⁶.

Our findings highlight a high level of unmet need for treatment of depression in this sample. In this survey, only about 37% of elderly persons with lifetime depression had ever received any form of treatment, either from orthodox or traditional health providers, for their MDD, with men more likely to have ever done so. Given the predominant urban distribution of health facilities and out-of-pocket payment for health service in Nigeria, the associations of low economic status and of rural dwelling with reduced likelihood of treatment for MDD is not surprising. Previous studies conducted in more developed Western countries suggest that, even though under treatment is a common problem, when treatment is given, elderly depressed patients commonly respond ³⁷. The level of impairments that elderly persons with MDD have speaks directly to the need for a scaling up of effective treatment for those affected ³⁸.

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REFERENCES

1. 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. Harvard School of Public Health: World Health Organization and World Bank; Boston, Mass: 1996.
2. Ustun TB, Ayuso-Mateos JL, Chatterji S, Mathers C, Murray CJL. Global burden of depressive disorder in the year 2000. *British Journal of Psychiatry*. 2004; 184:386–392. [PubMed: 15123501]
3. World Health Organization. Health futures. 1999 Available: <http://www.who.int/hpr/expo>
4. Wilson KC, Chen R, Taylor S, McCracken CF, Copeland JR. Socio-economid deprivation and the prevalence and prediction of depression in older community residents: the MRC-ALPHA Study. *British Journal of Psychiatry*. 1999; 175:549–553.
5. Cole MG, Dendukuri N. Risk factors for depression among elderly community subjects: a systematic review and meta-analysis. *American Journal of Psychiatry*. 2003; 160:1147–1156. [PubMed: 12777274]
6. United Nations Population Division. Population, health, and human well-being: Nigeria. 2003
7. World Health Organization. The World Health Report 2000: Health systems: improving performance. WHO; Geneva: 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. *Social Psychiatry and Psychiatric Epidemiology*. 2006; 41:4 4–49.
9. World Health Organization. World Health Report 2004: Changing History. World Health Organization; Geneva: 2004.
10. Kish, L. Survey Sampling. John Wiley; New York: 1965.

11. Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research*. 2004; 13(2):93–121. [PubMed: 15297906]
12. American Psychiatric Association. *DSM-IV: Diagnostic and Statistical Manual of Mental Disorders*. 4th ed.. American Psychiatric Association; Washington DC: 1994.
13. 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. *Journal of Psychosomatic Research*. 2006; 61:327–333. [PubMed: 16938510]
14. 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. *British Journal of Psychiatry*. 2006; 188:465–471.
15. Rush AJ, Gullion CM, Basco MR, Jarrett RB, Trivedi MH. The Inventory of Depressive Symptomatology (IDS): psychometric properties. *Psychological Medicine*. 1996; 26:477–486. [PubMed: 8733206]
16. Hamilton M. Development of a rating scale for primary depressive illness. *British Journal of Social and Clinical Psychology*. 1967; 6:278–296. [PubMed: 6080235]
17. 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. *Biological Psychiatry*. 2003; 54:573–583. [PubMed: 12946886]
18. 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. *Journal of American Medical Association*. 1963; 185:914–919.
19. Nagi SZ. An epidemiology of disability among adults in the United States. *Milbank Memorial Fund Quarterly. Health and Society*. 1976; 54:439–467.
20. Sheehan DV, Harnnet-Sheehan K, Raj BA. The measurement of disability. *International Clinical Psychopharmacology*. 1996; 11(suppl. 3):89–95. [PubMed: 8923116]
21. The WHOQOL Group. *Program on Mental Health*. World Health Organization; Geneva: 1996. WHOQOL-BREF: Field Trial Version.
22. The WHOQOL Group. Development of the World Health Organization Quality of Life Assessment WHOQoL-Bref. *Psychological Medicine*. 1998; 28:551–558. [PubMed: 9626712]
23. Naumann VJ, Byrne GJA. WHOQOL-BREF as a measure of quality of life in older patients with depression. *International Psychogeriatrics*. 2004; 16(2):159–173. [PubMed: 15318762]
24. Ferguson, BD.; Tandon, A.; Gakidou, E.; Murray, CJL. Estimating permanent income using indicator variables. In: Murray, CJL.; Evans, DB., editors. *Health Systems Performance Assessment: Debates, Methods and Empiricism*. World Health Organization; Geneva: 2003.
25. StataCorp. *Stata Statistical Software, version 7.0 for windows*. Stata, College Station; Texas: 2001.
26. Hosmer, DW.; Lemeshow, S. *Applied Logistic Regression*. John Wiley & Sons; New York: 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. *Psychological Medicine*. 1993; 23:719–729. [PubMed: 8234578]
28. Knauper B, Wittchen H. Diagnosing major depression in the elderly: evidence for response bias in standardized diagnostic interviews. *Journal of Psychiatric Research*. 1994; 28:147–164. [PubMed: 7932277]
29. Beekman ATF, Copeland JR, Prince MJ. Review of community prevalence of depression in later life. *British Journal of Psychiatry*. 1999; 174:307–311.
30. Steffens DC, Skoog I, Norton MC, et al. Prevalence of depression and its treatment in an elderly population. The Cache County Study. *Archives of General Psychiatry*. 2000; 57:601–607. [PubMed: 10839339]
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. *Archives of General Psychiatry*. 2005; 62:593–602. [PubMed: 15939837]

32. Gureje O, Lasebikan VO, Ephraim-Oluwanuga O, Olley BO, Kola L. Community study of knowledge of and attitude to mental illness in Nigeria. *British Journal of Psychiatry*. 2005; 186:436–441. [PubMed: 15863750]
33. Kessler RC, Berglund P, Demler O, et al. The epidemiology of major depressive disorder. *Journal of the American Medical Association*. 2003; 289(23):3095–3105. [PubMed: 12813115]
34. Chen R, Wei L, Hu Z, Qin X, Copeland JRM, Hemingway H. Depression in older people in rural China. *Archives of Internal Medicine*. 2005; 165:2019–2025.
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 Psychiatrica Scandinavica*. 2002; 105:20–27. [PubMed: 12086221]
36. Kleinman A. Depression, somatization, and the new cross-cultural psychiatry. *Social Science and Medicine*. 1977; 11:3–10.
37. Cole MG, Bellavance F, Mansour A. Prognosis of depression in elderly community and primary care populations: a systematic review and meta-analysis. *American Journal of Psychiatry*. 1999; 156:1182–1189. [PubMed: 10450258]
38. Stein DJ, Gureje O. Depression and anxiety in the developing world: is it time to medicalize the suffering? *Lancet*. 2004; 364:233–234. [PubMed: 15262087]

Table 1

Demographic distribution of the sample compared to the population on post-stratification variables

Age	n	Unweighted, %	Weighted, %	National Census, % ¹
65-69	716	33.3	33.6	32.6
70-74	493	22.9	31.4	30.2
75-79	295	13.7	11.8	11.8
80+	648	30.1	23.2	25.6
Sex				
M	995	46.2	52.5	50.3
F	1157	53.8	47.5	49.7

¹United Nations 2000 projections from the 1991 Nigerian National Census

Table 2

Prevalence of 12-month and lifetime CIDI/DSM-IV major depressive disorder by socio-demographic characteristics

Characteristics	Weighted n	Lifetime MDD* n= 498 ; % (se)	12-month MDD* n= 134; % (se)
Entire group	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			
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			
Currently married	968	22.8(1.7)	6.5(0.9)
Widowed/Seperated/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 floor	533	30.8(2.1)	9.2(1.7)
Earth floor	1364	23.1(1.2)	6.5(0.6)
Site			
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)

CIDI is Composite International Diagnostic Interview; *DSM-IV* is *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; MDD is Major Depressive Disorder

Table 3

Odds ratio of 12-month and lifetime CIDI/DSM-IV major depressive disorder by socio-demographic characteristics

Characteristics	Lifetime MDD N=498; Odds ratio (95% Confidence Interval)	p	12-month MDD n=134; Odds ratio (95% Confidence Interval)	p
Sex				
Male	1.0		1.0	
Female	1.9(1.5-2.4)	0.001	1.5(1.0-2.3)	0.026
Age				
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+	0.1(0.07-1.4)	0.948	0.6(0.2-1.2)	0.200
Marital Status				
Currently married	1.0		1.0	
Widowed/Seperated/Divorced	1.5(1.1-2.0)	0.005	1.5(0.9-2.2)	0.072
Education				
Tertiary	1.0		1.0	
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
Economic Status				
Highest	1.0		1.0	
High average	0.8(0.6-1.3)	0.545	0.5(0.2-1.2)	0.127
Low average	0.5(0.3-0.8)	0.009	0.4(0.2-0.9)	0.032
Low	0.5(0.3-0.8)	0.002	0.7(0.4-1.4)	0.452
Floor				
Hard floor	1.0		1.0	
Earth floor	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

CIDI is Composite International Diagnostic Interview; *DSM-IV* is *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; MDD is Major Depressive Disorder

Table 4

Age at onset, course and treatment for CIDI/DSM-IV lifetime major depressive disorder

Characteristics	Men (n=194)	Women (n=304)	Total (n=498)
Age at onset, mean (se)	51.0(1.2)	51.0(1.1)	51.0(0.8)
Number of lifetime episodes, mean (se)	2.1(0.1)	2.0(0.09)	2.1(0.07)
Treated % (se) *	42.1(4.3)	32.3(3.4)	36.9(3.2)
Hospitalized %(se)	8.7(2.0)	3.9(1.1)	5.8(1.0)
Age at first treatment, mean (se)	57.5(1.8)	56.0(1.9)	56.7(1.3)
History of depression in first degree relative, %(se)	2.3(0.4)	2.9(0.3)	2.7(0.3)
Felt worthlessness, %(se)	39.8(4.7)	37.7(3.9)	38.7(3.3)
Felt guilty nearly everyday, %(se)	26.5(3.8)	37.2(3.8)	32.1(2.6)
Thought a lot about own or others death, %(se)	52.1(3.7)	50.2(3.3)	51.1(2.7)
Felt that they wanted to die, %(se)	31.4(4.3)	41.1(3.4)	36.7(3.0)
Thought a lot about suicide, %(se)	4.9(1.4)	7.2(1.6)	6.1(1.4)
Made suicide plan, %(se)	2.0(0.6)	2.9(0.9)	2.6(0.7)
Attempted suicide, %(se)	1.5(0.7)	2.9(0.9)	2.4(0.6)

CIDI is Composite International Diagnostic Interview; *DSM-IV* is *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition**
p < 0.05

Table 5

Quality of life of persons with and without 12-month CIDI/DSM-IV major depressive disorder (n = 134)

WHOQoL-Bref Domain	12-month MDD			
	Present Mean (C.I)	Absent Mean (C.I)	t	p
Physical	12.4(11.7-13.2)	14.9(14.8-15.1)	7.63	0.001
Psychological	13.5(12.9-14.2)	15.6(15.5-15.7)	7.45	0.001
Social	13.5(12.8-14.2)	13.5(13.3-13.7)	0.115	0.907
Environmental	13.9(13.3-14.4)	14.2(14.1-14.3)	1.27	0.202
Total (item) scores	80.2(76.9 – 83.5)	88.3 (87.6 – 89.0)	5.71	0.001

CIDI is Composite International Diagnostic Interview; *DSM-IV* is *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; MDD is Major Depressive Disorder; WHOQoL-Bref is World Health Organization quality of life instrument, brief version. The lower the scores on the WHOQoL-Bref the poorer the quality of life.

Table 6
Severity of role impairment associated with 12-month CIDI/DSM-IV major depressive disorder (n = 134)

SDS Domains	MDD cases in SDS category, % (95% confidence interval)				
	None	Mild	Moderate	Severe	Very Severe
Home	16.2 (9.3-23.1)	8.1 (3.7-14.8)	30.6 (22.1-39.2)	33.3 (24.6-42.1)	11.7 (5.7-17.7)
Work	11.4 (5.5-17.2)	5.3 (1.9-11.1)	23.6 (15.9-31.5)	42.1 (33.0-51.2)	17.5 (10.6-24.5)
Relationship	23.8 (16.0-31.8)	19.4 (12.2-26.8)	27.4 (19.2-35.7)	24.7 (16.8-32.7)	4.4 (1.4-10.0)
Social	22.8 (15.1-30.5)	22.8 (15.1-30.5)	21.0 (13.6-28.5)	26.3 (18.2-34.4)	7.0 (3.0-13.4)

CIDI is Composite International Diagnostic Interview; DSM-IV is Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; MDD is Major Depressive Disorder; SDS is Sheehan Disability Scale

Table 7

Pattern and correlates of symptom severity 12-month CIDI/DSM-IV major depressive disorder

	Major Depressive Disorder Cases					Total n=134
	Mild n=47	Moderate n=47	Severe n=35	Very Severe n=5		
Symptom severity %(95% CI)	34.0 (26.2-42.0)	34.0 (26.2-42.0)	25.3 (18.1-32.6)	3.6 (1.1-8.2)		
Correlates of symptom severity						
WHOQoL-Bref, mean score ¹ (95% CI)	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)	
Disability (% Yes) (95% CI) ²	17.0 (7.6-30.8)	17.0 (7.4-30.7)	34.2 (19.1-52.2)	80.0 (28.4-99.5)	23.1 (16.1-30.2)	
Role Impairment, Mean score (95% CI) ³	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)	

CIDI is Composite International Diagnostic Interview; DSM-IV is *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; WHOQoL-Bref is World Health Organization quality of life instrument, brief version. The lower the scores on the WHOQoL-Bref the poorer the quality of life.

¹ Mean total score on the WHOQoL-Bref (F = 5.61, p < 0.001)

² Percent of respondents with disability in any area of activities of daily living or instrumental activities of daily living, ($\chi^2 = 14.69$, p < 0.005)

³ Mean total score on the four subscales of the Sheehan Disability Scale, (F = 14.3, p < 0.001)

Table 8

Bivariate socio-demographic predictors of lifetime treatment among respondents with lifetime CIDI/DSM-IV major depressive disorder (n = 498)

Characteristics	Lifetime treatment, O.R (95% Confidence Interval)	P
Sex		
Male	1.0	0.026
Female	0.6(0.4-0.9)	
Age		
65-69	1.0	0.103
70-74	0.7(0.4-1.0)	
75-79	0.5(0.3-0.9)	
80+	0.6(0.4-1.0)	
Marital Status		
Currently married	1.0	0.001
Widowed/Seperated/Divorced	0.6(0.4-0.8)	
Education		
Tertiary	1.0	0.906
None	0.9(0.4-1.9)	
Primary	1.0(0.4-2.2)	
Secondary	0.9(0.4-2.2)	
Economic Status		
Highest	1.0	0.162
High average	0.6(0.3-1.1)	
Low average	0.4(0.2-0.7)	
Low	0.3(0.1-0.6)	
Floor		
Hard floor	1.0	0.010
Earth floor	0.6(0.4-0.8)	
Site		
Rural	1.0	0.310
Semi-Urban	1.2(0.8-1.8)	
Urban	3.0(1.9-4.8)	

CIDI is Composite International Diagnostic Interview; *DSM-IV* is *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*