

Prevalence of depression and associated factors among elderly Sudanese: a household survey in Khartoum State

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معدل انتشار الاكتئاب والعوامل المرافقة له بين السودانيين الكبار في السن: مسح سكاني في ولاية الخرطوم

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الخلاصة: أجرى الباحثون تقييماً شمل 300 من كبار السن السودانيين (من بلغت أعمارهم الستين عاماً فما فوق)، بواسطة مسح مستعرض للسكان في ثلاثة مواقع من ولاية الخرطوم، ضم عينات طباقية ذات مرحلتين من أجل اختيار المواقع ثم المناطق باستخدام اعتيان عشوائي بسيط ثم اعتيان منهجي لاختيار العائلات؛ ووجدوا أن معدل انتشار الاكتئاب 47.5%. وقد ترابط الاكتئاب بقدر يُعتدّ به إحصائياً بالعمر ($P = 0.002$)، وبمستوى التعليم ($P = 0.015$)، وبالمهنة ($P < 0.001$)، وبالمشكلات اليومية ($P = 0.026$)، وبالمشكلات الاجتماعية ($P > 0.001$)، وبعد ضبط العوامل المتداخلة باستخدام التَّحَوُّف اللوجستي المتعدد، وجد الباحثون أن معدل انتشار الاكتئاب بين كبار السن المتقاعدين يعادل أربعة أضعاف معدل انتشاره بين كبار السن الذين يعملون، وثلاثة أضعاف معدل انتشاره بين كبار السن الذين يعانون من مشكلات اجتماعية وأولئك الذين يعانون من سلس البول، وضيعفَي معدل انتشاره بين كبار السن ممن لديهم مشاكل معيشية.

ABSTRACT We assessed depression among 300 elderly Sudanese (age 60+ years). We conducted a cross-sectional household survey in 3 localities in Khartoum State. A 2-stage stratified sampling was carried out to select the localities and then the areas using simple random sampling; then systematic random sampling was used to select households. The prevalence of depression was 47.5%. Depression was significantly associated with age ($P = 0.002$), level of education ($P = 0.015$), occupation ($P < 0.001$), the problems of everyday living ($P = 0.026$), and social problems ($P < 0.001$). After controlling for confounders using multiple logistic regression, we found that depression was 4 times greater among the elderly retired compared to the elderly working, 3 times greater among the elderly with social problems and those who were suffering from urine incontinence and 2 times greater among the elderly with living problems.

Prévalence de la dépression et des facteurs associés chez des Soudanais âgés : enquête auprès des ménages dans l'État de Khartoum

RÉSUMÉ Nous avons évalué la dépression chez 300 Soudanais âgés de plus de 60 ans. Nous avons mené une enquête transversale auprès des ménages dans trois localités de l'État de Khartoum. Un échantillonnage stratifié à deux degrés a été réalisé pour sélectionner les localités, puis les zones ont été choisies à l'aide d'un échantillonnage aléatoire simple et les ménages par un échantillonnage aléatoire systématique. La prévalence de la dépression était de 47,5 %. La dépression était significativement associée à l'âge ($P = 0,002$), au niveau d'études ($P = 0,015$), au métier ($P < 0,001$), aux problèmes de vie quotidienne ($P = 0,026$), ainsi qu'aux problèmes sociaux ($P < 0,001$). Après avoir contrôlé les facteurs de confusion à l'aide de l'analyse de régression logistique multiple, nous avons constaté que la dépression était quatre fois plus fréquente chez les personnes âgées à la retraite que chez celles continuant à travailler, trois fois plus fréquente chez les personnes âgées affligées de problèmes sociaux ou atteintes d'une incontinence urinaire et deux fois plus fréquente chez les personnes âgées traversant des problèmes de vie quotidienne.

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Introduction

With no acceptable definition for “elderly”, becoming eligible for statutory and occupational retirement pensions has become the default definition. The ages of 60 and 65 years are often used arbitrarily [1,2]. The population aged 60+ years is estimated at nearly 1 person in 10 worldwide, with a ratio of 302 million women to 247 million men [3]. In the countries of the Arab League, the absolute number of people aged ≥ 65 years doubled from 5.7 million in 1980 to 10.4 million in 2000, and is expected to increase to 21.3 million by 2020 [4].

In Sudan, a developing country, little emphasis has been placed on the elderly. Khartoum, the capital, has an estimated population of approximately 5.27 million according to the 2008 population census; 20% of these are elderly [5].

Depression is a common mental disorder among the aged population; it presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy and poor concentration [6]. These problems can become chronic or recurrent, and can lead to substantial impairment in the ability to carry out everyday responsibilities. Depression can also lead to suicide, which accounts for the loss of about 850 000 lives every year [6].

Depression is a leading cause of disability, and in 2000 it was the 4th leading contributor to the global burden of disease (measured as disability adjusted life years, or DALYs) [6]. It has been estimated that in developed countries approximately 1%–3% of people aged over 65 years suffer from severe depression, with a further 10%–15% suffering milder forms [7].

Assessment of depression in the elderly poses a challenge because it is often undiagnosed or untreated. It has been estimated that only 10% of depressed elderly persons receive treatment owing to the widespread belief

that depression is normal with aging, to the denial due to shame or stigma, or to masked depression [8,9].

To advocate for geriatric problems, specifically depression, among the aged population, baseline information on the burden of the disease and associated factors is required, but this is lacking in Sudan. This study is aimed at determining the prevalence of depression as a mental health problem among the elderly at community level and assessing the associated risk factors.

Methods

A community-based, analytical, cross-sectional design was followed to fulfil the objectives of the study.

This study was conducted during June 2010–September 2010 in Khartoum State, which comprises 7 localities: Omdurman, Bahari, Khartoum, Ummbada, East Nile, Karari and Jabal Awliya.

Assessment of aged population

Age 60+ years was the cut-off age we used to determine the eligible target population [1]. Any one of the following criteria was considered evidence of old age (i.e. 60+ years): birth certificate from which age could be determined; any official document (identity card, passport, etc.) that included the age of the person; or retirement documents associated with the age at which a person begins to receive pension benefits.

For calculation of sample size, the following formula was used: $n = z^2 \times (pq/d^2)$, where n is the estimate of sample size; $z = 1.96$, a quantile from the standard normal distribution; p is the proportion of the target population with the characteristic being measured ($= 0.11$); q is the proportion without the characteristic ($= 1 - p$); d is margin of error ($= 0.05$).

Based on the above formula, estimated sample size was 150. This was multiplied by 2 (to take into consideration

design effect and effect of cluster design), to give a final sample size of 300.

Simple random sampling was used to select 3 localities, Khartoum, Jabal Awliya, and East Nile, out of the 7 identified above. From within these 3 localities, 2 blocks were selected randomly from each locality, giving a total of 6 blocks in the 3 localities. In each block, systematic random sampling was used to select households. Based on the sample size, 50 households were randomly selected in each block. The sampling interval (k) was determined by sample size and number of households in each block. The first household in each block was selected randomly, and then systematically each k th house anticlockwise was selected for interview. The target elderly people living in the selected households were interviewed; if no eligible person was found, the next house was selected till an eligible person found. This was continued till the desired number of participants was reached for each block. Individual oral consent was obtained from the participants after presenting a disclosure statement regarding the purpose of the research. There were no refusals to participate.

Structured questionnaire

A structured questionnaire was used to collect data from the participants. The questionnaire had 3 sections: 1) sociodemographic characteristics such as age, sex, marital status, educational attainment, employment, source of income and living conditions; 2) the screening for depression questions, (see below); and 3) self-reported health conditions, which included 14 questions pertinent to risk factors common to depression in old age experienced prior to the survey.

The data collectors were trained on the techniques for completing the questionnaire. They were successively distributed to collect primary data from households based on a detailed implementation plan.

Data were edited and analysed using SPSS, version 17. Mean and standard

deviation, odds ratio (OR) and 95% confidence interval (CI) were computed. Statistical significance of the results was tested using the chi-squared test, logistic and linear regression analyses and judged at the 5% level.

The analysis was done as follows: first analyses were performed separately for all the independent variables and the dependent variable (depression). Bivariate analysis was used (cross tabulation) with chi-squared statistics to test the degree of association. $P < 0.05$ (2-sided) was used to determine significance. Then logistic regression analysis was used for the dependent variable with all independent variables (with significant P-value) as predictors to assess the degree of association using OR with 95% CI.

The participants were initially informed about the study, including a full explanation of the study objectives, expected outcomes, rights of respondents and confidential processing of collected data and their consent was obtained. Only oral consent was obtained from interviewees before the interview as no harm was expected because there was no intervention.

Screening of depression: Geriatric Depression Scale

Depression of aged participants at households was assessed using the short version of the standardized Geriatric Depression Scale [10], which includes 15 questions. The total possible score ranged from 0 to 15. Higher scores reflect an increase in depressive symptoms and a score of 5 or more was set to indicate depression. The Geriatric Depression Scale (GDS) was created specifically for the use with the elderly population. It is effective amongst elderly persons residing in community settings; it is less effective with the presence of dementia. The questionnaire takes around 5–7 minutes to complete [11,12]. GDS-15 was already translated in Arabic. With reported prior diagnosis of depression as a criterion, the specificity of the scale

is strong (GDS = 0.90, GDSCOL = 0.91), but the sensitivity appeared relatively low [13].

The following questions were administered and the participants were asked to answer yes or no for how they felt over the week preceding the interview.

- Are you basically satisfied with your life?
- Have you dropped many of your activities and interests?
- Do you feel that your life is empty?
- Do you often get bored?
- Are you in good spirits most of the time?
- Are you afraid that something bad is going to happen to you?
- Do you feel happy most of the time?
- Do you often feel helpless?
- Do you prefer to stay at home, rather than going out and doing new things?
- Do you feel you have more problems with memory than most?
- Do you think it is wonderful to be alive now?
- Do you feel pretty worthless the way you are now?
- Do you feel full of energy?
- Do you feel that your situation is hopeless?
- Do you think that most people are better off than you are?

- Score 1 for each “depressed” answer, i.e. “no” for questions 1, 5, 7, 11, and 13, and “yes” for the others.

Results

The prevalence of geriatric depression at community level was 41.1% (122/300). Most of the respondents 56.7% were in the age group 60–69 years (Table 1). The proportion of males was 53%.

The prevalence of depression among age group 60–69 years was 33.9% ($P = 0.002$) and prevalence increased with increasing age (chi squared = 12.325, $df = 2$). The difference was significant ($P < 0.05$) (Table 2).

There was evidence against of an association between depression and age ($P = 0.002$), level of education ($P = 0.015$), occupation ($P < 0.001$), the problems of everyday living (such as food, clothing, housing, transportation, furniture, medical treatment costs, children's education) ($P = 0.026$), social problems (such as inability to visit friends and relatives, being worried about the children's future, feeling lonely, having no friends) ($P < 0.001$) (Table 3).

We found that a number of common geriatric medical problems were associated with depression, namely memory loss ($P < 0.001$), urinary incontinence ($P = 0.001$), rheumatoid arthritis ($P = 0.005$), Parkinsonism (P

Table 1 Distribution of the study population (n = 300) by age and sex, Khartoum State, 2010

Characteristic	No.	%
Age (years)		
60–69	169	56.7
70–79	100	33.6
80+	29	9.7
Total	298	100.0
Sex		
Male	159	53.0
Female	141	47.0
Total	300	100.0

Table 2 Prevalence of depression among the elderly (n = 300), by age group, Khartoum State, 2010

Age (years)	Depressed		Not depressed		Total	
	No.	%	No.	%	No.	%
60–69 (n = 168)	57	33.9	111	66.1	168	100
70–79 (n = 99)	44	44.4	55	55.6	99	100
80+ (n = 28)	22	67.9	11	32.1	33	100

= 0.007) and Alzheimer's disease ($P = 0.048$) (Table 4).

After controlling for confounders, the overall model of logistic regression

showed that depression was significantly associated with 3 risk factors: social problems (adjusted OR = 3.2; 95% CI: 1.45–7.41; $P = 0.0004$), problems of

everyday living (adjusted OR = 2.1; 95% CI: 1.19–3.94; $P = 0.011$) and loss of work (occupation) (adjusted OR = 3.8; 95% CI: 1.27–1.76; $P = 0.017$) (Table 5).

Table 3 Sociodemographic risk factors of depression among the elderly (n = 300), Khartoum State, 2010

Variable	Not depressed		Depressed		χ^2	P-value
	No.	%	No.	%		
Age (years)					12.325	0.002
60–69 (n = 168)	111	66.1	57	33.9		
70–79 (n = 99)	55	55.6	44	44.4		
80+ (n = 28)	9	32.1	19	67.9		
Sex					2.662	0.103
Male (n = 158)	100	63.3	58	36.7		
Female (n = 139)	75	54.0	64	46.0		
Level of education					15.814	0.015
Illiterate (n = 143)	70	49.0	73	51.0		
Read & write (n = 49)	33	67.3	16	32.7		
Primary (n = 35)	20	57.1	15	42.9		
Intermediate (n = 25)	21	84.0	4	16.0		
Secondary (n = 21)	14	66.7	7	33.3		
University (n = 20)	14	70.0	6	30.0		
Postgraduate (n = 4)	3	75.0	1	25.0		
Marital status					1.901	0.539
Married (n = 154)	95	61.7	59	38.3		
Divorced (n = 1)	1	100.0	0	0.0		
Widowed (n = 136)	76	55.9	60	44.1		
Unmarried (n = 6)	3	50.0	3	50.0		
Occupation					15.426	< 0.001
Working (n = 41) ^a	35	85.4	6	14.6		
Retired (n = 106)	63	59.4	43	40.6		
Not working (n = 150)	77	51.3	73	48.7		
Problems of everyday living^b					5.422	0.026
Yes (n = 106)	53	50.0	53	50.0		
No (n = 191)	122	63.9	69	36.1		
Social problems^c					30.769	< 0.001
Yes (n = 59)	16	27.0	43	73.0		
No (n = 238)	159	67.0	79	33.0		

^aSome people had retired from government work, according to the rules, but found a job in the private sector.

^bHaving less than 2 meals per day as a proxy indicator of problems of everyday living and only one set of clothes. If both are present, this was considered a living problem.

^cLiving alone; detached from children and relatives.

Table 4 Medical problems associated with depression among the elderly, Khartoum State, 2010

Risk factor	Not depressed		Depressed		Total No.	χ_1^2	P-value
	No.	%	No.	%			
Memory loss							
No	156	64.7	85	35.3	241	17.812	< 0.001
Yes	19	33.9	37	66.1	56		
Sadness							
No	150	66.1	77	33.9	227	20.381	< 0.001
Yes	25	35.7	45	64.3	70		
Parkinson disease							
No	174	60.2	115	39.8	289	7.320	0.007
Yes	1	12.5	7	87.5	8		
Alzheimer disease							
No	173	59.9	116	40.1	289	3.909	0.048
Yes	2	25.0	6	75.0	8		
Rheumatoid arthritis							
No	116	65.5	61	34.5	177	7.918	0.005
Yes	59	49.2	61	50.8	120		
Urinary incontinence							
No	167	62.1	102	37.9	269	11.766	0.001
Yes	8	28.6	20	71.4	28		

Discussion

The proportion of males in our study sample was 53% and females 47%, a finding which is line with the elderly population demographic in Sudan, where the proportion of males aged 60+ years is 56%, and females 44% [5]. The overall prevalence of geriatric

depression at community level was 41.1%, which is higher than the total rate of depression found among older adults in a study in Egypt, 30% [11].

A similar prevalence for depression was reported from a study in a rural area of Russia which was experiencing demographic and epidemiological changes [14].

Among the study population, depression was found to be associated with age, especially the age group 60–69 years. At this age, the transitional period starts changing the lives of the elderly; they retire and suffer from a reduction in their social activities and their roles. This change exerts a considerable burden of stress on the

Table 5 Logistic regression analysis of risk factors associated with depression in the elderly, Khartoum State, 2010

Factor	Adjusted OR	95% CI	P-value
Occupation (retired)	3.876	1.27–11.76	0.017*
Social problems	3.27	1.45–7.41	0.004*
Urine incontinence	2.73	0.89–8.36	0.079
Level of education	2.723	0.21–34.72	0.441
Problems of everyday living	2.19	1.19–3.94	0.011*
Parkinson disease	2.104	0.18–24.06	0.550
Memory loss	1.758	0.80–3.86	0.159
Age	1.652	0.19–1.91	0.392
Rheumatoid arthritis	1.287	0.72–2.32	0.400
Support from family	1.236	0.56–2.71	0.598
Alzheimer disease	1.108	0.13–6.43	0.918
Social problems	1.097	0.42–2.00	0.817

*Statistically significant at $P < 0.05$.

OR = odds ratio; CI = confidence interval.

elderly leading to anxiety and depression [11].

Depression was not significantly associated with sex. This finding is contradictory to the results of other studies where depression was found to be more common among females: it has been reported that the lifetime prevalence of depression was 9.1% in women and 2.9% in men [15]. This difference could be related to the nature of the extended family in Sudanese society, where the role of older ladies as grandmothers is respected by other family members [A. Suliman. Assessment of health status of elders at two old homes in Khartoum – Sudan, 2000. Unpublished study]

The prevalence of depression among elderly women 46% was higher than in other countries in the Eastern Mediterranean Region, for example, depression

among elderly females reached 27.7% in Saudi Arabia [16] and 29.6 % in Lebanon (outskirts of Beirut [17].

We found that those with lower education levels were more likely to be depressed, contrasting with the findings of a study in Sweden (a country with contrasting education levels, economy, income levels, culture and religion), where education was unrelated to depression in men and women overall. However, a strong association between occupation and depression was found in both studies: those who were retired were more likely to be depressed than those who were working [18]. Also, problems of everyday living and social problems were associated with increased risk of depression, which is similar to the findings of the Swedish study [18].

There was no association between marital status and depression; this differed from the findings of a similar study in Quebec (Canada), another country where lifestyles differ greatly from lifestyles in Sudan, in which it was reported that men without a partner tended to consult for depression more frequently than men with a cohabiting partner [19].

Although all medical problems were individually significantly associated with depression, in logistic regression modelling they were not identified as risk factors. Similar results were found in a study in Australia, indicating that socioeconomic factors were more important than medical problems [20].

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