ORIGINAL ARTICLE

The Prevalence of Cognitive Impairment among Older Adults in Jamaica

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ABSTRACT

Objective: *This study sought to document the prevalence of cognitive impairment among a nationally representative sample of community-dwelling older adults and determine associated factors.*

Methods: *A survey of 2943 older adults was undertaken in four parishes in Jamaica. A two-stage cluster sampling methodology was used, with the first and second cluster units being enumeration districts and households, respectively. Cognitive impairment was assessed using the Mini-Mental State Examination tool. Bivariate analyses were used to explore relationships between cognitive impairment and sociodemographic and health characteristics. Significant variables were entered into a logistic regression model and adjusted odds ratios for likelihood of cognitive impairment obtained.*

Results: *Less than one in three persons had some level of cognitive impairment. Older age and lower levels of education independently predicted cognitive impairment (OR 1.05, 95% CI 1.04, 1.06; OR 3.00, 95% CI 2.23, 4.01). Older adults who limited their activities because of fear of falling (OR 1.35, 95% CI 1.09, 1.67), self-reported diabetes mellitus (OR 1.32, 95% CI 1.05, 1.67), screened positive for depression (OR 1.02, 95% CI 1.02, 1.03) and reported dependence in one or more activities of daily living (OR 2.47, 95% CI 1.62, 3.78) were more likely to have cognitive impairment.*

Conclusion: *The prevalence of cognitive impairment in community-dwelling older adults is significantly higher than previously found in Jamaica, a middle-income developing country, but similar to that of populations with comparable age, education and income profile. Further exploration of risk factors may point to interventions for reducing cognitive impairment and associated morbidity.*

Keywords: Cognitive impairment, Jamaica, Mini-Mental Status Examination, older adults

WIMJ Open 2015; 2 (2): 71

INTRODUCTION

Globally, the age-standardized prevalence of dementia has been estimated to be between 5% and 7% among persons aged 60 years and over (1). The highest prevalences documented were in Latin America and the Caribbean, with age-standardized rates of 8.5% and 8.1%, respectively (1, 2). With advances in life expectancy and rapid population ageing, the prevalence of dementia is expected to increase. Almost 36 million people globally have dementia with an expected doubling in the next 20 years and an increase to 135 million by the year 2050 (3, 4).

Diagnosing dementia is a multi-stage process which begins with screening followed by diagnostic tests for those with abnormal results. The screening process identifies cognitive impairment and the most widely used instrument is the Mini-Mental State Examination [MMSE] (5). This instrument was designed to screen for cognitive deficits in several domains including orientation (time and place), memory (immediate and short-term), attention and calculation, language and constructional praxis [figure copy] (5–7). The MMSE has been used extensively across many populations of different sociocultural background with reported excellent validity (8–12).

Scores on MMSE are greatly influenced by age and education level (13–15). Cognitive impairment and dementia have been associated with rural dwellers (16), increased rates of hospitalization (17, 18), increased risk for falls (19, 20), increased prevalence of fear of falling (21, 22), diabetes mellitus (23, 24), depression (17, 25), and dependence in activities of daily living [ADL] (26). There are conflicting studies on the association of gender and hypertension with cognitive impairment (27–29). The last nationally representative study on cognitive impairment in Jamaica was completed over two decades ago and reported a prevalence of 14.1% (30).

Against a backdrop of rapid population ageing, this study seeks to document the current prevalence of cognitive impairment among a nationally representative sample of community-dwelling older adults and determine its associated factors.

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 DOI: 10.7727/wimjopen.2014.003

SUBJECTS AND METHODS

A cross-sectional survey of 2943 older adults was done in 2012 in four parishes in Jamaica. These parishes collectively reflect the age, gender and urban/rural diversity of the Jamaican population. A two-stage cluster sampling methodology was used, with the first and second stage cluster units being enumeration districts and households, respectively. The methods used in this survey have been described previously (31).

The interviewer-administered survey instrument contained 196 questions on community and social relationships, socio-economic factors, lifestyle behaviours, health status and access/utilization behaviours. The instrument also included the following standard tools:

- the MMSE, an 11-item instrument designed to screen for cognitive impairment (5, 6). Two options of the MMSE "Place Orientation" item were modified for relevance to the typical home setting in Jamaica. Possible scores range from 0−30 points, with higher scores indicative of better cognitive functioning. The cut-point of 21/22 (*ie* with scores of 21 and below indicative of cognitive impairment) was applied because of the age group surveyed and low educational attainment of older adults in Jamaica (11, 32). The scores were further categorized as 22–30 points reflecting no cognitive impairment, while 18–21 and 0–17 points reflected mild cognitive impairment and severe cognitive impairment, respectively.
- the 20-item Zung Self-Rating Depression Scale (SDS), to assess depression. Raw SDS scores were converted to a 100-point index (SDS index) in which < 50 points indicated no depression (normal mood), 50–59 points: mild depression, 60–69 points: moderate depression and ≥ 70 points: severe depression (33, 34).
- the Katz Index of Independence in Activities of Daily Living (ADL) consisting of six questions on physical functioning (bathing, dressing, toileting, transferring, feeding and continence). The possible score range of the ADL was 0–6 points, which was dichotomized to dependent in at least one ADL (label = 1) and independent in all ADL [label = 0] (34, 35).

The data were analysed with the assistance of the Statistical Package for Social Sciences, version 17, for Microsoft Windows. Chi-squared test for association was used to determine significant differences between the dependent variable (cognitive impairment: severe, mild, none) and covariates. The MMSE scale was subsequently dichotomized to older adults with no cognitive impairment (label = 0) and older adults with mild or severe cognitive impairment (label = 1). Using this as the outcome variable, a logistic regression model was developed to determine adjusted odds ratios (OR) and 95% confidence intervals (CI) for significant covariates.

This study protocol was approved by the University Hospital of the West Indies/University of the West Indies/Faculty of Medical Sciences Ethics Committee. Study participants or their legal guardians/caregivers provided informed consent.

RESULTS

Sociodemographic characteristics

Table 1 shows the sociodemographic characteristics of the sample that consisted of 2943 older adults, with the majority

Table 1: Sociodemographic characteristic of the sample by gender

	Gender % (n)		Total % (n)
	Males	Females	
Age groups, years (n = 2919)			
60–69	48.0 (673)	40.7 (618)	44.2 (1291)
70–79	32.6 (457)	34.8 (529)	33.8 (986)
≥ 80	19.3 (271)	24.4 (371)	22.0 (642)
Parish of residence (n = 2942)			
St Andrew	41.1 (581)	52.7 (806)	47.1(1387)
St Catherine	51.0 (720)	36.9 (564)	43.6 (1284)
St Thomas	7.0 (99)	7.8 (119)	7.4 (218)
Kingston	0.8 (12)	2.7 (41)	1.8 (53)
Highest level of education (n = 2920)			
No formal schooling	6.9 (97)	4.6 (69)	5.7 (166)
Primary	70.4 (988)	73.5 (1114)	72.0 (2102)
Secondary	12.9 (181)	11.9 (181)	12.4 (362)
Technical/vocational	5.5 (77)	3.8 (58)	4.6 (135)
University	4.3 (61)	6.2 (94)	5.3 (155)
Union status (n = 2932)			
Single	27.3 (383)	38.1 (581)	32.9 (964)
Married	43.7 (614)	24.3 (371)	33.6 (985)
Widowed	15.4 (216)	30.2 (461)	23.1 (677)
Divorced	4.4 (62)	3.1 (48)	3.8 (110)
Common law	5.4 (76)	1.8 (27)	3.5 (103)
Separated	3.8 (53)	2.4 (36)	3.0 (89)

(52.0%, n = 1531) being female. The age of the sample ranged from 60 to 103 years, with the mean age being 72.2 (SD 8.9) years. The majority (76.9%) of the respondents were between the ages of 60 and 79 years. Females were, on average, older ($p < 0.001$) than male respondents (72.9 (SD 9.0) *vs* 71.4 (SD 8.7) years, respectively). The majority (77.7%) of the older adults reported that their highest level of educational attainment was primary school and below (Table 1).

Table 2 demonstrates that the sample was nationally representative by gender, age and rural/urban composition.

Prevalence of cognitive impairment

Scores of older Jamaican adults on the MMSE scale extended across the full range of possible scores, 0–30, with a mean of 23.1 (SD 4.8). More than one fifth (21.2%, n = 591) of older adults had mild cognitive impairment and more than one tenth (11.0%, n = 307) had severe impairment. The majority (67.7%, n = 1884) of older adults had no cognitive impairment.

Table 2: Percentage distribution of population, sample and subsample characteristics

Variable	Census 2011, population of study area	Sample (n = 2943)
Age (years)		
60–69	49.9	44.1
70–79	30.7	33.7
≥ 80	19.6	21.4
Gender		
Male	47.6	48.0
Female	52.4	52.0
Area of residence		
Rural	21.6	25.7
Urban	78.4	74.3

Cognitive impairment was significantly associated with age, educational level, gender, area of residence, hospitalization in the last three years, falls in the last three months, limit activities for fear of falling, self-reported diabetes mellitus and hypertension, depression and dependence in ADL (Table 3).

Table 3: Cognitive impairment categories by variables

Variables	Cognitive impairment (n = 2775) % (n)			Total % (n)
	Severe	Mild	None	
Age categories, years (n = 2775)***				
60 – 69	5.2 (64)	17.1 (210)	77.7 (954)	100 (1228)
70 – 79	9.9 (93)	23.8 (223)	66.2 (620)	100 (936)
≥ 80	24.5 (150)	25.7 (157)	49.8 (304)	100 (611)
Highest level of education (n = 2762)***				
Secondary and above	4.0 (25)	10.2 (63)	85.8 (530)	100 (618)
Primary and below	12.9 (277)	24.3 (522)	62.7 (1345)	100 (2144)
Gender (n = 2782)***				
Female	12.9 (185)	22.6 (324)	64.6 (927)	100 (1436)
Male	9.1 (122)	19.8 (267)	71.1 (957)	100 (1346)
Area of residence (n = 2751)**				
Rural	12.8 (90)	24.5 (172)	62.6 (439)	100 (701)
Urban	10.1 (208)	20.3 (417)	69.5 (1425)	100 (2050)
Hospitalization in last three years (2750)***				
No	9.8 (208)	21.0 (447)	69.2 (1470)	100 (2125)
Yes	15.4 (96)	21.8 (136)	62.9 (393)	100 (625)
Falls in last three months (2768)***				
No	10.4 (227)	20.0 (437)	69.6 (1521)	100 (2185)
Yes	13.6 (79)	25.9 (151)	60.5 (353)	100 (583)
Limit activity for fear of falling (2630)***				
No	8.6 (150)	18.6 (324)	72.8 (1268)	100 (1742)
Yes	16.0 (142)	26.5 n(235)	57.5 (511)	100 (888)
Self-reported diabetes mellitus (n = 2768)**				
No	10.0 (205)	20.6 (422)	69.4 (1423)	100 (2050)
Yes	14.1 (101)	23.0 (165)	63.0 (452)	100 (718)
Self-reported hypertension (n =2773)*				
No	11.5 (124)	18.5 (199)	70.0 (753)	100 (1076)
Yes	10.8 (183)	22.9 (389)	66.3 (1125)	100 (1697)
Depression (SDS Index) (n = 2355)***				
No depression	6.4 (90)	18.4 (259)	75.2 (1060)	100 (1409)
Mild depression	15.4 (88)	21.0 (120)	63.6 (363)	100 (571)
Moderate depression	17.4 (50)	31.6 (91)	51.0 (147)	100 (288)
Severe depression	32.2 (28)	34.5 (30)	33.3 (29)	100 (87)
ADL (Katz Index) (n = 2751)***				
Independent in all	8.8 (227)	20.8 (533)	70.4 (1807)	100 (2567)
Dependent in at least one	41.8 (77)	26.1 (48)	32.1 (59)	100 (184)

SDS Index: Zung Self-Rating Depression Scale; ADL: activities of daily living

Results of the logistic regression analysis are presented in Table 4. For every one year increase in age, there was a 5% increase in the likelihood of having cognitive impairment (OR 1.05, 95% CI 1.04, 1.06), while older adults with a lower educational attainment were three times more likely to have cognitive impairment (OR 3.00, 95% CI 2.23, 4.01).

Gender, area of residence, hospitalization in the last three years and having fallen in the last three months were not found to be independent predictors of cognitive impairment. Older adults who had limited their activity for fear of falling were 35% more likely to have cognitive impairment (aOR 1.35, 95% CI 1.09, 1.67).

Older adults with self-reported diabetes mellitus were 32% more likely to have cognitive impairment (aOR 1.32, 95% CI 1.05, 1.67). Older adults with self-reported hypertension were not found to be at greater risk for cognitive impairment (Table 4).

A one-point increase on the depression index was associated with a 2% increase in the likelihood of having cognitive impairment (aOR 1.02, 95% CI 1.02, 1.03). Older adults dependent in at least one ADL were more than twice as likely to have cognitive impairment [aOR 2.47, 95% CI 1.62, 3.78] (Table 4).

Table 4: Odds ratios for likelihood of having cognitive impairment

Variable	aOR	95% CI¥
Age at last birthday	1.05***	1.04, 1.06
Highest level of education		
Secondary and above	1.00	–
Primary and below	3.00***	2.23, 4.01
Gender		
Female	1.00	–
Male	0.95	0.77, 1.17
Area of residence		
Rural	1.00	–
Urban	0.83	0.66, 1.04
Hospitalization in last three years		
No	1.00	–
Yes	0.92	0.73, 1.17
Falls in last three months		
No	1.00	–
Yes	1.18	0.93, 1.51
Limit activity for fear of falling		
No	1.00	–
Yes	1.35**	1.09, 1.67
Self- reported diabetes mellitus		
No	1.00	–
Yes	1.32*	1.05, 1.67
Self- reported hypertension		
No	1.00	–
Yes	0.84	0.67, 1.05
Depression (SDS Index)	1.02***	1.02, 1.03
ADL (Katz Index)		
Independent in all	1.00	–
Dependent in at least one	2.47***	1.62, 3.78

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

SDS Index: Zung Self-Rating Depression Scale; ADL: activities of daily living

DISCUSSION

Despite compensating for the age and lower educational attainment of the sample by adjusting the cut-point for the MMSE, the prevalence of cognitive impairment (32.2%) among community-dwelling older adults in Jamaica is much higher than previous studies in Jamaica which used a higher cut-point of 23/24 for the MMSE (30). Other studies using the cut-point of 23/24 documented lower cognitive impairment prevalence of 17.0% in Korea (36), 18.3% in the United Kingdom (37) and 20.4% in Poland (38). In a Brazilian population of similar age and educational attainment as Jamaica, using a cut-point of 22/23, the prevalence of cognitive impairment was 34.0% (39).

Most of the cases of severe cognitive impairment either have dementia or are at high risk of developing dementia, while many older adults with mild cognitive impairment may never progress to dementia (40). The reported prevalence must be viewed in that context. Given rapid population ageing, the prevalence of cognitive impairment and dementia is expected to increase; so too will the associated need for specialized health services, caregivers, community support and long-term care facilities.

There is a window of opportunity (demographic dividend) for developing countries like Jamaica, where the large numbers of persons in the working-age group can induce economic growth (41). This demographic dividend, managed well, can allow for development of appropriate and evidence-based services, policies and programmes to improve patient outcomes and reduce potential costs (12, 42).

Our findings of variables predicting an association with cognitive impairment build upon previous work among older adults (13–29). In this study, self-reported hypertension was not a significant predictor of cognitive impairment. The literature reports conflicting results regarding the influence of hypertension and gender on cognitive impairment (29, 43–45). Gender, though significant in bivariate analysis, was not found to be an independent predictor in this study when the other variables were introduced in the regression model. Interactions between age, gender, education and the presence of diabetes, when controlled for, may explain this finding. Similarly, interactions between area of residence, education, hospitalizations, falls and gender may help explain associations of cognitive impairment in bivariate analysis but lack of significance in regression models. Hospitalization is influenced by access, cultural norms and perceptions of the quality of care. In the Jamaican context, these would tend to reduce hospitalization rates.

The prevalence of cognitive impairment may have been under-estimated as older adults with severe cognitive impairment are arguably less likely to participate in a community-based study. Moreover, institutionalized older adults were not included. These seminal results in Jamaica argue for further research to determine a) the most appropriate cut-point for MMSE in Jamaican elders, b) the prevalence of

dementia among MMSE screen-positives, c) dementia aetiology and d) the most appropriate interventions to reduce the risk for cognitive impairment and dementia and reduce associated morbidity and mortality.

ACKNOWLEDGEMENTS

The authors thank the National Health Fund for their financial support of this study.

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Received 27 Aug 2014
Accepted 08 Sep 2014
Published 28 May 2015
Online: http://www.mona.uwi.edu/wimjopen/article/1640