Cognitive Performance of the Elderly People in an Urban Area of Bangladesh: A Sociodemographic Study

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Abstract

A cross-sectional, analytical study was conducted to see the sociodemographic characteristics of elderly people and their association with cognitive performance in an urban setting in Dhaka, Bangladesh, between January and December of 2016. A convenient sampling technique was adopted. A total of 189 elderly people (118 male and 71 female) were included in the study. A semi structured questionnaire was first developed in English and then translated into Bangla. The questionnaire contains questions related to sociodemographic characteristics of the respondents and their cognitive functions, as determined by using Mini Mental state Examination (MMSE). Sociodemographic data were analyzed with descriptive statistics. Pearson correlation test was applied to determine the relationship between quantitative variables, while Chi-square test was done to assess association of qualitative data. The age of the respondents ranged from 60 to 90 years. The mean age was 67.8±6.26 years. Higher proportion of male (37.3%) and female respondents (36.6%) were in 60-64 age group, while the lower proportion was in ≥75 years age group (male 12.7% and female 14.1%). Most of the male respondents were graduate and above education group (64.4%), while most female respondents belonged to SSC and below and informal education group (50.7%) group. The rest of them fell into HSC education group: 11% and 32.4% respectively. Most of the elderlies (57.67%) belonged to the extended family and the rest lived in the nuclear family (42.33%). Among the male respondents, 76.3% were retired. Rest of the respondents was service holder (9.3%), businessman (12.7%) and teacher (1.7%). Female respondents were mostly housewives (97.2%) and two were teachers (2.8%). Among 189 respondents, 35.4% had normal cognitive function. Half of the respondents (52.4%) had mild cognitive impairment and the rest had moderate cognitive impairment (12.2%). None had severe cognitive impairment. Significant relationships of the cognitive performance were observed with age, sex, marital status, educational status, and type of family they lived in. However, no significant association was found between occupation and cognitive performance.

Keywords: Elderly people, cognitive function, sociodemographic characteristics, Bangladesh

Introduction

Cognition is about the processes behind human thinking and experiences. Cognition refers to "a process of identifying, selecting, interpreting, storing, and using information to make sense of and interact with the physical and social world, to conduct one's everyday activities, and to plan and enact the course of one's occupational life".[1] Scientists and researchers often refer to different cognitive domains such as perception, attention, memory, language, executive function (initiating, planning, organizing, controlling and evaluation of thinking and acting) and psychomotor speed.[2] Some of those cognitive functions decrease within normal aging; for example, short-term memory and the way we learn new skills, mental

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speed, logical thinking and spatial problem solving.[3,4] The World Health Organization (WHO) states that in mild cognitive impairment, the cognitive deficit is less severe than in dementia and normal daily function and independence are generally maintained. It is a chronic condition that is a precursor to dementia in up to one third of cases.[5] Cognitive impairment prevalence of 3% to 19% among people older than 65 years in different parts of the world.[6] In 2014, Canada reported that 6-15% of Canadians aged 65 years and older suffer from Alzheimer's disease and other forms of dementia.[7] The prevalence of dementia of rural population in different regions of India showing varying rates: from 2.44-4.1% in West India, 1.83% in North India, 0.8-1.28% in East India and 3.6% in South India.[8] Prevalence of cognitive impairment in a Chinese population was estimated 12.6%.[9] Several countries have their own research data. However, our country lacks specific research and data on cognitive impairment of elderly population. Cognitive impairment imposes a huge burden on the patients, their families, society and the country as a whole in terms of quality of life and health care costs. As we know that a substantial acceleration of cognitive decline appears several years before a diagnosis of dementia,[10] early detection of cognitive decline could lead to secondary prevention because this information could be used to develop strategies that control risk factors.[11] Hence, we proposed to this study to see the sociodemographic characteristics of elderly people and their association with cognitive performance in an urban setting in Dhaka, Bangladesh.

Methods

This cross-sectional, analytical study was conducted in Mirpur area under Dhaka City Corporation, Bangladesh, between January and December of 2016. The study population was elderlies over the age of 60 years of both sexes who were present at their homes during data collection.

Inclusion criteria:

1. 60 years and above elderly person having reading and writing abilities;
2. Willing to participate in the study;
3. Who have been staying at home for more than 6 months.

Exclusion criteria:

1. Diagnosed stroke patients;
2. History of head injury or trauma;
3. Having speech or communication difficulties;
4. Severely ill individuals;
5. People with mental health issues;
6. Diagnosed with brain tumors; and
7. Reported cardiovascular events.

A convenient sampling technique was adopted. Based on the inclusion and exclusion criteria, finally 189 elderly people (118 male and 71 female) were included in the study. A semi structured questionnaire was first developed in English and then translated into Bangla. The questionnaire contains questions related to sociodemographic characteristics of the respondents and their cognitive functions, as determined by using Mini Mental state Examination (MMSE).

The MMSE is one of the most commonly used tests worldwide for assessing cognitive function; it was developed by Folstein *et al.* in 1975.[12] The MMSE assesses orientation in time and place, attention, memory, and language and visual construction. The MMSE has a maximum of 30 points where higher scores indicate better cognition. The cut-off levels used in this study

were: ≥27 = no impairment; 21–26 = mild; 11–20 = moderate; and ≤10 = severe impairment.[13]

After data collection, each questionnaire form was checked to find out any incompleteness or missing data or outliers. Data sheets produced on the computer were double checked to ensure their accuracy and completeness. Statistical analysis was carried out using SPSS software version 23.0. Sociodemographic data were analyzed with descriptive statistics. Pearson correlation was done to determine the relationship between quantitative variables, while Chi-square test was carried out to assess association of qualitative data. To assess the strength of association, odds ratio (OR) and their corresponding 95% confidence interval (CI) were calculated. All tests were two tailed and a P value <0.05 was considered statistically significant. This research was approved by the Institutional Ethical Review Committee of National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh.

Results

The age of the respondents ranged from 60 to 90 years. The mean age was 67.8± 6.26 years. Higher proportion of male (37.3%) and female respondents (36.6%) were in 60-64 age groups, while the lower proportion was in the age group of ≥75 years (male 12.7% and female 14.1%). Most of the male respondents were graduate and above education group (64.4%), while most female respondents belonged to SSC and below and informal education group (50.7%) group. The rest of them fell into HSC education group: 11% and 32.4% respectively. Most of the respondents belonged to the extended family (58.20%) (44.1% of male and 38.0% of female) and in nuclear

family 41.80% lived in. Among the male respondents, 76.3% were retired. Rest of the respondents was service holder (9.3%), businessman (12.7%) and teacher (1.7%). Female respondents were mostly housewives (97.2%) and two were teachers (2.8%) (Table-I).

Table-I: Sociodemographic characteristics of the respondents (N=189)

Characteristics	Male	Female
	Frequency (%)	Frequency (%)
Age group		
60-64 years	44 (37.3%)	26 (36.6%)
65-69 years	32 (27.1%)	18 (25.4%)
70-74 years	27 (22.9%)	17 (23.9%)
≥75 years	15 (12.7%)	10 (14.1%)
Mean age	67.8±6.26 years	
Sex	118 (62.43%)	71 (37.57%)
Marital status		
Married	88 (74.6%)	36 (50.7%)
Separated/widow/widower	30 (25.4%)	35 (49.3%)
Educational status		
SSC and below and informal education	29 (24.6%)	36 (50.7%)
HSC	13 (11%)	23 (32.4%)
Graduate and above	76 (67.4%)	12 (16.9%)
Type of family		
Nuclear	53 (44.92%)	27 (38.03%)
Extended	65 (55.08%)	44 (61.97%)
Occupation		
Service	11 (9.3%)	-
Business	15 (12.7%)	-
Teacher	2 (1.7%)	2 (2.8%)
Retired	90 (76.3%)	-
Housewife	-	69 (97.2%)

Cognitive status of the respondents was measured by Mini Mental State Examination questionnaire which had 11 components. It was observed that the highest mean score was found

in spatial orientation related questions (4.89), followed by temporal orientation related questions (4.29). The other domains showed more or less similar mean scores, e.g., registration related question (2.99), attention and calculation related question (2.19), repeat memory question (2.99), naming object related question (2.00), and stage command related question (2.70). However, relatively lower scores were noted in domains named as reading and obeying related question (0.96), followed by question related to writing a complete sentence (0.85) and repeat the words (0.58). The lowest score was noted in the domain copying 2 pentagons with intersection related question (0.41) (Table-II).

Table-II: Scores of mini mental state examination (MMSE) of the respondents (N=189)

Components	Mean± SD	Min.	Max.
Temporal orientation related questions score	4.29± 1.02	0	5
Spatial orientation related questions score	4.49± 0.45	2	5
Registration related questions score	2.99± 0.10	2	3
Attention and calculation related questions score	2.19± 1.57	0	5
Repeat memory related questions score	2.99± 0.10	2	3
Naming object related questions score	2.00±. 0.0	2	2
Stage command related questions score	2.70± 0.51	1	3
Copying 2 pentagons related questions score	0.41± 0.49	0	1
Reading and obeying related questions score	0.96± 0.20	0	1
Writing a complete sentence related questions score	0.85± 0.36	0	1
Repeat the words related questions score	0.58± 0.49	0	1

Among the respondents, 35.4% had normal cognitive function. Half of the respondents (52.4%) had mild cognitive impairment and the rest had moderate cognitive impairment (12.2%). No severe cognitive impairment was found (Fig. 1). A moderate negative association was revealed between age of the respondents and their cognitive performance, which was statistically significant (p<0.001) (Fig. 2).
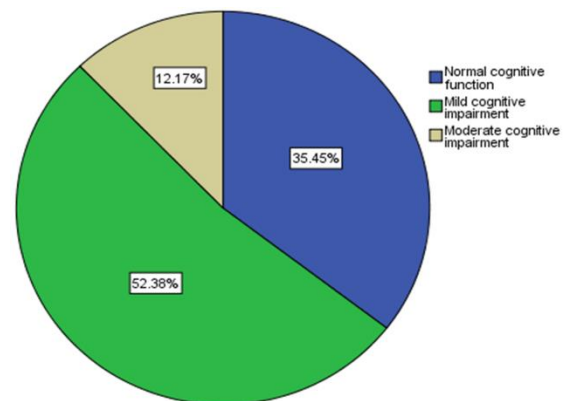

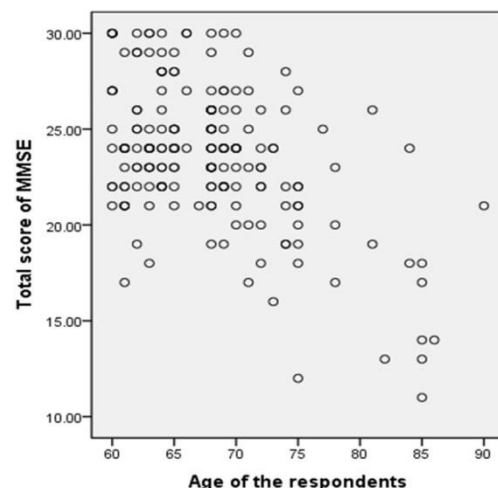**Fig. 1:** Cognitive performance of the respondents (N=189)

Fig. 2: Association of age with the cognitive performance of the respondents (N=189), as done by Pearson correlation test (r =-0.507; p<0.001)

Significant relationships were found between sex and cognitive performance ($X2=7.336$; $p<0.05$), between marital status and cognitive performance ($X2=11.556$; $p<0.05$), between educational status and cognitive performance ($X2=30.236$; $p<0.001$), and between type of family and cognitive performance ($X2=10.825$; $p<0.05$). However, no significant association was found between occupation and cognitive performance ($X2=11.026$; $p=0.200$) (Table-III).

Discussion

The present study was done on elderly people. Moderate negative association between age of the respondents and cognitive performance was found ($p<0.001$) in the study. Several studies reported that with increasing age the cognitive performance decreases significantly.[14-16]

Our results revealed that sex affects cognitive impairment ($p<0.05$). Beam *et al.* showed that

Characteristics	Cognitive Performance			Statistics	
	Normal cognitive function n (%)	Mild cognitive impairment n (%)	Moderate cognitive impairment n (%)	X^2 value p value df	OR (95%CI)
Sex Male Female	50 (42.4%) 17 (23.9%)	57 (48.3%) 42 (59.2%)	11 (9.3%) 12 (16.9%)	7.336 0.026 2	2.33 (1.21-4.50)
Marital status Married Separated/Widow/Widower	49 (39.5%) 18 (27.7%)	67 (54.0%) 32 (49.2%)	8 (6.5%) 15 (23.1%)	11.556 0.003 2	0.17 (0.89-3.27)
Educational status SSC and below and informal education HSC Graduate and above	10 (15.4%) 14 (38.9%) 43 (48.9%)	38 (58.5%) 18 (50.0%) 43 (48.9%)	17 (26.2%) 4 (11.1%) 2 (2.3%)	30.236 0.000 4	0.21 (0.10-0.54)
Type of family Nuclear Extended	35 (44.3%) 32 (29.1%)	41 (51.9%) 58 (52.7%)	3 (3.8%) 20 (18.2%)	10.825 0.004 2	1.93 (1.05-3.5)
Occupation Service Business Teacher Retired Housewife	5 (45.5%) 9 (60.0%) 1(25.0%) 35 (38.9%) 17 (24.6%)	5 (45.5%) 6 (40.0%) 3 (75.0%) 45 (50.0%) 40 (58.0%)	1 (9.1%) - 0 (0.0%) 10 (11.1%) 12 (17.4%)	11.026 0.200 4	-

Table-III: Association of sociodemographic characteristics with the cognitive performance of the respondents (N=189)

female elderly people had more chances of presenting with cognitive impairment.[14] In contrast, van Exel *et al.* reported that women were less prone to the development of cognitive impairment.[17]

In our study, moderate cognitive impairment was 3.5 times higher in separated and widow/widower group (23.1%) than married group (6.5%) and married were of normal cognitive performance (39.5%) compared to the separated and widow/widower (27.7%). Losing a spouse in mid-life or late life may increase the risk of developing cognitive decline, which is suggested by a longitudinal follow-up study.[18] Living alone or remaining unmarried status is also a risk of subsequent cognitive deterioration, as reported by many studies.[19,20] Depressive mood or depression is associated with cognitive performance and may increase risk of developing dementia in the future.[21]

Our findings suggest that higher educational level decreases cognitive impairment. This finding corroborate the studies done by Brayne & Calloway, Herrera *et al.* and Gatz *et al.,* as they reported that elderly individuals with a low level of education obtained the lowest scores of MMSE.[22-24] Conversely, no correlation was found between education and cognitive impairment in a study conducted by Wilson *et al.,* as they suggested that the contribution of education to cognitive reserve is limited to its association with level of cognitive function before old age.[25]

Our study showed that cognitive impairment in elderly people is much more prevalent among who are living in extended family than that of nuclear family. This result is supported by a recent study done by Bonsang & Skirbekk.[26]

However, in terms of structural aspects of family relationships, early research done by Crooks *et al.* reported that older adults with a larger number of family members had a higher level of cognitive function, as perceived by reduction in psychological stress on cognitive performance of older adults having more support from a larger number of family members.[27]

It was observed in the study that there was no association found between occupational status and cognitive performance; this may be due to our adoption of convenient sampling technique which could not show much variation in their pattern of earning livelihood and living standards.

Conclusion

Our data revealed significant relationships of the cognitive performance with age, sex, marital status, educational status, and type of family they lived in. However, no significant association was found between occupation and cognitive performance.

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