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Original Research Article

Study of cognitive impairment and suspected dementia in geriatric population and its association with socio-demographic factors in urban slum area of metropolitan city

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ABSTRACT

Background: According to the World Health Organization (WHO) Mental Health Report 2001, by the year 2025, elderly population will make up for more than 20% of the total world population. Literature suggests that the prevalence of dementia in geriatric population is 1% at the age of 60-64 years and it doubles every five years thereafter. Thus prevalence is 30-40% at the age of 85 and above.
Methods: The present study was carried out in Kumbharwada Health Post area in Dharavi slums in Mumbai. The study was community based descriptive study with cross sectional design. The period of study was from January 2005 to June 2006.
Results: It was observed that 25.6% of the respondents were from 60-64 years of age, 28.9% were from 65 to 69 years of age. The distribution of respondents according to the cognitive status as defined by Hindi mental state examination (HMSE) was found as, 77.3% of the respondents have no cognitive impairment. Prevalence of mild cognitive impairment and suspected dementia was 18.6% and 4.1% respectively.
Conclusions: Prevalence of cognitive impairment and suspected dementia was found to be 18.6% and 4.1% respectively. There was no difference in the cognitive status of male and female. More than half of the respondents were from 60-69 years of age. Mean age of the respondents was 68.9 years. Proportion of females in each age group was approximately two-thirds of the total; almost three forth of them were widowed.

Keywords: Cognitive impairment, Dementia, Mental health

INTRODUCTION

One of the main achievements in 20th century has been a considerable increase in the life expectancy of human being. This has resulted into a significant increase in the number and proportion of older people in both developed and developing countries. The phenomenon referred to as 'population ageing'.[1]

According to the World Health Organization (WHO) Mental Health Report 2001, by the year 2025, elderly population will make up for more than 20% of the total world population.[2] Literature suggests that the prevalence of dementia in geriatric population is 1% at the age of 60-64 years and it doubles every five years thereafter. Thus prevalence is 30-40% at the age of 85 and above. Few epidemiological studies done in India showed the prevalence of dementia in the range of 2 % to 4 %. Though these percentages appear to be minimal, the actual number of individuals affected by dementia is very high because of rapidly increasing and ageing population.[3]

Cognitive impairment can be detected as early as 7 years before the diagnosis of dementia. The literature suggests that 63-80% of patients with mild cognitive impairment will have progression to dementia.[4]

As it is very important health problem in elderly the present study has been conducted in urban slum to know the prevalence and their association with sociodemographic profile.

METHODS

Study area: The present study was carried out in Kumbharwada Health Post area in Dharavi slums in Mumbai.

Study type and design: The study was community based descriptive study with cross sectional design.

Study period: The period of study was from January 2005 to June 2006.

Selection of sample: The total population of the area was 62,042.The entire health post area is divided into 8 sections. Out of the 8 sections of the health post, 4 sections were selected randomly by lottery method. Total population of these 4 sections was 29,713. Approximate number of households in this area was calculated as follows.[5]

29,713/5= 5,942.06 ≈ 5,943.

According to WHO Mental Health Report 2001, the percentage of geriatric population in India is 7.7. Applying this percentage to the study population, the estimated geriatric population of study area was calculated as follows.

7.7/ 100×29,713=2,287.

Required sample size was estimated using the following formula:[6]

$n= Z^2 1\text{-}\alpha/2\times p(1–p)/d^2$

(n = required sample size, Z = standard vitiate = 1.96 for alpha error of 5, p = anticipated population proportion = 0.128,[7] d = absolute precision in percentage points = 5% = 0.05, confidence interval = 95%)

Data collection: As the list of geriatric persons in the study area was not available, 'household' was taken as a sampling unit rather than an individual. It was estimated that approximately 488 households would have to be selected to interview geriatric age group. Sample was selected using Systematic random method. Sampling interval was calculated as, 5943/488 = 12.17.

Thus every 12th household was selected. First household was chosen randomly. In case, in a house there was more than one member satisfying inclusion criteria, all of them were included in the study. If there was no person satisfying inclusion criteria in the house, the consecutive house was visited until the respondent satisfying inclusion criteria was identified. If the individual was not present at the time of visiting household, the same household was revisited twice, in the following two consecutive weeks and in case the person was still not found, he was labeled as 'unavailable' for the study and excluded. Data collection was to be continued till the desired sample size was obtained or till the entire area was covered, whichever appeared later.

Data was collected using a semi structured interview schedule, which included identifying data and information about sociodemographic factors and few questions assessing functional activity status of the individual. Second part of the interview schedule was to detect cognitive impairment and/or suspected dementia, using modified version of Mini-mental State Examination (MMSE) called as HMSE-Hindi Mental State Examination which is not affected by educational level. Sensitivity and specificity of HMSE with cutoff point at 23 is found to be 94% and 98% respectively. There are total 22 items in HMSE, covering several areas of cognitive functioning such as orientation to time and place, memory, attention, concentration, recognition of object, language function, motor functioning and praxis. The maximum score is 30. Score of less than or equal to 23 is indicative of cognitive impairment and less than or equal to 17 is indicative of suspected dementia.[8]

Pretesting of the study tool was done by interviewing 30 individuals. Few of the questions were restructured after consultation with Psychiatrists and Neurologists. The subjects detected as having cognitive impairment or suspected dementia was referred to psychiatry OPD of the teaching hospital, with a referral card. A total of 281 persons in geriatric age group were visited out of which 242 persons were interviewed. The remaining was excluded because of the refusal, language barrier and hearing, vision or speech impairment. Data thus collected was compiled and analyzed using software package SPSS (10.0).

Statistical method: To test the significance of results Chi square test, 'Z' test of mean and binary logistic regression were applied. Level of significance was fixed as 5%. Results were represented graphically wherever appropriate.

Operational definitions used in the study were as follows.

Mild cognitive impairment: Individual who scored between 18 to 23 on applying HMSE was labeled as having mild cognitive impairment.

Severe cognitive impairment or suspected dementia: Individual who scored less than 18 on applying HMSE

was labeled as having severe cognitive impairment or suspected dementia.

RESULTS

It was observed that 25.6% of the respondents were from 60-64 years of age, 28.9% were from 65 to 69 years of age. Proportion of respondents above 80 years of age was only 0.1%.Mean age of the respondents was 68.9 years (S.D. 6.73 years) with a minimum age of 60 years and maximum of 90 years. Majority of the respondents (70.2%) were females. Proportion of females in each age group was at least two thirds of the total (Table 1).

Table 1: Age and sex-wise distribution of the respondents.

Age in years	Sex					
	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
60-64	13	21.0	49	79.0	62	100.0
65-69	24	34.3	46	65.7	70	100.0
70-74	19	33.9	37	66.1	56	100.0
75-79	11	37.9	18	62.1	29	100.0
80-84	05	29.4	12	70.6	17	100.0
85 & above	00	00.0	08	100.0	08	100.0
Total	72	29.8	170	70.2	242	100.0

Table 2: Distribution of respondents according to cognitive status.

Cognitive status	Number	Percentage
No cognitive impairment	187	77.3
Mild cognitive impairment	45	18.6
Suspected dementia	10	04.1
Total	242	100.0

The distribution of respondents according to the cognitive status as defined by Hindi mental state examination (HMSE) was found as, 77.3% of the respondents have no cognitive impairment. Prevalence of mild cognitive impairment and suspected dementia was 18.6% and 4.1% respectively. The mean HMSE score for all the respondents was 24.6 (SD=3.2). Minimum score obtained was 11 and maximum was 30. Mean HMSE score of respondents with mild cognitive impairment was 21.5 and that of those with suspected dementia was 14.3. For the further analysis purpose 'mild cognitive impairment' and 'suspected dementia' were considered together (Table 2).

Advancing age was found to be associated with increased prevalence of cognitive impairment. Prevalence of cognitive impairment in the age group of 60 to 64 years was 9.7%, that of in the age group of 80 to 84 years was 41.2% and in 85 years above it was 75%. The difference was statistically significant. Prevalence of suspected dementia also showed an increasing trend with advancing age (Table 3).

Table 3: Association of age with cognitive impairment.

Age groups in years	C.I.					
	Present		Absent		Total	
	No.	%	No.	%	No.	%
60-64	06	09.7	56	90.3	62	100.0
65-69	10	14.3	60	85.7	70	100.0
70-74	17	30.4	39	69.6	56	100.0
75-79	09	31.0	20	69.0	29	100.0
80-84	07	41.2	10	58.8	17	100.0
85 & above	06	75.0	02	25.0	08	100.0
Total	55	22.7	187	77.3	242	100.0

χ^2=27.590, df=5, p<0.05, significant

No statistically significant difference was obtained in the cognitive status of men and women. Percent distribution of suspected dementia was also similar in both sexes (4.2% in males and 4.1% in females) (Table 4).

Table 4: Sex –wise distribution of cognitive impairment.

Sex	C.I.					
	Present		Absent		Total	
	No.	%	No.	%	No.	%
Male	17	23.6	055	76.4	72	100.0
Female	38	22.4	132	77.6	170	100.0
Total	55	22.7	187	77.3	242	100.0

χ^2=0.046, df=1, p >0.05, not significant.

Table 5: Association of marital status with cognitive impairment.

Marital status	C.I.					
	Present		Absent		Total	
	No.	%	No.	%	No.	%
Married	23	21.3	085	78.7	108	100.0
Widowed	32	23.9	102	76.1	134	100.0
Total	55	22.7	187	77.3	242	100.0

χ^2=0.227, df=1, p>0.05, not significant.

It was observed that proportion of cognitive impairment was not significantly different between the married (21.3%) and widowed (23.9%) groups. 3.7% of the married respondents had suspected dementia, as compared to 4.5% of the widowed group (Table 5).

The study showed that out of the 234 individuals living with their families, 22.6% had cognitive impairment of which 4.3% had suspected dementia. The proportion of respondents with no companion was very less as compared to those living with companions. Hence no statistical test was applied. Out of the 8 individuals living alone, 2 had cognitive impairment but none had dementia (Table 6).

Table 6: Association of companionship with cognitive impairment.

Companionship	C.I.		
	Present	Absent	Total
	No. %	No. %	No. %
No companion	02 25.0	006 75.0	008 100.0
Companion	53 22.6	181 77.4	234 100.0
Total	55 22.7	187 77.3	242 100.0

Table 7: Association of educational status with cognitive impairment.

Education	C.I.		
	Present	Absent	Total
	No. %	No. %	No. %
Illiterate	37 25.5	108 74.5	145 100.0
Primary	09 19.6	037 80.4	046 100.0
Secondary	05 13.2	033 86.8	038 100.0
S.S.C. & above	04 30.8	009 69.2	013 100.0
Total	55 22.7	187 77.3	242 100.0

χ^2=1.651, df=2*****, p<0.05, not significant; *****(Considering Secondary, S.S.C. and above together)

The percent distribution of cognitive impairment was higher (25.5%) in illiterate respondents as compared to those who were educated up to primary or secondary level. Respondents who were educated up to primary, secondary and SSC and above showed proportion of cognitive impairment as 19.6%, 13.2% and 30.8% respectively. The difference was not statistically significant between different educational classes (Table 7).

Table 8: Association of financial dependence with cognitive impairment.

Financial dependence	C.I.		
	Present	Absent	Total
	No. %	No. %	No. %
Dependent	49 27.7	128 72.3	177 100.0
Partially dependent	01 12.5	07 87.5	08 100.0
Independent	05 08.8	52 91.2	57 100.0
Total	55 22.7	187 77.3	242 100.0

χ^2=11.96, df=1*; p<0.05, significant; *(partially dependent and independent were considered together)

Respondents who were financially dependent on others showed higher percentage (27.6%) of cognitive impairment as compared to those who were either partially or totally independent (9.2%).The difference was statistically significant. All of the 10 respondents having suspected dementia were financially dependent on others (Table 8).

Out of the 220 respondents who were currently unemployed, 24.5% had cognitive impairment. Of the remaining 22 who were currently employed only one individual had mild cognitive impairment. None of the respondents with suspected dementia was currently employed (Table 9).

Table 9: Association of present employment status with cognitive impairment.

Present employ. status	C.I.		
	Present	Absent	Total
	No. %	No. %	No. %
Employed	01 04.5	021 95.5	022 100.0
Unemployed	54 24.5	166 75.6	220 100.0
Total	55 22.7	187 77.3	242 100.0

As regards the previous occupation of the respondent, the proportion of cognitive impairment was found to be significantly varied from one occupational group to another. The rates were lowest in the home managers (13.1%); comparatively higher in unskilled workers (22.5%) and highest in skilled workers (28.8%).None of the respondents belonged to professional class of occupation. Only one respondent remained unemployed throughout life but was cognitively normal.

Table 10: Association of previous occupation with cognitive impairment.

Previous Occupation	C.I.		
	Present	Absent	Total
	No. %	No. %	No. %
Unemployed	00 00.0	001 100.0	001 100.0
Home-manager	08 13.1	053 86.9	061 100.0
Unskilled	20 22.5	069 77.5	089 100.0
Skilled	27 28.8	064 71.1	091 100.0
Professional	00 00.0	000 00.0	000 000.0
Total	55 22.7	187 77.3	242 100.0

χ^2=5.88, df=2*****, p<0.05, significant *(excluding unemployed and Professional)

Skilled types of occupations mostly consist of jobs which have a fixed age of retirement. Once the person is retired from his job, his activities, both mental as well as physical are likely to be reduced which may affect his cognitive status. On the other hand, unskilled workers are mostly labourers or workers from unorganized sectors. They continue to work till they have ability to work which keeps them engaged in some kind of activity even in the later years of life .This can be correlated with their better cognitive status. Similar thing holds true for the home-managers (Table 10).

Proportion of cognitive impairment in upper-middle class was 33.3%.The percent distribution in upper lower, lower middle and lower classes were 16.2, 23.5, and 19.4 respectively. The difference did not reach statistical significance. None of the respondents belonged to upper economic status. Cases of suspected dementia were not found in the upper middle and upper lower economic status (Table 11).

Table 11: Association of economic status with cognitive impairment.

Economic status	C.I.		
	Present	Absent	Total
	No. %	No. %	No %
Upper middle	05 33.3	010 66.7	015 100.0
Upper lower	11 16.2	057 83.8	068 100.0
Lower middle	25 23.5	081 76.4	106 100.0
Lower lower	07 19.4	029 80.5	036 100.0
Total	48 21.3	177 78.7	225 100.0

χ^2=2.76, df=3, p<0.05, not significant

DISCUSSION

In present study, out of 242 people prevalence of suspected dementia was 4.1%, de Silva et al conducted a study in a semi-urban population in those aged more than or equal to 65 years in Sri Lanka using Sinhalese Mini Mental State Examination.[8] In this study the prevalence rate of suspected dementia was 3.98% (95% confidence interval 2.6% to 5.7%) which was less than present study.

A study conducted in Mumbai using DSM IV criteria showed the prevalence of dementia in people above 65 years of age as 2.44%.[9]

It is a known fact that as the age advances, the sex ratio becomes favorable for the females. Incidence of cognitive impairment as detected by Chandra et al in Ballabgarh, Haryana in subjects above 55 years of age was 18.2% with a mean HMSE score of 26.4 (SD=3.4) at baseline and 26.1 (SD=3.8) at two year follow up.[10]

Various studies have documented that prevalence of dementia approximately doubles every five years after the age of 65 years.[2] Increasing age is an important risk factor for cognitive impairment, But in present study dementia is high among the age group of 70-79 (17%), the reason may be respondent in this group were more.

Even in study conducted by Shaji et al also found that increasing age is associated with increased prevalence of dementia.[7] In this study the prevalence of dementia was 0.32% at the age of 60-64 years which had increased to 16.28% at the age of 85 years and further up to 32.14% at the age of 90 years and above.

In present study dementia prevalence was more in females than males, in a study conducted by Shaji et al[7] in persons aged 60 years and above in a rural community in Kerala the prevalence of dementia was found to be 3.5% in females and 2.8% in males. Further neuropsychological evaluation showed that Alzheimer's disease was more prevalent in women (ratio 1:3) and opposite tendency was seen for vascular dementia (ratio 1:0.9).

In present study, dementia was high among widower (32%) than single; similar findings were seen in, a study conducted by Kristjansson et al to find out the association between marital status and mortality.[11] In this study it was observed that age standardized prevalence of dementia was highest among single people and also high among those who were widowed.

Illiffe et al conducted a study in 239 people aged 75 years and above where they found no significant difference in the measures of cognitive impairment between those living alone and those living with others.[12]

In present study it was shown that, high education level is associate with less percent of cognitive impairment; similarly in a study conducted by Wilson et al it was found that higher educational attainment was associated with higher level of global cognition at baseline but it was also associated with a slightly accelerated rate of cognition decline.[13]

In another study by Godda et al a 5-year longitudinal follow up of MMSE examination was done.[14] It was suggested that high educational level protects against cognitive impairment because the maximum level reached during life is higher.

Cognitive screening instruments including MMSE are affected by the educational level of the respondents. Individuals with higher education tend to score more than those who are illiterate or with lower education (less than 8 standards). But this limitation is overcome with the use of Hindi Mental State Examination (HMSE).[15]

Participation in productive activity fulfills the meaningful social as well as economic role which helps individual to maintain his or her self esteem thus may be maintaining cognitive status. Another view is that a person with intact cognition can only continue with his or her occupation in the old age, thus showing association of occupational status and cognitive status.

Wang et al had classified 'Working for pay' as a productive type of leisure activity. Such activity was found to be protective for dementia.[16] The adjusted relative risk was 0.61.

Dartigues et al reported higher risk of cognitive impairment in farm workers (OR=6.1, Confidence Interval C.I.3.3-11.4), farm manager (OR=2.9, CI 1.6–5.1), domestic service employees (OR=2.8, CI 1.5-5.1), blue collar workers (OR=2.5, CI 1.4-4.4) than the subjects who had an intellectual occupation.[17]

Philip et al conducted a hospital based case –control study where annual income of $ <15000 was found to be associated with increased risk of multi-infarct dementia (OR=8.82, CI 2.31-32.70).[18] But as the study was hospital based, results obtained might be due to the

different health seeking behaviors of individuals in different economic status.

Limitations of the study

1. In absence of family members, the information given by the geriatric person was relied upon irrespective of his cognitive status.
2. Elderly individual with gross vision, hearing or speech difficulties could not be interviewed.
3. All the risk factors of cognitive impairment and dementia could not be studied. For e.g. genetic and nutritional factors.

CONCLUSION

Prevalence of cognitive impairment and suspected dementia was found to be 18.6% and 4.1% respectively. More than half of the respondents were from 60-69 years of age. Mean age of the respondents was 68.9 years. Proportion of females in each age group was approximately two-thirds of the total; almost three forth of them were widowed. Majority (96.7%) of the respondents were staying with their families. More than half of the respondents were illiterate. More or less equal proportions of respondents were involved in unskilled or semiskilled work. Majority of them were currently unemployed (90%) and financially dependent (73%) on others. Nearly half of the respondents were from lower middle economic class. Advancing age was found to be associated with increased prevalence of cognitive impairment. Distribution of cognitive impairment was higher in illiterate respondents (25.5%) as compared to overall literate group (18.5%). Proportion of cognitive impairment was higher in currently unemployed group as compared to employed ones. Significantly higher proportion of cognitive impairment was observed in individuals with skilled type of occupation as compared to unskilled workers and home managers. Financial dependency but not the economic status of the family was found to be associated with the cognitive status. In present study increasing age, illiteracy and poor financial condition were associated with poor cognitive status and dementia.

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REFERENCES

1. Ageing in India. World Health Organization. Geneva. 1999. Available at: http://apps.who.int/iris/bitstream/10665/65965/1/WHO_HSC_AHE_99.2.pdf. Accessed 10 January 2018.
2. World Health Report. Mental Health: New Understanding, New Hope. World Health Organization. Geneva: 2001. Available at: http://www.who.int/whr/2001/en/whr01_en.pdf?ua=1. Accessed 10 January 2018.
3. Kumar Krishna A. Understanding Dementia. India's National Magazine from the publishers of The Hindu. 2003;20(6):15-28.
4. Kevin C, Andrea C, Pettersen R. Dementia: Diagnosis and Evaluation. Mayo Clinical Proceedings. 1995;70:1093-107.
5. Goverment of India. Census India 2011.Ministry of home affairs. Available at: http://www.censusindia.net/t-00-002html. Accessed 10 January 2018.
6. Lwanga SK, Lemeshow S. Sample size determination in health studies. A practical Manual. WHO, Geneva; 1991: 1-10.
7. Shaji S, Promodu K, Abraham T, Roy KJ, Verghese A. An Epidemiological study of dementia in a rural community in Kerala, India. British J Psych. 1996;168:745-9.
8. De Silva HA, Gunatilake SB, Smith AD. Prevalence of dementia in a Semi-urban population of in Sri Lanka: report from a regional survey. Int J Geriatric Psychiatry. 2003;18(80):711-5.
9. Vas CJ, Pinto C, Panikker D, Noronha S, Deshpande N, Kulkarni L, et al. Prevalence of dementia in an urban Indian Population. Int Psychogeriatr. 2001;13(4):389-93.
10. Chandra V, Pandav R, Dodge H, Johnston J, Belle S, Dekosky S, et al. Incidence of Alzheimer's disease in a rural community in India. The Indo-US Study. Neurol. 2001;57:985-9.
11. Kristjansson B, Helliwell B, Forbes WF, Hill GB. Marital status, dementia and institutional residence among elderly Canadians. The Canadian Study of Health and Ageing, Public Health Agency of Canada, 2000;20(4).
12. Illiffe S, Tai SS, Haines A, Gallivan S, Goldenberg E , Booroff A, et al. Are elderly people living alone an 'at risk group'? British J Med. 1992;305(6860):1001-4.
13. Wilson R, Li Y, Aggarwal N, Bomes L, McCann J, Gilley D, et al. Education and the course of cognitive decline in Alzheimer disease. J Neurol. 2004;63:1198-202.
14. Godda J, Fabrigoule C, Commenges D, Dartigues J. A 5 year longitudinal study of the mini mental state examination in normal ageing. Am J Epidemiol. 1997;145:498–506.
15. World Health Day 'Active ageing makes the difference'. .Geneva 1999. Ageing and Health Department. World Health Organization. Available from: who.int/agefriendlyworld/wpcontent/uploads/WHO-Active-Ageing-Framework.pdf. Accessed 10 January 2018.
16. Wang H, Karp A, Winblad B, Fratiglionil L. Late life engagement in social and leisure activities is

associated with increase risk of dementia, A longitudinal study from the Kungsholmen project. Am J Epidemiol. 2002;155:1081–7.
17. Dartigues J, Gagnon M, Lucletenneur, Barberger P, Commenges D, Evaldre M, et al. Principal lifetime occupation and Cognitive Impairment in a French Elderly cohort. Am J Epidemiol. 1992;135:981-8.
18. Philip B, Gorelick, Cotien D, Dollear LP, Forman H. Risk factors for dementia associated with multiple cerebral infarcts. Arch Neurol. 1993;50:714-72.

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