ORIGINAL ARTICLE

A community based study in South India of the association between Common Mental Disorders(CMD) and Cognitive Impairment(CI) in urban elderly.

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Abstract:

Background: Unprecedented aging in India has brought with it a host of difficulties for the elderly, including urbanization, breakdown of the joint family system, economic distress, poor nutrition and significant unpreparedness to manage their increasing needs. This urgent need was addressed through a formal research proposal aimed to study the prevalence of CMD and CI in community living elderly, their associations and sociodemographic correlates. This detailed analysis thus provides a framework to stimulate policy decisions for elder care in the country. Materials and methods: A prospective cross-sectional study was conducted across six old age homes in Chennai, India where 273 community living elderly aged 65 and older were assessed using the Clinical Interview Scale-Revised and the Mini Mental State Examination (Hindi version). Results: Most of the subjects were female (71.1%), had at least ten years of education and were of high socio-economic status; 52% were positive for CMD and 14.28% had CI. There was a statistically significant association between CMD and CI (t=5.115, p=0.000, 95%CI 8.453-19.034). Conclusions: The prevalence of CI is in keeping with the published literature. However, the prevalence of CMD in this population was found to be higher than that published in literature from India and low- and middle-income countries (LAMIC). Older age, female gender, low educational attainment and middle socio-economic status were factors associated with CI. This study validates the extensively reported finding that CMD and CI are important in the public health implications of human ageing that health planners and policy makers need to focus on.

Keywords: *CMD, CI, Community Living Elderly*

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INTRODUCTION

A common mental health disorder, is defined as mental health comorbidities including depression, generalised anxiety disorder (GAD), panic disorder, phobias, social anxiety disorder, obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD) in the community.[1]

Cognitive impairment is when a person has trouble remembering, learning new things, concentrating, or making decisions that affect their everyday life. Cognitive impairment ranges from mild to severe(2-5). With mild impairment, people may begin to notice changes in cognitive functions, but still be able to do their everyday activities. Severe levels of impairment can lead to losing the ability to understand the meaning or importance of something and the ability to talk or write, poor ability to carry out ADL, delusions and hallucinations and progressive inability to live independently. CMD and CI are prevalent among the elderly and contribute to disablement and impaired Quality of Life(QoL). The population living with dementia is expected to double by 2030 (6, 7). CMD are also present in the non-cognitively impaired community living elderly with multiple medical and neurological comorbidities, in those aged 65 and older (8, 9). The justification for this study was the inadequacy of data on the determinants of CMD and CI in community living elderly in India. It is set in Chennai, India with a population of 11.2 million (10).

Materials and Methods We approached 453 community living elders 65 and older, male and female residing in six elder care facilities in and around Chennai. Of the 453, 288 (63.58%) agreed to participate of which 273 (60.26%) met the inclusion criteria and were subsequently recruited. Participants were examined between September 2013 and December 2015 using a consecutive sampling technique. Those without a reliable informant namely those who had not lived with the subject for more than three months, or those with serious medical co-morbidities that precluded their full participation were excluded. The study had due ethical clearance from the Institutional Review Board of Voluntary Health Services (VHS) Hospital. Consenting participants were interviewed at the place they were residing using a two-stage interview design. Demographic characteristics including SE were assessed using the Standard of Living Index (SLI) (11). CMD was assessed using the Clinical Interview Scale-Revised(Cis R) (12) which has been translated and validated in the Indian setting. CI was assessed using the Mini Mental State Examination-Hindi version (13). We present here the demographic indicators of the population studied, the prevalence of CMD and CI, and thereof. Data was processed and analysed using SPSS v20 (IBM SPSS Inc., Chicago, IL, USA).

Participant flow diagram

SLI, the 10/66 Socio-demographic risk factor questionnaire, CiS R(≥11), MMSE-Hindi version(<24)(N=273)

↓

All subjects were then administered the NPI by the psychiatrist(N=273)

↓

All subjects(N=273) underwent a thorough physical examination on the 10/66 Dementia Research Group Physical and Neurological Examination Proforma. Those subjects who screened positive in Phase I(N=148) additionally underwent a comprehensive neuropsychiatric assessment using the same proforma.

Participants were also assessed with multiple other instruments for cognition including the Clinical Dementia Rating Scale(14) and the Addenbrooke's Cognitive Examination translated and validated for use in India(15) that is part of a larger study comparing the above mentioned epidemiological tools. Only the prevalence of CMD and CI, and the associations thereof, will be presented in this paper.

RESULTS

Two hundred seventy-three consenting subjects were assessed, with a mean age of 77.64 ± 7.70. Seventy one percent of our subjects were female of which 54.6% belonged to high SE, 43.58% had at least high school education, 74.7% suffered from at least one medical condition and 52.4% suffered from at least two medical conditions (Figure 1, Table 1).

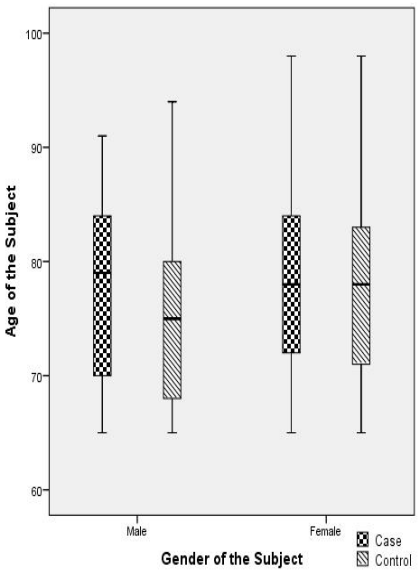

Figure 1: Sociodemographic details of the subjects

Mean (SD)	Cases (N=147)	Controls (N=126)	Chi²/T value
Age (Years)	78.50(7.54)	76.64(7.70)	0.083#
65-70	30	31	
71-75	26	28	
76-80	35	31	
81-85	29	23	
86-90	19	9	
91-95	6	3	
96-100	2	1	
Gender			30.235*
Male	22	57	
Female	125	69	
Education (Years)			28.83*
0-5	45	17	
6-10	44	21	
11-15	43	76	
>16	15	12	
SLI			1.178#
Low (0-14)	8	4	
Middle (15-27)	62	50	
High (28-67)	77	72	

Table 1: Group differences on sociodemographic variables

**-significance at p<0.05 *-2 tailed significance at p<0.01. #-Not significant.

The mean CiS-R score was 14.22±16.24, with a range of 0-76 (Table-2). The cut-off used for caseness(CMD) was 11(12). 52% of those surveyed were found to have a CMD at the time of evaluation. The mean MMSE score was 27.57±4.31, with a range of 9-31 (Table-2). The cut-off used for caseness (CI) was 23(13).14.28% of the community living elderly were cognitively impaired.

Mean (SD)	MMSE			CIS R		
	Cases N=39	Control N=234	Chi²/T value	Cases N=142	Control N=131	Chi²/T value
Age	77.08(7.53)	81.5(7.61)	0.047*	78.41(7.72)	76.82(7.52)	0.505***
65-70	5	56		30	31	
71-75	5	49		26	28	
76-80	11	55		32	34	
81-85	8	44		28	24	
86-90	7	21		17	11	
91-95	1	8		6	3	
96-100	2	1		3	0	
Gender			7.722*			28.81*
Male	4	75		21	58	
Female	35	159		121	73	
SLI			7.102*			0.059*
Low	3	9		7	5	

Mean (SD)	MMSE			CIS R		
	Cases N=39	Control N=234	Chi²/T value	Cases N=142	Control N=131	Chi²/T value
Medium	20	92		59	53	
High	16	133		76	73	
Education#			18.99*			20.25*
0-5	19	43		42	20	
6-10	9	56		41	24	
11-15	9	110		44	75	
>16	2	25		15	12	

Table-2: Group differences in rating instruments

*-Significant at p<0.01, ***-Not significant, # in years.

We compared the means of MMSE and CiS-R caseness using the independent samples t test. We found a significant association between MMSE score & CiS-R caseness indicating that people with CI were more likely to report CMD (Table-3).

Mean (SD)	MMSE			CIS R		
	Cases N=39	Control N=234	Chi²/T value	Cases N=142	Control N=131	Chi²/T value
Medium	20	92		59	53	
High	16	133		76	73	
Education#			18.99*			20.25*
0-5	19	43		42	20	
6-10	9	56		41	24	
11-15	9	110		44	75	
>16	2	25		15	12	

Table-2: Group differences in rating instruments

	T value	Sig. (2-tailed)	95% CI
Total score of CISR	5.115	.000	8.453 - 19.034
	4.878	.000	8.084 - 19.403

Table-3: MMSE and Cis-R

A one-way ANOVA was conducted to compare the effect of SE (as measured by the Standard of Living Index) and educational status on CMD and CI (Table-4).

		df	Mean Square	F	Sig
SLI and Mini Mental Sate Examination-Hindi version	Between groups(Combined) Within groups(Combined) Total	2 270 272	126.466 17.807	7.102	.001
Educational status and CiS R	Between groups(Combined) Within groups(Combined) Total	3 269 272	1499.927 249.922	6.002	001
Educational status and MMSE	Between groups(Combined) Within groups(Combined) Total	3 269 272	258.001 15.936	16.190	0.000

Table-4: Analysis of Variance-Between groups

SLI was significantly associated with CI [F (2,270) =7.102, p=0.001]. Post hoc comparisons using the Tukey HSD test revealed that the differences in the mean score for middle SE (M=26.72, SD=4.65, p=0.005) were significantly different from low SE at p<0.05 level (M=25.17, SD=4.97, p=0.03) (Table 5) indicating that the risks of developing CI were significantly greater for those from middle SE as compared to low SE. There was no significant association between SLI and CMD in our sample [F (2,270) =0.059, p=0.943].

Sociodemographic status				Mean Difference	Sig.	95% CI
MMSE	Tukey HSD	0-14	15-27 28-67	-1.557 -3.236*	.446 .030	-4.578 - 1.464 -6.220 - -.252
		15-27	0-14 28-67	1.557 -1.679*	.446 .005	-1.464 - 4.578 -2.923 - -0.436
		28-67	0-14 15-27	3.236* 1.679*	.030 .005	.251 - 6.220 .436 - 2 923

Table-5: Analysis of Variance-Within groups (SE)

Educational status was also significantly associated with both CMD [F (3,272) =6.002, p=0.001] and CI [F (3,272) =16.190, p=0.000]. Post hoc comparisons using the Tukey HSD test revealed that the differences in the mean score for CI for no formal/minimal educational status (0-5 years) [M=3.1, SD=0.71, p=0.000] were significantly different from those with at least six years of education at p<0.05[M=4.2, SD=0.63, p=0.000] (Table 6). Similarly, post hoc comparisons using the Tukey HSD test revealed that the differences in the mean score for CMD for no formal/minimal educational status (0-5 years) [M=10.026, SD=2.476, p=0.000] were significant at p<0.05 as compared to those with at least six years of education.

Educational Status				Mean Difference	Sig.	95% CI
CiS R	Tukey HSD	0-5	6-10	4.125	.457	-3.13 - 11.38
			11-15	10.026*	.000	3.63 - 16.43
		6-10	>16	8.075	.122	-1.35 - 17.50
			0-5	-4.125	.457	-11.38 - 3.13
		11-15	11-15	5.902	.076	-.40 - 12.20
			>16	3.950	.695	-5.41 - 13.31
		>16	0-5	-10.026*	.000	-16.43 - -3.63
			6-10	-5.902	.076	-12.20 - 0.40
			>16	-1.952	.938	-10.66 - 6.76
			0-5	-8.075	.122	-17.50 - 1.35
			6-10	-3.950	.695	-13.31 - 5.41
			11-15	1.952	.938	-6.76 -10.66

Educational Status				Mean Difference	Sig.	95% CI
MMSE	Tukey HSD	0-5	6-10	-3.097*	.000	-4.928 - -1.264
			11-15	-4.193*	.000	-5.809 - -2.576
			>16	-4.308*	.000	-6.688 - -1.929
		6-10	0-5	3.097*	.000	1.264 - 4.928
			11-15	-1.097	.285	-2.688 - -.496
			>16	-1.212	.547	-3.575 - 1.151
		11-15	0-5	4.193*	.000	2.577 - 5.809
			6-10	1.097	.285	-.496 - 2.688
			>16	-.116	.999	-2.316 - 2.084
		>16	0-5	4.308*	.000	1.929 - 6.688
			6-10	1.212	.547	-1.151 - 3.575
			11-15	.116	.999	-2.084 - 2.316

*. The mean difference is significant at the 0.05 level.

Table-6: Analysis of Variance-Within groups (Educational status)

Discussion

This study of CI and mental health in community living elderly is contemporary and coming as it does in a time and from a region of rapid urbanisation and demographic transition. Though a decade might not be significant in terms of time frames, significant trends in population aging and the predictions thereof strongly suggest the contrary (16-22).

The presence of CMD was associated with CI as evidenced by literature from the developed countries (8, 9, 23-25). The presence of a CMD in over half of all the elderly surveyed is a matter of urgent public health concern. The results of this study are in line with global research that suggests a considerable burden of CMD among the elderly (12, 26-28). Our findings on the prevalence of CI on the MMSE (14.28%) is in keeping with established evidence from India (3.4%-16.91%)(29-34). Our data suggest a significant direct association between CMD and CI using the CiS-R in this community living population (Table 3) which is in line with published literature.

Prevalence of CMD (52%) on the Cis R was found to be higher than prevalence rates reported from Indian studies thus far using Cis-R (33.3% to 46.5%) in those living in the community (12, 26, 27) and an epidemiological survey from Chile (28). It is noteworthy that these studies were not elderly specific. While our findings could potentially be explained by having assessed those living in old age homes (selection bias), we were unable to find any study from India that examined psychological morbidity in community living elderly using the CiS-R, an instrument that has been widely used in mental health epidemiology including the National Psychiatric Morbidity Surveys of Great Britain (35). The CiS-R (36) has also been translated and validated in Indian settings(12).

Our participants were aged 65 and older, in line with large scale epidemiological surveys from the developed world (8, 9, 23, 24, 37, 38). Increased years of formal education (at least 10 years on an average) and higher socio-economic status were found, both figures in variance with published studies from India and other LAMIC countries (16, 17, 19, 39-45) excepting for Ferri C et al. 2004 where consenting subjects had at least ten formal years of education (19). A single comparable study from India did not find a significant association between education and CI (46).

No clear positive association was demonstrated between low SE and CI in literature from developed countries (47). In contrast, a significant relationship between poverty, CMD and CI has been demonstrated in literature from the LAMI countries (12, 16, 17, 26, 31, 33, 34, 40, 44, 45, 47-53). CMD are more prevalent in people with low socio-economic status in India (26).

In this study, while CMD was not significantly associated with the SLI, CI was. People from middle socio-economic status were more likely to be cognitively impaired, when compared with those from lower socio-economic status. This too may be an effect of demographic transition in India with the diet and lifestyles of those belonging to the middle class being more likely to put them at risk for lifestyle diseases and dementia thereof (4, 54-56). This may of course be slightly at odds with understanding of the relationship between dietary practices and lifestyle diseases in the western world (57, 58).

We had approached old age homes that ranged from those for destitute homes to affluent senior citizen homes with hired caregivers for the elderly and believe our selection of sites was representative overall. However, as just under 65% of those approached participated (two-thirds), there could have been a responder bias inadvertently introduced. Another factor worthy of consideration is demographic transition in urban India, people moving up the social ladder with industrialisation and urbanisation and the current generation of the elderly having had more years of education than the elderly surveyed a decade earlier. Thus, while our data may reflect bias, they may equally represent the emerging reality of urban India(1, 4).

Interestingly, our findings are in keeping with epidemiological surveys from Malaysia (59) and Singapore (60). This too is in line with countries in South-East Asia having undergone rapid demographic transition two decades to three decades earlier than India (43, 61-66).

The socio demographic correlates of our study influencing CMD and CI and are in general, in line with established literature, namely older age, female gender, educational status, SE for CI and female gender, lower educational attainment for CMD, excepting for SE for CMD (33, 34, 67-72). That almost one-fifth of the elderly surveyed were cognitively impaired is also a matter of considerable public health concern (29-34). This finding is in line with international and Indian research on Mild Cognitive Impairment and Dementia.

In summary our study validates the widely held assumption that CMD and CI are important public health correlates of human aging that health planners/policy makers must focus on. Large scale, adequately powered studies that are sensitive to the impact of demographic transition on the elderly are therefore urgently required.

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Nil

CONFLICT OF INTEREST

Nil

AUTHOR'S CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors have read and approved the final manuscript.

CONSENT

As per the ICMR guidelines, the informed written consent has been obtained and preserved by the corresponding author.

ETHICAL APPROVAL

As per the National standards, the ethical approval letter/ certificate from local IEC has been obtained and preserved by the authors.

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