



DEMENTIA AND ITS ASSOCIATED FACTORS AMONG THE ELDERLY IN KERALA: A FACILITY BASED CASE CONTROL STUDY

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ABSTRACT **BACKGROUND:** Dementia is construed as a normal part of ageing and is being neglected at the primary level of health care. Objective : To study the risk factors of Dementia in elder population in Kerala

MATERIALS AND METHODS: The present study was conducted among the out patients attending Geriatrics department of Amrita Institute of Medical Sciences, Kochi. Cases of Dementia were identified by screening the patients using Mini Mental Status Examination (MMSE) questionnaire which has a sensitivity of 76% and specificity of 94%.¹²⁾ MMSE cut off score as 23 out of 30 was taken.. The screened patients were clinically diagnosed by a Neurologist before including in the study. The comparative group was selected adjusting to age and gender [+5 years]. A semi-structured questionnaire was used to collect data from the informant preferably spouse.

RESULTS : 48% of the respondents belonged to the age group of 65-74. Majority (55.7%) were females. 2.9% were illiterates. Multivariate analysis was done to create a model for predicting the risk factors of Dementia. Living alone was found to be strongly associated (aOR18.95(95% CI 3.49-102.74)) independent factor of Dementia among elderly.

CONCLUSION: This is a facility based case control study of elderly population. Our study was contented with strong evidence on the predictive factors of Dementia. These findings may be used for selecting individuals for dementia screening programs

KEYWORDS : Elderly, dementia, risk factor

Earlier Dementia was described as simply "mental weakness"⁽¹⁾ Dementia is a syndrome that affects memory, thinking, behavior and ability to perform daily activities.² It is typically irreversible and is most commonly seen among geriatric age group.⁽³⁾ It is anticipated that the dementia load will triple by 2050 (>71%) particularly in low and middle income countries as a result of the aging of the population, demographic shifts, and lack of disease-modifying treatments, with an associated cost exceeding \$1.1 trillion.^(4,5) About 47 million people live with Dementia in the world. WHO states that the rate of Dementia doubles every 20 years and will result in 4.1% of overall Disability Adjusted Life Years (DALY).⁽⁶⁾

There is robust evidence on the predictive risk factors which play major role in clinical expression of Dementia and those lifelong factors which enhance premorbid cognitive ability and enhance cognitive reserve.^(7,8) There are limited epidemiological studies conducted on the burden of Dementia and its associated factors. The major factors contributing to the onset of Dementia are advancing age, illiteracy, addiction, hypertension, diabetes, poor socio-economic status, trauma, familial or genetic factors, nutritional factors and stroke⁽⁹⁾

Dementia is construed as a normal part of ageing and is being neglected at the primary level of health care. The specialties of old age psychiatry or geriatric medicine are poorly established in India.⁽¹⁰⁾ Even though the countries majority of the old age homes are clustered in Kerala and Tamil Nadu, the objective of dementia care is seldom reflected.⁽¹¹⁾ Thus knowledge on the risk factors prevalent among Indian population leading to Dementia is required for refining screening and prevention activities in our country.

METHODOLOGY

Amrita Institute of Medical Science is a 1450 bedded super specialty tertiary care centre in Kochi, Kerala. It provides care to patients coming mainly from the southern part of Kerala. The department of Geriatrics is a specialty department catering services to person above 65 years of age. The present study was conducted among the out patients attending Geriatric OPD.

Cases of Dementia were identified by screening the patients by using a validated Mini Mental Status Examination (MMSE) questionnaire which has a sensitivity of up to 76% and specificity of up to 94%.⁽¹²⁾

MMSE cut off score as 23 out of 30 was taken for diagnosing by a Neurologist. The screened patients were clinically diagnosed by a Neurologist before including in the study. The comparative group was selected adjusting to age and gender [+5 years]. A total of 219 patients including 85 cases aged more than 65 years were selected for the study. This study was conducted between, July 2016 to May 2018. Patients, who are not a resident of Kerala and was aged less than 65 was not included in this study.

A semi-structured questionnaire was used to collect data from the informant. The informant was preferably the spouse. After obtaining informed consent, the validated questionnaire was administered which covered components such as socio-demographic characteristics, physical activity, use of tobacco and alcohol, Geriatric Depression Scale, morbidity profile, diet history, hearing loss and history of Dementia among family members and spouse. Approximate duration since the onset of Dementia was estimated for measuring the exposure of risk factors.

The group comparisons were made using the chi-squared test. Fisher's exact test was used to find out the statistical significance whenever the expected frequency was less than 5. Odds ratios were used to find out the relative risk of various risk factors pertaining to Dementia and 95% confidence intervals were determined. Analysis was done using Statistical Package for Social Sciences version 18. This study was approved by the Institutional Ethics Committee.

RESULTS :

Socio-demographic factors like age, sex, education level and past occupation were analyzed and its shown in table 1. 48% of the respondents belonged to the age group of 65-74. Majority (55.7%) of our study population was females and only 2.9% were illiterates. Table.1 shows the socio demographic characteristics.

Table 1. Socio-demographic Characteristics Of The Study Population In Table 1

Sl. No	Variable	Dementia (n=85)	Non Dementia (n=134)
1	Age		
	65-74	34 (40.0%)	72 (53.7%)

	75-84	37 (43.5%)	51 (38.1%)
	>=85	14 (16.5%)	11 (8.2%)
2	Sex		
	Male	34 (40.0%)	63 (47.0%)
	Female	51 (60.0%)	71 (53.0%)
3	Educational level		
	Degree & above	16 (18.8%)	38 (28.4%)
	Diploma/predegree	06 (07.1%)	08 (06.0%)
	1-10	58 (68.2%)	87 (64.9%)
	Illiterate	05 (05.9%)	01 (0.70%)
4	Past Occupation		
	Business	03 (03.5%)	07 (5.2%)
	Clerk	03 (03.5%)	11 (8.2%)
	Professional	25 (29.4%)	31 (23.1%)
	Homemaker	27 (31.8%)	48 (35.8%)
	Skilled	21 (24.7%)	30 (22.4%)
	Unskilled	05 (05.9%)	07 (05.2%)
	Unemployed	01 (01.2%)	0 (0.00%)

Table 2. Univariate Analysis Of Exposure To Risk Factors Prior To The Onset Of Dementia

Sl No	Variables	Case	Control	OR (95% CI)	p value	
1	Age	34 (32.1%)	72 (67.9%)	1	0.15	
	65-74	37 (42.0%)	51 (58.0%)	1.54 (0.85-2.76)	0.02	
	75-84	14 (56.0%)	11 (44.0%)	2.70 (1.11-6.55)		
	≥85					
Sex	34 (35.1%)	63 (64.9%)	1	0.30		
2	Male	51 (41.8%)	71 (58.2%)	1.33 (0.76-2.30)	0.15	
	Female					
	Education	05 (83.3%)	01 (16.7%)	6.66 (0.60-73.03)		0.84
	Illiterates	58 (40.0%)	87 (60.0%)	0.88 (0.29-2.70)		
1-10	06 (42.9%)	08 (57.1%)	0.56 (0.16-1.88)			
Pre-degree/Diploma ≥Degree	16 (29.6%)	38 (70.4%)				
4	Physical activity of occupation	09 (19.6%)	37 (80.4%)	0.71 (0.26-1.92)	0.61	
	Mainly sitting	60 (50.8%)	58 (49.2%)	3.01 (1.39-6.52)	0.30	
	Sitting or standing	11 (25.6%)	32 (74.4%)	2.07 (0.55-7.09)		
	Walking	05 (41.7%)	07 (58.3%)			
Heavy manual work						
5	Physical activity of occupation	16 (29.1%)	39 (70.9%)	0.57 (0.30-1.10)	0.087	
	Physically Active	69 (42.1%)	95 (57.9%)			
	Sedentary					
6	Occupation involving the use of Maths	12 (21.1%)	45 (78.9%)	0.32 (0.16-0.66)	0.001	
	Yes	73 (45.1%)	89 (54.9%)			
7	Marital status	46 (34.6%)	87 (65.4%)	0.63 (0.37-1.11)	0.11	
	Staying with spouse	39 (45.3%)	47 (54.7%)			
8	Living alone	02 (05.6%)	34 (94.4%)	0.07 (0.01-0.30)	<0.0001	
	Yes	83 (45.4%)	100 (54.6%)			
9	Tobacco	13 (33.3%)	26 (66.7%)	0.75(0.36-1.56)	0.43	
	Yes	72 (40.0%)	108(60.0%)			
9	Smokeless tobacco	11 (57.9%)	08 (42.1%)	2.34 (0.90-6.08)	0.07	
	Yes	74 (37.0%)	126(63.0%)			

10	Alcohol	13 (35.1%)	24 (64.9%)	0.83 (0.40-1.73)	0.61		
	Yes	72 (39.6%)	110(60.4%)				
11	Depression (present)	40 (30.3%)	92 (69.7%)	0.41 (0.23-0.71)	0.001		
	Yes	45 (51.7%)	42 (48.3%)				
12	Morbidity profile	38 (29.7%)	90 (70.3%)	0.39 (0.23-0.69)	0.001		
	Hypertension	35 (38.0%)	57 (62.0%)	0.94 (0.54-1.64)			
	Diabetes mellitus	20 (26.3%)	56 (73.7%)	0.43 (0.23-0.78)			
	Dyslipidemia	14 (19.2%)	59 (80.8%)	0.25 (0.13-0.48)			
	Visual impairment	09 (36.0%)	16 (64.0%)	0.87 (0.36-2.07)			
	Thyroid disorders	07 (22.6%)	24 (77.4%)	0.41 (0.17-1.00)			
	COPD/BA	10 (35.7%)	18 (64.3%)	0.86 (0.37-1.96)			
	CAD/CVA	07 (25.0%)	21 (75.0%)	0.48 (0.20-1.19)			
	Psychiatric illness	02 (25.0%)	06 (75.0%)	0.51 (0.10-2.60)			
	Cancer						
	13	Type of Diet	19 (30.6%)	43 (69.4%)		1	0.12
		Veg	66 (42.0%)	91 (58.0%)		1.64 (0.88-3.10)	
	14	Fruit consumption					<0.001
		<5 days	66 (46.8%)	75 (53.2%)		2.73 (1.48-5.04)	
≥5 days		19 (24.4%)	59 (75.6%)	1			
Vegetable consumption							
15	≤5 days	03 (37.5.0%)	05 (62.5%)	0.94 (0.22-4.05)	0.94		
	>5 days	82 (38.9%)	129 (61.1%)				
14	Hearing loss	22 (29.3%)	53 (70.7%)	0.53 (0.30-0.97)	0.04		
	Yes	63 (43.8%)	83 (56.3%)				
15	Spouse Dementia	04 (36.4%)	07 (63.6%)	0.89 (0.25-3.16)	0.86		
	Present	81 (38.9%)	127 (61.1%)				
16	Family history of Dementia	15 (57.7%)	11 (42.3%)	2.4 (1.04-5.50)	0.03		
	Present	70 (36.3%)	123 (63.7%)				

On univariate analysis of the risk factors of Dementia, age, physical activity, occupation involving maths, living alone, depression, hypertension, dyslipidemia, visual impairment, COPD/BA, fruit consumption, hearing loss and family history of Dementia were found to be significantly associated with Dementia with a p value of <0.05.

Table 3. Multivariate analysis for independent risk factors of Dementia

Multivariate analysis was done using backward logistic regression method to find out the independent predictors of Dementia. The significant predictors are shown in table 3.

DISCUSSION:

There are very few studies on Dementia conducted in Indian settings. Though a facility based study, this case control study provides stronger evidence on Dementia and its associated risk factors in an elderly population in Kerala. It is pertinent to note that the predictive risk factors in our study are all modifiable risk factors except for the genetic predisposition.

Living alone is mostly due to ostracism perceived by elderly in the community. This will lead to reduced quality of life and was observed as a risk factor by Feildman et al.⁽¹³⁾ Studies conducted in Germany and

Japan also showed comparable findings.^(14,15) Instrumental activities of Daily Living were significantly reduced among demented patients living alone in a study conducted by Lehmann et al.⁽¹⁶⁾ The Amsterdam Study of the Elderly found that feeling of loneliness was associated with cognitive impairment.⁽¹⁷⁾ A comparative study on Dementia conducted by us among 50 patients and 50 non Dementia patients found living alone as not a risk factor. This variation of result may be attributable to the weaker comparison group.⁽¹⁸⁾

History of Dementia in family was the only non-modifiable predictive factor in our study. Similarly, study conducted among Dutch patients produced strong evidence of familial aggression for Dementia (Alzheimer's disease).⁽¹⁹⁾ Furthermore findings in a study conducted among young olds in Los Angeles were also in agreement with our finding.⁽²⁰⁾ Several other studies conducted in different parts of the world established association of family history with subtypes of Dementia.^(21,22) Paulson et al has detailed about genetic factors associated with various types of Dementia.⁽²³⁾

Hypertension disrupts the structure and function of cerebral blood vessels leading to ischemic damage of the white matter regions critical for cognitive functions. American Heart Association stated that there is strong association of midlife hypertension on late life cognitive decline but the effect of antihypertensive treatment on cognition is less clear.⁽³⁾ Where as a cohort study conducted in Scotland showed hypertension had no association with Dementia. This is probably due to the protective effect of antihypertensives or due to the paradoxical effect of death of individuals due to hypertension related conditions before they had cognitive impairment.⁽²⁴⁾ Also a prospective study conducted in California showed that the onset of hypertension in old age has protective effect against Dementia.⁽²⁵⁾

Our study provides evidence that visual impairment is a predictive factor of Dementia. Endorsing that a prospective study on retired individuals in US showed 63% reduced risk of developing Dementia among those with good vision.⁽²⁶⁾ In a Longitudinal study of Aging conducted in Australia, visual acuity and hearing significantly affected cognitive decline.⁽²⁷⁾ In the Baltimore Longitudinal study of Ageing, performance of the Benton Visual Retention test was a significantly associated predictive test of Alzheimer's diseases up to 15 years after testing.⁽²⁸⁾

Study conducted by Christie et al observed that there is a significant association with hearing impairment and decline in cognitive impairment.⁽²⁹⁾ A study conducted in Taiwan showed evidence of relation of age related hearing impairment and Dementia [HR 1.30; (95%CI 1.14–1.49)].⁽³⁰⁾ Similarly a Meta-analysis conducted by Zheng et al showed an association [RR2.82 (95% CI 1.47–5.42; $p = 0.002$)]. Whereas, Wayne et al described that the hearing and cognition relay shared neurocognitive resources and relate to each other in several different ways.⁽³¹⁾

CONCLUSION:

This study was a facility based case control study among the elderly population. Our study was contented with strong evidence on the predictive factors of Dementia such as living alone, staying with spouse, having family history of Dementia, being a Hypertensive, having impaired vision and impaired hearing. Screening adults fitting into the above risk factors will be a paramount measure for taking preventive actions and life style modifications.

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