

Research Article**To Study the Relationship of Socioeconomic Status, Hypertension and the Severity of Dementia in Elderly People**Nelofar Sultana¹, Khalida Sumroo², Rukhshan Khudshid³, Masood A. Quraishi¹, Fatima Shad K.⁴¹Department of Physiology, Dow University of Health Sciences, Karachi, Pakistan.²Department of Cardiology, DOW University of Health Sciences, Karachi, Pakistan.³Department of Biochemistry, Fatima Jinnah Medical College, Lahore, Pakistan.⁴PAP RSIB Institute of Health Sciences, University of Brunei, Darussalam.**Corresponding author**

Prof. Nelofar Sultana

Email: meraghar@gmail.com

Abstract: Dementia is a syndrome described by impairment in memory, thinking such as the ability to organize thoughts and reason, the ability to use language etc. These impairments are related to vascular and non vascular factors and are severe enough to cause a decline in the patient's usual level of functioning. Study was designed to find out the relationship of socioeconomic status, hypertension and the severity of dementia in elderly people. 100 Subjects participated in study. Their detailed autobiographical interview and completed questionnaires including socio-demographic data was taken. The cognitive status was judged by using the Mini-Mental State Examination. Both systolic and diastolic blood pressure was recorded by sphygmomanometer. Socioeconomic status was assessed based on the lifetime longest occupation that the subject had held. Our study observed that pre hypertensive individuals with low socioeconomic status were at high risk of developing severe form of dementia as compare to the patients with stage 1 hypertension. Severity of dementia in both pre hypertensive patients and in stage 1 hypertensive patients with middle socioeconomic group was quite similar. It is observed that 50% of pre hypertensive having high socioeconomic status showed mild form of dementia, 50% patients with stage 1 hypertension with high status showed moderate form of dementia and 50 % with stage2 hypertension of high status showed severe form of dementia. Chi square value showed a significant positive relationship of severity of dementia with the stage of pre hypertension, stage 1 & 2hypertension. It is concluded that severity of dementia and hypertension are both associated with all socioeconomic classes.

Keywords: Dementia, hypertension, socioeconomic status.

INTRODUCTION

Dementia is characterized by deterioration in cognition, function and behavior. It may be latent, due to brain damage, or it may be gradual due to some pathology in the body [1, 2]. Dementia is a syndrome described by impairment in memory, impairment in another area of thinking such as the ability to organize thoughts and reason, the ability to use language etc. These impairments are severe enough to cause a decline in the patient's usual level of functioning. Alzheimer disease (AD) is the most ordinary cause of dementia [1, 3].

Among populations aged ≥ 60 years of North America and Western Europe revealed the highest prevalence of dementia (6.4% and 5.4%, respectively), followed by those from Latin America (4.9%) and China and its western-Pacific neighbors (4.0%) [4, 5]. Statistics showed that incidence of dementia is 4.1% in Pakistan at present. People who are mostly affected are those who live in joint family system and they face problem beyond their limits [6].

Both vascular and non vascular or environmental factors including age, BMI, education and

socioeconomic status (SES) may be the possible risk factors for the development of dementia. Socioeconomic status was based on the husband's occupation for married women and own occupation for unmarried women, and was termed as low, medium or high. Low SES shown to be associated with a higher prevalence of dementia, increased psychiatric co morbidity and worse baseline cognitive functioning [7]. Persons associated with higher socioeconomic status may be exposed to fewer toxins and enjoy a generally healthier lifestyle that may spare the brain from lesions contributing to dementing disorders [8].

Additionally high SES reduced the risk of Mild cognitive impairment (MCI) and AD by increasing cognitive reserve [9]. The socioeconomic status of societies also influences the incidence and duration of mental illnesses by influencing life expectancy and availability of appropriate healthcare services and treatments [10].

Hypertension was defined as systolic blood pressure ≥ 160 mmHg and/or diastolic blood pressure ≥ 95 mmHg. Blood pressure in later life tends to be lower in association with dementia [11]. Therefore hypertension appears to exerts it effect at any early stage in cognitive

decline and the association may no longer be apparent by the time cognitive function be deteriorated and be classified as dementia [12, 13]. It is stated that etiology of cognitive decline and dementia include socioeconomic status in both early and late life factors while hypertension is considered as midlife factor. On the other hand late life pathological factors are small and large vessel disease, amyloid deposition and tau protein phosphorylation [13].

Pakistan is considered as a middle-income country. There is scarcity of data regarding the prevalence of dementia in Pakistan. In addition, the effects of potential confounders, such as cognitive functioning prior to dementia, vascular diseases, and socioeconomic status, have been largely neglected by most previous studies addressing this issue. At present, disease-modifying drugs are not available and symptomatic medications have been found to have only modest benefit. Primary prevention of dementia is therefore of great importance.

Present study was tried to investigate the relationship of socioeconomic status, hypertension and the severity of dementia in elderly people.

MATERIALS AND MEHODS

100 Subjects participated in a thorough psycho geriatric examination and neuropsychological testing.

Moreover, they took part in a detailed autobiographical interview and completed questionnaires including socio-demographic data. The cognitive status was judged by using the Mini-Mental State Examination (MMSE), which was used to characterize the severity of cognitive impairment with a maximal score of 30. Subtests representing 5 different domains of cognition were analyzed; orientation, memory, attention and calculation, language and copying design. Any score over 27 (out of 30) was considered normal. Scores between 20 and 26 indicates some cognitive impairment; 10-19 moderate to severe cognitive impairment, and below 10 very severe cognitive impairment. Both systolic and diastolic blood pressure was recorded by sphygmomanometer in seated position. Hypertension was defined as systolic blood pressure ≥ 160 mmHg and/or diastolic blood pressure ≥ 95 mmHg. Socioeconomic status was assessed based on the lifetime longest occupation that the subject had held.

Statistical Analysis

Data were recorded and analyzed with the SPSS 15, a statistical software package (SPSS, Inc., USA). Variables including severity of dementia and stages of hypertension were described in terms of percentages. Statically analysis was performed by chi-square test for independence between variables.

Table 1: Severity of dementia, hypertension in percentages of patients with poor socioeconomic status

Dementia Index	Pre hypertension	Stage 1 (Hypertension)
Mild (+)	16%	33%
Moderate (++)	17%	22%
Severe (+++)	67%	44%

Table 2: Severity of dementia, hypertension in percentages of patients with middle socioeconomic status

Dementia Index	Pre hypertension	Stage 1 (Hypertension)	Stage 2 (Hypertension)
Mild (+)	35%	35%	25%
Moderate (++)	29%	30%	13%
Severe (+++)	35%	35%	50%
More severe (++++)	0%	0%	13%

Table 3: Severity of dementia, hypertension in percentages of patients with higher socioeconomic status

Dementia Index	Pre hypertension	Stage 1 (Hypertension)	Stage 2 (Hypertension)
Mild (+)	50%	33%	0%
Moderate (++)	25%	50%	50%
Severe (+++)	25%	17%	50%

RESULTS

Severity of dementia, hypertension with poor socioeconomic status was noted (Table 1). It is observed that mild form of dementia is observed in 16% pre hypertensive patients with poor socioeconomic group. Among this group the moderate form of

dementia was observed in 17% of patients and severe form is observed in 67% of patients. In case of patients with stage 1 hypertension 33% patients have mild form of dementia, 22% with moderate form and 44% of patients with severe form dementia was observed. Chi square value= 44.26 P<0.001 showed a positive

relationship of severity of dementia with the stage of pre hypertension and stage 1 hypertension.

Table 2 showed mild form of dementia is observed 35% pre hypertensive patients with middle socioeconomic group, 29% showed moderate form of dementia and 35% showed severe form of dementia. With stage 1 hypertension 35% patients showed mild form of dementia, 30% patients showed moderate form of dementia and 35% showed severe form of dementia. 25% of patients with stage 2 hypertension have mild form of dementia, 13% have moderate form of dementia and 50% have severe form of dementia. 13% patients of this group showed more severe form of dementia. Chi square value= 61.9 $P < 0.001$ showed a positive relationship of severity of dementia with the stage of pre hypertension and stage 1 & 2 hypertension.

Table 3 showed that mild form of dementia is observed 50% pre hypertensive patients with higher socioeconomic group. Among this group the moderate form of dementia was observed in 25% of patients and severe form is observed in 25% of patients. 33% Patients with stage 1 hypertension have mild form of dementia, 50% have moderate form of dementia and 17% showed severe form of dementia. No patients with stage 2 hypertension showed mild form of dementia. However 50% of patients showed moderate form of dementia and 50% of patients showed severe form of dementia. Chi square value= 13.0 $P < 0.001$ showed a positive relationship of severity of dementia with the stage of pre hypertension, stage 1 & 2 hypertension.

DISCUSSION

Dementia is a progressive neurodegenerative disease which can affect persons regardless of geographical or socio-economic status. With the range of etiological conditions, it is often superimposed on other medical conditions making demented persons susceptible to a host of pathological and psychological changes which result in severe impairments in functioning. In a developing country, the presentation of dementia patients to psychiatric services is often delayed as in older age if an individual is demented and hypertensive, did not seek medical help attributing his forgetfulness to normal aging until he meets with an accident [14].

Our study observed that pre hypertensive individuals with low socioeconomic status were at high risk of developing severe form of dementia as compare to the patients with stage 1 hypertension. Chi square value showed a significant positive relationship of severity of dementia with both stages of hypertension. Numbers of studies are in accord with our study. A study stated that SES was strongly related to cognitive function [15]. Another study reported that low socioeconomic status is a risk factor for cardiovascular disease and early death [16]. Study of a group of workers stated that low SES at 20 years of age, even when SES was high at age 40 or

60 years, was associated with increased risk dementia [17].

Severity of dementia in both pre hypertensive patients and in stage 1 hypertensive patients with middle socioeconomic group was quite similar. On the other hand 50% patients with stage 2 hypertension showed severe form of dementia. In some patients of the same group showed more severe form of dementia. Chi square value showed a significantly positive relationship of severity of dementia with the stage of pre hypertension and stage 1 & 2 hypertension. A Pakistani study stated that socioeconomic status play an important role in developing dementia especially with co morbidities like hypertension and diabetes. Study observed 18.4% of patients belong to middle socioeconomic class was hypertensive [18]. Another study suggested that if patients have middle socioeconomic class in his first decade of life. These patients have more chances of developing dementia later in life as compared to the patients with high socioeconomic status. Their study stated that decrease in dementia risk may be due to schooling, according to the cerebral reserve hypothesis, or to other factors associated with a higher educational level during childhood [19].

We observed that 50% of pre hypertensive with high socioeconomic status showed mild form of dementia, 50% patients with stage 1 hypertension with high SES showed moderate form of dementia and 50 % with stage 2 hypertension of high status showed severe form of dementia.

Chi square value showed a significant positive relationship of severity of dementia with the stage of pre hypertension, stage 1 & 2 hypertension.

Our study is in accord with number of studies who stated patients with higher socioeconomic status are usually educated spent healthy lifestyle and potentially less exposure to environmental toxins, all of which may protect against the development of brain disease and consequent dementia [20]. There is also less vascular changes in people of higher socioeconomic status [21]. We may correlate our results with a study of a group of workers who stated that a strong association between age, individual annual income range, education, medical co morbidity and a diagnosis of dementia [7].

CONCLUSION

It is concluded that severity of dementia and hypertension are both associated with all socioeconomic classes.

REFERENCES

1. Ganz M; Genetics, Dementia, and the Elderly. Current Directions in Psychological Science, 2007; 16(3): 123-127.

2. Pendlebury ST, Rothwell PM; Prevalence, incidence, and factors associated with pre-stroke and post-stroke dementia: a systematic review and meta-analysis. *Lancet Neurol.*, 2009; 8(11): 1006–1018.
3. Carotenuto A, Rea R, Colucci L, Ziello AR, Molino I, Carpi S *et al.*; Late and early onset dementia: What is the role of vascular factors? A retrospective study. *J Neurol Sci.*, 2012; 322(1-2):170-175.
4. Farris W, Mansourian S, Chang Y, Lindsley L, Eckman EA, Frosch MP *et al.*; Insulin-degrading enzyme regulates the levels of insulin, amyloid beta-protein, and the beta-amyloid precursor protein intracellular domain in vivo. *Proc Natl Acad Sci.*, 2003; 100(7):4162-4167.
5. Reitz C, Brayne C, Mayeux R; Epidemiology of Alzheimer disease. *Nat Rev Neurol.*, 2011; 7(3): 137-152.
6. Shafqat S; Alzheimer disease therapeutics: perspectives from the developing world. *J Alzheimers Dis.*, 2008; 15(2):285-287.
7. Fischer C, Yeung E, Hansen T, Gibbons S, Fornazzari L, Ringer L *et al.*; Impact of socioeconomic status on the prevalence of dementia in an inner city memory disorders clinic. *Int Psychogeriatr.*, 2009; 21(6): 1096-1104.
8. Gao Y, Huang C, Zhao K, Ma L, Qiu X, Zhang L *et al.*; Depression as a risk factor for dementia and mild cognitive impairment: a meta-analysis of longitudinal studies. *Int J Geriatr Psychiatry*, 2013; 28(5):441-449.
9. Sattler C, Toro P, Schönknecht P, Schröde J; Cognitive activity, education and socioeconomic status as preventive factors for mild cognitive impairment and Alzheimer's disease. *Psychiatry Res.*, 2012; 196(1): 90-95.
10. Shah A; The importance of the socioeconomic status of countries for mental disorders in old age: development of an epidemiological transition model. *International Psychogeriatrics*, 2007; 19(4): 785-787.
11. Skoog I, Aversson Q; Epidemiology of vascular dementia in Europe. In *cerebrovascular disease and dementia: Pathology. Neuropsychiatry and Management.* Chiu E, Gustafson L, Ames D *et al.* editors; Martin Dunitz London. 2000: 15-24.
12. Notkola IL, Sulkava R, Pekkanen J, Erkinjuntti T, Ehnholm C, Kivinen P *et al.*; Serum total cholesterol, apolipoprotein E epsilon 4 allele, and Alzheimer's disease. *Neuroepidemiology*, 1998; 17(1): 14-20.
13. Stewart R, Masaki K, Xue Q-L, Peila R, Petrovitch H, White LR *et al.*; A 32-Year Prospective Study of Change in Body Weight and Incident Dementia: The Honolulu-Asia Aging Study. *Arch Neurol.*, 2005; 62(1): 55–60.
14. McLoughlin DM, Cooney C, Holmes C, Levy R; Career Informants for Dementia Sufferers: Carer Awareness of Cognitive Impairment in an Elderly Community-resident Sample. *Age Ageing*, 1996; 25 (5): 367-371.
15. Zhao JH, Brunner EJ, Kumari M, Singh-Manoux A, Hawe E, Talmud PJ *et al.*; APOE polymorphism, socioeconomic status and cognitive function in mid-life - The Whitehall II Longitudinal Study. *Soc Psych Psych Epid.*, 2005; 40(7): 557-563.
16. Clark AM, DesMeules M, Luo W, Duncan AS, Wielgosz A; Socioeconomic status and cardiovascular disease: risks and implications for care. *Nat Rev Cardiol.*, 2009; 6(11): 712-722.
17. Karp A, Kareholt I, Qiu C, Bellander T, Winblad B, Fratiglioni L; Relation of Education and Occupation-based Socioeconomic Status to Incident Alzheimer's Disease. *Am J Epidemiol.*, 2004; 159 (2): 175-183.
18. Usman S, Chaudhary HR, Asif A, Yahya MI; Severity and Risk Factors of Depression in Alzheimer's Disease. *Journal of the College of Physicians and Surgeons Pakistan*, 2010; 20 (5): 327-330.
19. De Ronchi D, Fratiglioni L, Rucci P, Paternicò A, Graziani S, Dalmonte E; The effect of education on dementia occurrence in an Italian population with middle to high socioeconomic status. *Neurology*, 1998; 50(5):1231-1238.
20. Del Ser T, Hachinski V, Merskey H, Munoz DG; An autopsy-verified study of the effect of education on degenerative dementia. *Brain* 1999; 122(12): 2309-2319.
21. Skoog I, Gustafson D; Update on hypertension and Alzheimer's disease. *Neurol Res.*, 2006; 28(6): 605-611.