Original

A Study on Community Based Memory Screening

Gupta Sanjay[1], Arun Kuruppath[2], yadav J S[3], shahi amit[4], yadav pradeep[5]
Department of Psychiatry, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India[1,2,3,4,5]

ABSTRACT

Background-

Dementia is a large and growing problem but is often not diagnosed in its earlier stages. Screening and earlier treatment could reduce the burden of suffering of this syndrome.

Methods-

We screened individuals aged 18 and older attending cognitive screening programme conducted in department of psychiatry, IMS,BHU. Dementia was diagnosed according to International Classification of Diseases (ICD)-10 criteria by an expert panel using the results of neuropsychological testing and information collected from patients, caregivers.

Results-

A total of 153 individuals participated in the community based dementia screening program, including 140 males and 13females . Of the screened individuals, 12 were found to have cognitive impairment (either MCI = 7 or dementia = 5) and 131 were determined to be cognitively normal.

Compared to cognitively normal participants, cognitively impaired participants displayed greater mean age (mean = 53.982 S.D. = 16; mean = 66.18 S.D. = 7.48, resp.; No significant differences were identified for gender , and no significant differences were identified for self-report of alcohol or illicit substance use.

Conclusion-

Screening tests can detect undiagnosed dementia. In persons with mild to moderate clinically detected Alzheimer disease, cholinesterase inhibitors are somewhat effective in slowing cognitive decline. The effect of cholinesterase inhibitors or other treatments on persons with dementia detected by screening is uncertain.

INTRODUCTION

Dementia is a major healthcare problem that causes a significant financial burden to society[1]. Dementia is an age-related progressive decline in cognition that interferes with activities of daily living. This disorder affects about 15% of those over the age of 70 years. If current aging trends continue, the costs of taking care of demented patients may increase by almost 80% by the year 2040 [1]

Previous reports suggest that early detection leading to early therapy with cholinesterase inhibitors and other treatments can help maintain dementia patients at lower dementia severity levels longer [2,3]. If so, dementia care costs could be significantly reduced through earlier detection and treatment that maintains patients at less severe stages for a greater portion of the duration of their illness.

Community based dementia screening may be one method that can be used to achieve earlier detection and earlier initiation of therapy, with consequent reduced time spent in more costly higher dementia severity levels. The need for community based dementia screening programs arises from the increasing prevalence of Alzheimer's disease and other progressive dementing disorders in the general population and the consequent rising cost of caring for people with currently available treatment options for Alzheimer's disease which limit the potential benefits from screening programs [7]. Consequently, despite widespread attention given to the rising economic costs of treating and caring for people with Alzheimer's disease and other progressive degenerative dementias [4,] a financially cost-effective community based screening program has not yet been demonstrated.

Cadman et al. in 1984 described five essential characteristics needed for an effective community based disease screening program [8]. While these characteristics were originally developed as a guide for infectious disease screening programs, they were worded generally enough to apply equally well to screening programs for other diseases affecting the general population. The five characteristics are paraphrased as follows:(1) to detect a condition with sufficient societal burden, (2) for which treatment options are available, (3) a reliable screening test is available, (4) for which those who could benefit can be reached, and (5) necessary follow-up interventions and monitoring of compliance can be provided [8]. While disease modifying treatment options are still not available for most progressive

dementing disorders, we believe that a community based screeningprogram targeting Alzheimer's disease could be developed meeting these criteria and also providing a clear economic benefit to the community.

MATERIALS AND METHODS

Subjects

Participants were adults, over the age of 18 years, who presented sequentially to a community based dementia screening program during a one-week period from september22 to September 28 2014 conducted in department of psychiatry, IMS, BHU, Varanasi.

Dementia Screening Program Description

Screening examinations were conducted by a board certified psychiatrists in an exam room located within a department of Psychiatry BHU Varanasi. Community members were made aware of the dementia screening availability via advertisements in the Newspaper. Dementia screenings were conducted daily from 9 am to 7 pm during 22 – 28 September, . Each screening evaluation included a standardized workup consisting of a history which included information regarding functional activities and ability to complete activities of daily living independently, physical and neurological examinations, and Mini Mental State examination [9]. Presence of hypertension and diabetes was determined by self-report. Use of tobacco, alcohol, and illicit substances was determined by self-report and categorized "yes" or "no."

Diagnosis of Cognitive Impairment

Diagnoses of mild cognitive impairment (MCI) and dementia were made by a board certified neurologist according to established clinical criteria [10, 11]. Briefly, participants diagnosed with MCI displayed impairment on cognitive performance as evidenced by MMSE scores below 27 but did not have any impairment on function or activities of daily living noted in their history information, while participants diagnosed with dementia displayed evidence of cognitive impairment with MMSE scores below 25 and also were noted to have impairment in daily activities. Dementia severity was determined by MMSE score, with mild dementia indicated by scores ranging from 21 to 25, moderate dementia by scores ranging from 10 to 20, and severe dementia by scores below 10.

Statistical Analysis

Normally distributed continuous demographic factors and other continuous variables were compared between groups using two-tailed –tests. Frequency of occurrence of categorical variables was compared between groups using Chi-square analysis or Fisher's exact test as appropriate. All statistical calculations were performed using SPSS version 21 [12].

Observation and Results

A total of 153 individuals participated in the community based dementia screening program, including 140 males and 19 females . Of the screened individuals, 12 were found to have cognitive impairment (either MCI = 7 or dementia = 5) and 131 were determined to be cognitively normal. The prevalence and burden of the dementia syndrome are high after age 65.

The mean age of the sample was 53.92 ± 16years . Demographic data of the sample shows that there is a uneven gender distribution of the population sampled with a male predominance who constituted 91.5 % of 153 studied while female constituted 8.5 % of the whole.

Compared to cognitively normal participants, cognitively impaired participants displayed greater mean age (mean = 53.982 S.D. = 16 ; mean = 66.18 S.D. = 7.48, resp.; No significant differences were identified for gender , and no significant differences were identified for self-report of alcohol or illicit substance use. A total of 47.5% of the participants reported a family member or friend had been diagnosed with dementia, including 37.6% who reported a family history of a first degree relative with dementia and 12.9% who reported a history of a friend or family member other than a first degree relative who had been diagnosed with dementia. History of family members or friends with dementia did not significantly differ between the groups, although a trend was identified towards a greater frequency of self-report of a friend or family member being diagnosed with dementia among those who were cognitively normal compared to those who were cognitively impaired (yes = 50.6% and 25%, resp.;).

The sample population had higher percentage of people who were illiterate .Figures pertaining to education showed that the percentage of people with dementia was more in the 'Illiterate' group - 4.1%, and it fell in those with higher levels of education, 'middle school or lower' to 3.9% and was 0.5% in those with 'secondary school' level of education. Paradoxically, those with 'graduation or higher' education had the maximum proportion of elderly with dementia, which was statistically significant (P<0.09).

Majority of the persons studied were married 90.8% and only 1% of the sample groups were from the 'divorced or separated' group . Marriage had no significant difference on prevalence of dementia those who were married represented

the corresponding age groups in greater proportion than those who were 'never married', in either gender $P<.05$. Analyzing socio-economic status as a factor affecting prevalence of dementia revealed that in those from lower status it comes to occupy 60%, 34.8% in 'high middle' group and 25% in those from 'high' group. This trend was statistically significant $P<0.001$.When the data was compressed into two groups, 'high to middle status' and 'low middle to low status', the risk was found to be more than three-fold higher in those from the lower socio-economic strata. (Odds ratio 3.95, 95% CI 1.99 - 7.89, $P<0.001$).

DISCUSSION

Cost of caring for demented individuals places a significant financial burden on both caretakers and society in general. While it is possible that more effective treatments may be developed in the future for progressive dementing disorders, our results suggest that community based dementia screening can achieve a substantial cost savings benefit due to more effective use of currently available treatments through earlier detection and treatment compared to providing care without screening. Overall, our community based dementia screening program met the criteria described by Cadman et al. in 1984 for an effective community disease screening program[8].

In our study we identified new and previously undiagnosed MCI and mild dementia in 7.5% of individuals screened. This rate of detection of previously undiagnosed individuals is in good agreement with previously reported detection rates for community based screening programs which have ranged from 9 to 14%[17,18]. The ability of community based screening programs to reach previously undiagnosed individuals with dementia has also been demonstrated by Barker et al. in 2005 [19], who showed that subjects with Alzheimer's disease who were referred from a memory screening program presented with higher mean MMSE scores and shorter durations of illness than those referred by physicians or family members.

Others have suggested that it may be possible to increase the rate of detection for previously undiagnosed individuals through enriching the sample by screening individuals deemed to be at high risk for cognitive decline, such as individuals whose functional status has changed; whom friends, family, or caregivers notice a cognitive decline; whom doctors or other health professionals notice signs of cognitive impairment; or even those at advanced ages [3]. If methods such as these are successful in increasing the rate of detection of previously undiagnosed cases through community screening, then this would be expected to result in a directly proportional increase in the cost savings benefit provided by screening programs.

The findings of this study suggest several potential barriers to implementation of community based dementia screening including the use of physician screeners and the lack of voluntary participation of seniors. In our community based dementia screening program seniors utilized 93 of the 144 potentially available screening appointments, resulting in a utilization rate of only 64.6%. Additionally, we experienced particular difficulty engaging male seniors who only comprised 20.4% of the screening participants. Another potential barrier to implementation may result from the greater initial cost to public healthcare systems due to increased cost of treatment resulting from improved identification of MCI and mild dementia cases during the first six years after screening. Particular difficulty may arise due to the long term outlook and planning required for implementing such programs because the benefits of community screening do not become evident until years 8 through 10 after screening takes place.

Educational status had the protective effect .There was significant difference in the educational standards and evidence of dementia. The effect of education on the cognitive decline can be explained using the 'cognitive reserve hypothesis' with a positive correlation that a low level of education is related to an increased incidence of dementia. In this study, the percentage of people with dementia was more in the 'Illiterate' group though, paradoxically, those with 'graduation or higher' education had the maximum proportion of elderly with dementia, which was statistically significant ($P<0.09$). Further analysis did reveal that those with higher education were in the older age group, with more severe grade of dementia. This further strengthened the 'cognitive reserve' hypothesis that those with higher educational attainment take more time to deteriorate than their counterparts with lower educational status; the same was noted in other findings carried out in urban settings [16,17,18].

Limitations

The diagnosis of dementia was made by a single investigator and consequently the interrater reliability of the diagnosis could not be determined. Another limitation arises from the nature of screening visits which by definition are brief time-limited events and consequently important information such as laboratory test results and brain imaging study results can be lacking.

CONCLUSION

Dementia is common and undiagnosed in primary care. Screening instruments alone have insufficient specificity to

establish a valid diagnosis of dementia when used in a comprehensive screening program; these results may not be generalized to older adults presenting with cognitive complaints. Multiple health system and patient-level factors present barriers to this formal assessment and thus render the current standard of care for dementia diagnosis impractical in primary care settings.

REFERENCES

1. *M. D. Hurd, P. Martorell, A. Delavande, K. J. Mullen, and K. M. Langa, "Monetary costs of dementia in the United States," The New England Journal of Medicine 2013;368:1326–1334.*
2. *C. W. Zhu, E. E. Livote, N. Scarmeas et al., "Long term associations between cholinesterase inhibitors and memantine use and health outcomes among patients with Alzheimer's disease," Alzheimer's and Dementia 2013;9(6)733–740.*
3. *H. Brodaty, J. Clarke, M. Ganguli et al., "Screening for cognitive impairment in general practice: toward a consensus," Alzheimer Disease and Associated Disorders 1998; 12(1):1–13.*
4. *A. Wimo, B. Winblad, and L. Jönsson, "An estimate of the total worldwide societal costs of dementia in 2005," Alzheimer's and Dementia 2007; 3(2):81–91.*
5. *K. S. Jacob, P. S. Kumar, K. Gayathri, S. Abraham, and M. J. Prince, "Can health workers diagnose dementia in the community?" ActaPsychiatricaScandinavica 2007;116(2):125–128.*
6. *M. Boustani, L. Watson, B. Fultz, A. J. Perkins, and R. Druckenbrod, "Acceptance of dementia screening in continuous care retirement communities: a mailed survey," International Journal of Geriatric Psychiatry 2003;18 (9)780–786.*
7. *M. F. Mendez and J. L. Cummings, "Alzheimer's disease," in Dementia: A Clinical Approach, M. F. Mendez and J. L. Cummings, Eds., pp. 95–97, Elsevier, Philadelphia, Pa,USA, 3rd edition, 2003.*
8. *D. Cadman, L. Chambers, W. Feldman, and D. Sackett, "Assessing the effectiveness of community screening programs," Journal of the American Medical Association 1984;251(12): 1580–1585,.*
9. *M. F. Folstein, S. E. Folstein, and P. R. McHugh, "Mini-mental state: a practical method for grading the cognitive state of patients for the clinician," Journal of Psychiatric Research 1975; 12(3): 189–198.*
10. *G. M. De Marchis, G. Foderaro, J. Jemora et al., "Mild cognitive impairment in medical inpatients: the mini-mental state examination is a promising screening tool," Dementia and Geriatric Cognitive Disorders 2010; 29 (3) 259–264.*
11. *American Psychiatric Association, "Delirium, dementia, and amnestic and other cognitive disorders," inDiagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association, Ed., pp. 133–143, American Psychiatric Association, Washington, DC, USA, 4th edition, 1994.*
12. *IBM Corporation, IBM SPSS Statistics for Windows, version 21. 0, IBM Corporation, Armonk, NY, USA.*
13. *J. M. Lawrence, D. A. Davidoff, D. Katt-Lloyd, A. Connell, Y. A. Berlow, and J. A. Savoie, "Is large-scale community memory screening feasible? Experience from a regional memory-screening day," Journal of the American Geriatrics Society 2003;51(8)1072–1078.*
14. *J. J. Manly, N. Schupf, Y. Stern, A. M. Brickman, M.-X. Tang, and R. Mayeux, "Telephone-based identification of mild cognitive impairment and dementia in a multicultural cohort," Archives of Neurology 2011; 68 (5): 607–614.*
15. *W. W. Barker, C. Luis, D. Harwood et al., "The effect of a memory screening program on the early diagnosis of Alzheimer disease," Alzheimer Disease and Associated Disorders 2005;19(1): 1–7.*
16. *Qiu C, Bôckman L, Winblad B, Agóero-Torres H, Fratiglioni L. The influence of education on clinically diagnosed dementia incidence and mortality data from the Kungsholmen Project. Arch Neurol 2001;58:2034-2039.*
17. *Sachdev P. Is it time to retire the term "Dementia"? J Neuropsychiatry ClinNeurosci 2000;12:276-279.*
18. *Vas CJ, Pinto C, Panikker D, Noronha S, Deshpande N, Kulkarni L, et al. Prevalence of dementia in an urban Indian population. IntPsychogeriatr 2001;13:439-450.*