"PREVALENCE OF COGNITIVE IMPAIRMENT IN ELDERLY POPULATION RESIDING IN AN URBAN AREA"

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LIST OF ABBREVIATIONS USED

ADAMS	-	Ageing, Demographics and Memory study
ADL	-	Activities of daily living.
BMI	-	Body Mass Index
CAMDEX	-	Cambridge Mental Disorders of Elderly
CBI	-	Caregiver Burden Inventory
CI	-	Cognitive impairment
CI	-	Confidence interval.
CIND	-	Cognitive impairment no dementia
DSM -IV	-	Diagnostic and Statistical manual of mental diseases IVth Revision.
ECAQ	-	Elderly Cognitive Assessment Questionnaire
GHQ	-	General Health Questionnaire
GMS	-	Geriatric Mental Scale
HMSE	-	Hindi mini mental state examination
HRS	-	Health and Retirement Survey
IADL	-	Instrumental activity of daily living
ICD-10	-	International classification of diseases 10^{th} revision
Kgs	-	Kilogram
MCI	-	Mild Cognitive impairment
MF	-	Multiplication factor
MMSE	-	Mini Mental State Examination
PFAQ	-	Pfaffer Functional Assessment Activities Questionnaire
PUC	-	Pre-University College.
SD	-	Standard Deviation.

SPSS	-	Statistical Package for Scientific Studies.
SRQ	-	Self Reported Questionairre
UHC	-	Urban Health Centre.
WHO	-	World Health Organisation
ZCBS	-	Zarit Caregiver Burden Scale.
x^2	-	Chi Square.

ABSTRACT

Background and Objectives

Ageing is a natural process. The ageing population should be seen as one of the great success stories of the 20th century. Life expectancy at birth has continued to increase globally over the years**.** With the increase in life expectancy the proportion of elderly in the country is increasing. In recent years, a great deal of interest has been generated around the concept of boundary or transitional state between dementia and normal ageing. This condition has been termed as Mild Cognitive Impairment (MCI). Cognitive Impairment (CI) is emerging as an important health problem of elderly population in India. CI is no longer considered a normal and inevitable change of ageing, it occurs when problems with thought process occur. Hence the present study was undertaken with the objectives of knowing the prevalence of cognitive impairment among elderly residing in an urban area and to assess the burden among cognitively impaired elderly on caregivers.

Methods

A cross sectional study was carried out amongst the elderly population residing in the field practice area of Ashok Nagar, Urban Health Centre. The study was conducted from 1st January to 31st December 2012. A total of 783 elderly were interviewed using a predesigned and pretested questionnaire. Participants were screened for CI using Mini Mental State Examination (MMSE) (for literates), Hindi Mini Mental State Examination (HMSE) (for illiterates).Instrumental Activity of Daily Living (IADL) scale was used to assess the functional activities of elderly. Among the caregivers of cognitively impaired elderly, caregiver burden was assessed using Zarit Caregiver Burden Scale.

Results:

Among 783 elderly studied, majority (68.45%) were between 60 – 69 years age group, and a few (0.77%) participants were above 90 years of age. Males were 42.01% and rest were females. Out of the total elderly studied majority (66.79%) were Hindus, rest were Muslims and Christians reflecting the population distribution of the study area. Most (91.82%) of them, were literates, with a larger proportion (55.56%) being housewives, with respect to occupation 16.60% were retired and 90.80% belonged to nuclear families. Majority (75.47%) were married and living with their spouse but 21.08% were widows/widower. Most of them (76.76%) belonged to class III and IV socio-economic status according to Modified B.G.Prasad classification. Among the total elderly, 624 (79.70%) had a history of forgetfulness during their daily routine, 109 (13.90%) had difficulty to perform daily routine and 80 (10.20%) elderly did depend on the relatives for daily routine. Out of the total elderly, 28.36% were currently chewing tobacco and 18.26% were currently smokers. The present study revealed that 51.46% had family history of hypertension, 48.02% had Diabetes Mellitus and 5.61% elderly had family history of dementia. As regards to Body Mass Index (BMI) majority (63.30%) of the elderly participants had grade I obesity and (8.20%) had grade II obesity. With regards to number of morbidities, 97.70% were suffering from one or the other morbidities and 44.00% had more than one morbidity. The major morbidities noted in our study were: Iron deficiency anaemia (66.92%), Hypertension (55.94%), Diabetes Mellitus (50.32%), joint pain and muscle aches (24.31%), vitamin B-12 deficiency (12.67%) and acute lower respiratory tract infection (12.41%).

The prevalence of cognitive impairment was 7.02% in our study area.

Among them, 6.38% had mild cognitive impairment and 0.64% had moderate cognitive impairment. The prevalence of cognitive impairment increased with age ($p<0.001$) and was more among females, probably attributed to the high life expectancy among women and this was statistically significant ($p=0.003$). The percentage of cognitive impairment was inversely related to literacy and socio-economic status ($p<0.001$). The association between marital status and a positive family history of dementia among study participants with cognitive impairment was statistically significant ($p=<0.001$). Most of the cognitively impaired study participants could not perform daily routine tasks like using telephone ($p<0.001$), do shopping ($p<0.001$), meal preparation ($p<0.001$), housekeeping ($p=0.001$), laundry ($p<0.001$), difficulty in travelling ($p<0.001$), difficulty to take their own medications ($p<0.001$) and difficulty in handling finances ($p<0.001$). Out of 55 cognitively impaired elderly, 43.64% of the family members felt that the upbringing of children was affected and 27.27% families had marriage prospectus affected due to the presence of a cognitively impaired person at home. Among the elderly who were more than 65 years of age 80.68% were getting pension and 4.13% faced difficulty in getting the pension allowances.

In the present study a major proportion (60.00%) of the caregivers were females, with 52.72% in the age group of 31-40 years,41.83% of them were daughters and 40.00% of them were sons of the cognitively impaired elderly. Among the caregivers 43.63% were educated up to pre-university and 36.36% were working in a private sector. In our study a good number of caregivers (29.09%) had a Zarit Caregiver Burden Scale score of 21 to 40 and experienced mild to moderate burden, majority (69.09%) had a score of 41 to 60 and experienced moderate to severe burden, a few (1.82%) had a score of 61-88 and experienced severe burden. Caregivers experienced emotional, financial, social and occupational burden.

Conclusion and interpretation

The present study revealed that the prevalence of cognitive impairment was considerably high. A strong positive family history of dementia, low socio-economic status and low level of educational status were related to cognitive impairment among the elderly studied. Regarding the caregivers of cognitively impaired elderly, majority of them experienced a lot of physical, emotional, psychological stress and strain and they were overtaxed with responsibilities and felt that all responsibility fell on one caregiver.

Keywords: Cognitive Impairment, MMSE, HMSE, IADL, Zarit Caregiver Burden Scale, Morbidity, Elderly, Urban Area.

CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF FIGURES

INTRODUCTION

Ageing is a natural process. In the words of Seneco "Old age is an incurable disease". But more recently, Sir James Sterling Ross commented, "You do not heal old age. You protect it; you promote it; you extend it". The ageing population should be seen as one of the great success stories of the 20th century. Life expectancy at birth has continued to increase globally over the years[1].

Ageing begins at the moment of birth and continues over lifetime. Every individual experiences the process in a different way, depending on gender, culture, education, geographical location, environment and the culmination of life events. Improvements in public health care, living conditions, income and the control of infectious diseases were important factors in the first half of the twentieth century that led to increase in life expectancy, while in the second half it was improvements in social conditions, health technologies such as antibiotics, and widespread immunisation that has led to increased life expectancy[2].With the increase in life expectancy the proportion of elderly in the country is increasing. This trend is to continue in the time to come.

Old age means reduced physical ability, declining mental ability, the gradual giving up of role playing in socio-economic activities, and a shift in economic status moving from economic independence to economic dependence upon other's for support. Old age is called "dark" not because the light fails to shine but because people refuse to see it[3]. In 2013, the average life expectancy for Indian males and females was 63 and 66 years respectively. India's current population is 1.27 billion, out of which 8.2% population is 60 years and above[1]. In India, although the percentage of aged persons to the total population is low in

comparison to developed countries, the absolute size of aged population is considerable. Further increase in future years will impose a greater burden on the already outstretched health services in the country. Family is the main source of care giving to all its members. The role of families in case of older person has declined due to structural changes which have taken place in the Indian society and the concomitant disintegration of the joint family system, which results in the rejection or neglect of the aged.

In recent years, a great deal of interest has been generated around the concept of boundary or transitional state between dementia and normal ageing. This condition has been termed as Mild Cognitive Impairment (MCI). MCI may be defined "as a state in which at least one cognitive function usually memory, is impaired to an extent that is greater than that would be anticipated for a person's age"[4]. Such individuals may experience some difficulty in intellectually demanding activities.

Cognitive Impairment (CI) is emerging as an important health problem of the elderly population in India. CI is no longer considered a normal and inevitable change of ageing, it occurs when problems with thought process occur. It includes absent mindedness followed by forgetfulness of day to day events, learning disabilities, difficulty to concentrate, decreased intelligence, and loss of higher reasoning. CI has been under diagnosed in primary care settings even in developed countries and therefore changes in cognitive functions often call for prompt and aggressive action. Clinical and neurobiological evidences suggest that, patients with MCI are at increased risk for developing dementia at the rate of 10 to 15% per year[4]. In this subset of patients, early intervention to modify risk factors may prevent the slow the

progression to overt dementia. MCI has been suggested as a term for a boundary area between normal ageing and dementia, especially Alzheimer's disease. In follow-up studies, more than 50% of MCI subjects have been converted to dementia in 3–4 years[4].

Successful ageing means just what it says ageing well; which is very different from not ageing at all. The three main components of successful ageing include -avoiding disease and disability, maintaining mental and physical function, and continuing engagement with life which are important throughout life, but their realization in old age differs from that as in early life stages. Old age has been called a "Role-less role," a time when it is no longer clear what is expected of the elderly person or where he or she can find the resources that will make old age successful.

Population ageing has a profound impact on societies. It affects educational institutions, labour markets, social security, health care, long-term care and the relationship between generations. Active ageing is a centrally political concept that takes in not only the challenges, but also the opportunities of long-living societies. This includes opportunities for older people to continue working, to stay healthy longer and to contribute to society.

As very few studies have been done in our settings on CI, it is of utmost importance to first detect the prevalence and then proceed in a step wise systematic approach in promoting a healthy, graceful and active ageing. Considering this background, present study was undertaken to study cognitive functions in elderly and also to find out the prevalence of CI.

OBJECTIVES

The objectives of the present study were;

(1) To know the prevalence of cognitive impairment in elderly population residing in an urban area.

(2) To assess the burden of cognitively impaired elderly on caregivers.

REVIEW OF LITERATURE

Ageing is a multi-dimensional process that refers to the process of "acquiring maturity with the passage of time". It begins with conception and continues throughout life, until death occurs. Ageing is progressive, ubiquitous and inevitable to all living things[5].

Gerontology- is the term taken from the Greek word '*geron,* ' old man and '*-logy* 'study of coined by Ilya Ilyich Mechnikov in1903 and is the study of the social, psychological and biological aspects of ageing[6].

Gerontology encompasses the following:

- Studying physical, mental, and social changes in people as they age.
- Investigating the ageing process itself.
- Investigating the effects of an ageing population on society.

"Geriatric Giants" is a term coined by Bernard Isaacs, and the expression refers to the principal chronic disabilities of old age that have impact on physical, mental and social domains of older adults. These 'Giants' include:

- Cognitive Impairment (i.e. secondary to dementia, delirium or depression)
- Incontinence
- Postural Instability and Fall
- Caregiver Stress & Burnout.
- Dizziness.
- Iatrogenesis & Polypharmacy.
- Failure to Thrive (often from the above)

- Frailty.
- Elderly Abuse[6].

AGEING PROCESS: Ageing is a continuous process as an individual passes through life. In the year 2005, Osunde and Obiunu divided ageing into the following- primary ageing, secondary ageing and tertiary ageing.

The Primary Ageing: is considered as the normal process which has nothing to do with illness. It simply involves changes in the biological, social and psychological domains. These occur due to tear and wear of vital organs of the body.

The Secondary Ageing: This process is associated with different kinds of terminal illness which prevent normal functioning of the individual.

The Tertiary Ageing: This occurs when there is loss brought about by death or disasters like war on a family member or close friend that could lead to a gradual decline in the proper functioning of an individual[7].

ACTIVE AGEING is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age. The word 'active' refers to continuing participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active or to participate in the labour force.

AGEING IN INDIA

The United Nations defines a country as 'Ageing' where the proportion of people over 60 years reaches 7%. Presently the elderly population is 8.2% and by 2025 the proportion is expected to reach 12.6%. India's older population is expected to increase dramatically over the next four decades. The share of India's population

aged 60 and older is projected to climb from 8% in 2012 to 19 % in 2050, according to the United Nations Population Division. By mid-century, India's 60 and older population is expected to encompass 323 million people, a number greater than the total USA population in 2012[8].

By 2050, life expectancy at birth is projected to reach 74 years. Fertility rates in India have declined to 2.6 children per women, less than one-half of the early 1950s rate, of 5.9 children per woman[11].As India's population ages, the nation will face a shrinking pool of working people to support the elderly population. Arokiasamy and colleagues reported that the old-age dependency ratio which is the number of people aged 60 and older per person aged 15 to 59 is expected to rise from 12 per 100 to 31 per 100 by 2050[8]. By 2042, the share of Indians, 60 years and older is projected to exceed children and youth aged 14 and younger.

Demographic transition – The number of elderly are overtaking the number of younger resulting in a huge demographic shift threatening to overwhelm nations with huge economic and social problems. The report on *The Ageing World 2008* has also highlighted that within 10 years of time older people will out-number the children, for the first time. It has been forecasted that in the next thirty years, the number of elderly is expected to almost double from 506 million to 1.3 billion- a leap from seven percent to fourteen percent of world's population[5].

According to the study done in Kerala the prevalence of dementia was 33.6 per 1000 urban population. Their study was conducted in three phases-*Phase I* -to identify residents aged above 65 years, among whom 2031 people were aged 65 and above .Of these , 1934 people were screened with vernacular adaptation of MMSE . In *Phase II* all those scoring at or below the cut-off of 23 were evaluated further with Cambridge Mental Disorders of the Elderly Examination (CAMDEX) section B to confirm impairment in cognitive function. For each individual a caregiver was interviewed with CAMDEX Section H to confirm the history of deterioration in social and occupational functioning. Caregivers were asked whether the individual had a known history of high blood pressure, diabetes mellitus and cardiac disease. Smoking history and alcohol consumption history was also assessed. In *Phase III*, a psychiatrist visited the homes of participants and those with confirmed cognitive and functional impairment were assigned diagnosis according to Diagnostic and Statistical Manual of Mental Diseases (DSM-IV) criteria. Of the 1934 people screened with MMSE, 45.20% were males and 54.80% were females, 11.20% were illiterate and 4.23% were post-graduates and professionals. By religion wise 47.80% were Hindus, 45.20% were Muslims and 7.03% were Christians. With regard to marital status of the participants 59.50% were married, Unmarried were 3.50%, Widow were 32.41%, Widower 4.40% and Divorced/ separated 0.30%. The reported physical diseases included hypertension 41.50%, diabetes mellitus 36.00%, cardiac disease 24.00%, arthritis 19.50%, stroke 14.60% and other diseases such as bronchial asthma, tuberculosis and malignancy. Of the 1934 screened with MMSE, 327 scored at or below the cut off score of 23.These 327

were evaluated by CAMDEX section B and CAMDEX H and 56 of whom were diagnosed to have dementia based on DSM IV criteria. Among the screened cases 161 out of 1607 with an MMSE score of 23 and above were evaluated by CAMDEX section B, no cases of dementia were identified. Of the 223 with cognitive impairment, 127 had no impairment in social and occupational functioning. The mean MMSE score ± SD was 21 ± 0.2. Among them 41 people had cognitive impairment along with impairment in social and occupational functioning but did not meet the criteria for a diagnosis of dementia. Their mean MMSE Score ± SD was 17 ±5.24. Those elderly belonging to 70-74 years the prevalence of cognitive impairment was 0.66% and 13.33% in 90 plus age group and as the age increased the prevalence of dementia increased. The mean age ± SD of onset of dementia was 74.5± 9 years[9].

In another cross-sectional study on 1586 subjects > 60 years of age (1035 men and 551 women), who attended the Geriatric Clinic of the All India Institute of Medical Sciences, New Delhi, a clinical evaluation was carried out through a pre-designed protocol which included a questionnaire on demographic details, personal habits, socio-economic variables, family structure, past and present medical history, use of medications and aids, presence of certain common symptoms and perceived functional disability. Evaluation included a detailed physical examination, functional assessment, psychiatric assessment and a set of laboratory tests. Elderly Cognitive Assessment Questionnaire (ECAQ) of Kua and Koi was used instead of the MMSE. While assessing Activities of Daily Living (ADL)-IADL, inability to prepare meals by older men and to shop by older women was not considered significant. Among the 1586, 87.01% subjects

had experienced one or more acute illnesses and 3.40% did not have any symptom suggestive of a chronic illness or a pre-existing disease. A normal body mass index (BMI) as an indicator of normal nutritional status for Indian subjects 18.5-25 was detected in 52.05% elderly. While 33.04% were obese or overweight, 14.90% had a BMI <18.5, indicating nutritional deficiency. The variables that were looked for were vision 48.50%, hearing 31.62%, ADL-IADL impairment 6.86%, cognitive impairment 5.12%, depression 20.03%, urinary incontinence 19.55%, unsafe home environment 3.31%, inadequate family and social support 2.44%. Ninety-eight percent of subjects were secure and sure of receiving help from their immediate family in case of illness or emergency. They identified their spouse and children as the sources of help and care. Only 3.60% were actively considering moving to an old age home[10].

In a study done in Taiwan, analysis of data was done on 2119 persons aged 65 years and over who participated in the 2005 National Health Interview Survey. The elderly1347 were between 65-74 years of age and 772 were 74 years and above. Among the total elderly, 52.00% were males and 48.00% were females. As regards to literacy status, 29.44% were illiterate and 23.50% had studied up to higher secondary. Of the total elderly 42.61% were hypertensives,16.09% had diabetes,17.69% had heart disease and 21.94% had hyperlipidemia. As regads to habits, 17.74% elderly had a habit of smoking cigarettes and 8.68% chewed betel quid. As regards to BMI 5.33% had BMI<19kg/mt^2, 45.54% had BMI of 19-24 and 49.12% >24kg/mt^2.Cognitive impairment was defined as having the score of the MMSE lower than 24. Of the 2727 study participants, 10.94% were excluded because of proxies. The mean

score ± SD of MMSE were 26.9 ± 2.5 for normal cognition and 18.0 ± 3.8 for cognitive impaired respectively. The overall prevalence of cognitive impairment was 22.2%. Among the 1347 elderly belonging to 65-74 years, 18.20% had cognitively impairment and among 772 elderly >75 years 29.40% had cognitive impairment. Cognitive impairment rates increased with older age and decreased with higher level of education. Women and single persons were more likely to have cognitive impairment as were those, with low social support ($p<0.05$), marital status ($p=0.032$), social support ($p=0.05$), stroke ($p=0.031$), blood lipids, and physical function ($p=0.000$) in the health status, physical activity in the life-style and coffee consumption ($p=0.007$) in the diet. These results suggest that improving life-style behaviours such as regular exercise and increased social participation could help prevent or decrease the risk of cognitive impairment[11].

Another study done in Malaysia, 522 subjects were screened using ECAQ. Out of which 39.46% were males and 60.54% were females. Scores of <5 in ECAQ were diagnostic of cognitive impairment. A total of 24.13% elderly Malays scored 5 or below 5, of which 20.11% were females and 4.02% were males. Elderly who scored an ECAQ of 6 and below were submitted to a diagnostic interview using the Geriatric Mental Scale (GMS).The GMS was used as a semi–structured instrument to arrive at a diagnosis of dementia according to International Classification of Diseases (ICD-10). There was an increased prevalence in the above 65 as compared to the above 60 years of age.

Overall, the female preponderance was four times.There were 20 cases of dementia among the study subjects of age >65 with the estimated prevalence of 6.0% [12].

The study done in Canada, showed that the prevalence of Cognitive Impairment No Dementia (CIND) was 16.8 %. Over 36 cities and surrounding areas in five regions, a population of 10,263 was screened by MMSE and those found to have cognitive impairment according to DSM IV criteria were invited for clinical examination to diagnose dementia. Diagnosis of CIND was based on exclusion of dementia and presence of various categories of cognitive impairment identified by clinical examination and neuro-psychological tests. Among the total elderly screened, 31.60% had no cognitive impairment, 861 elderly had cognitive impairment no dementia, 9.02% elderly had mild dementia, 15.27% had moderate dementia and 14.56% had severe dementia. This study showed that cognitive impairment increased with age. Patients with CIND were three times more likely to be living in institutions than cognitively unimpaired patients (odds ratio 3.1[95% CI 2.4-3.9]). Circumscribed memory loss had a prevalence of 5.3% in elderly Canadian population, and was the most common category[13].

In a study done in participants in ADAMS (Ageing, Demographics, and Memory Study) in the United States of America who were aged 71 years or older were drawn from the national representative HRS (Health and Retirement Study) conducted from July 2001 to March 2005. Of 1770 selected individuals, 856 (48.36%) completed initial assessment, and of 241 (28.15%) selected individuals the prevalence of cognitive impairment without dementia was 22.0%. A nurse and a neuropsychology technician assessed all participants at their residence for cognitive impairment. In brief, the following information about the participant was collected from a knowledgeable informant: chronological history of cognitive symptoms, medical history, current

medications, current neuropsychiatric symptoms, measures of severity of cognitive and functional impairment, and family history of memory problems. Specific assessment measures reported here were the MMSE and the Dementia Severity Rating Scale. Diagnoses were divided within the three general categories: normal cognitive function, cognitive impairment without dementia and dementia. People aged 71 years and older in the US in 2002 were 5.4 million who had cognitive impairment without dementia and out of these individuals, annually 8% died and 12% progressed to dementia. In the 71 to 79 years age group, 16% had cognitive impairment without dementia, and 5% had cognitive impairment with dementia , suggesting that more than 1 of 5 individuals in this age group had cognitive impairment. Overall, individuals with cognitive impairment without dementia progressed to dementia at a rate of about 12% per year, but the annual rate of progression ranged from 2% to 20% across the various subtypes [14].

In a study done in urban area of Catanduva, Sao Paulo state of Brazil, out of 1681 elderly, 1656 elderly participated in the study. Among them 37.10% were in age group 65-69years, 28.40% were 70-74 years, 16.1% were 75-79 years, 12.0% in 80-84 years and 6.5% in 85-96 years age group. As for the educational level, 34.23% subjects were illiterate, 35.62% had 1–3 years of schooling, 21.49% had 4–7 years, and 8.64% had 8 or more years. Illiteracy was more common (69.10%) among women. Regarding the socio-economic level, most of the subjects were classified into classes C, 606 (36.60%) and D 631 (38.10%). The majority of the subjects were white 84.50%, with a remaining 9.60% of African descent, 4.30% with mixed ancestry (white, African, and

indigenous), and 1.8% of Japanese origin. All 1656 elderly were screened using MMSE and Pfeffer functional assessment activities questionnaire (PFAQ) by 20 graduate students from Cantaduva School of Medicine in phase I and all subjects with PFAQ score higher than 5 and MMSE score below specific education adjusted scores were considered to have dementia were selected in phase II. Selected subjects were interviewed by a neurologist who obtained history, performed general physical and neurological examination with emphasis on cognitive testing. In phase III patients with dementia were submitted to a diagnostic workup that included the following examinations: routine blood tests; tests for liver, kidney, and thyroid functions; cholesterol and triglycerides; serum B12 levels; serology for syphilis; chest radiograph; electroencephalograph; and computed tomography of the head. The prevalence of dementia in this community-dwelling elderly population was 7.1%. If the institutionalized elderly subjects were included, the overall prevalence of dementia in the cohort would increase to 7.5%. The prevalence of dementia in 60-69 years was 1.6%, in 70-74 years 3.2%, in 75-79 years 7.9%, in 80-84 years it was 15.1% and in 85 years and more it was 38.9%.The prevalence of dementia increased proportionately with age. As regards to the prevalence of dementia with respect to educational level it was inversely proportional. Among illiterates prevalence was 12.20%, among those who completed schooling up to third standard it was 4.40%, in those studied up to seventh standard it was 5.00% and among those who had studied up to eighth standard and more the prevalence was 3.50%[15].

In a study done in Portugal, data from a cross-sectional survey of adults aged 50+ years living in Portugal were selected. The sample consisted of 1268

participants, mean age 70.3 ± 8.7 years, and 70.40% were women. Subjects were recruited through announcements in local newspapers, local agencies and using the snowball method by which participants indicate other persons with similar conditions. The survey was conducted by trained interviewers, using a structured questionnaire format. Cognitive impairment was measured with MMSE. They used the Portuguese version adapted to different education levels and illiterate people. The General Health Questionnaire (GHQ) was used as a single index of psychological distress (mostly depression) and they used a cut-off point of 4 to select cases with psychological distress. Social network was measured through the Lubben social network scale using a cut-off score of 20 to qualify elderly at greater risk of extremely limited social network. Functional status was measured by considering 18 activities and selecting people with atleast one difficulty in ADL and in IADL. There were 29.63% males and 70.37% females, among whom 25.06% were in the age group of 50-64 years, 43.51% were 65-74 years old, 25.80% were 75-84 years old and 5.56% were 85 years old and above. Among them 57.47% were married and living with their spouse, 0.90% were single and 36.08% were widow /widower. The prevalence of cognitive impairment was 9.60%. The prevalence of cognitive impairment in 65-74 years age group was 7.5% and 15.50% in 75-84 years age group. There was an increase in cognitive impairment with the increase in age of the study participants, beginning with 1.60% in the age group 50–64years, 7.50% in the 65–74 years age group, 15.50% in the 75–84 years age group and 32.40% in the 85+ age group. The percentage of cognitive impairment was higher in women 11.4% than in men 5.2% [16].

The study done in Northern Portugal on prevalence and pattern of cognitive impairment in rural and urban populations, two random samples of residents aged 55 to 79 years in rural and urban communities were drawn from the Health Centres Registries and these elderly were screened for cognitive impairment. A total of 713 elderly in rural area and 433 in urban area were enrolled for the study. Out of the total study subjects, 41.23% were in the age group of 55-64 years, 42.22% were in 65-74 years and 16.55% belonged to 75-79 years in rural population. In urban population 44.34% belonged to 55-64 years, 44.80% were in 65-74 age group and 10.85% in 75-79 years. The screening criteria for dementia were an abnormal MMSE score or a Blessed Dementia Scale score. After excluding those who tested positive for dementia, cut-off points for CIND were set at one standard deviation below the mean of the MMSE, according to their educational level. All those who screened positive either for dementia or CIND were examined by a neurologist for establishing a definitive diagnosis. Prevalence of cognitive impairment was higher in rural than in urban populations, 16.8% and 12.0% with a rural/urban prevalence ratio (PR) of 2.16% in the eldest and 2.19 in persons with vascular risk factors. The prevalence of dementia was 2.7% with a rural/urban PR = 2.1 and the prevalence of CIND was 12.3% and PR = 1.3. The prevalence of dementia increases exponentially with age and in those with cerebrovascular disease or other comorbid conditions while the prevalence of CIND, besides these factors, is also higher in persons with low levels of education or vascular risk factors[17].

A population-based survey was conducted in three randomly selected communities in Luwan District of Shanghai City in 2009. In this study, a total of

3,176 residents aged 55 years or older were interviewed and screened by trained neurologist**.** The study aimed to investigate the prevalence of CI and the associated risk factors among elderly people in Shanghai urban area. Interviews were carried out to collect information including demographic characteristics, medical history, and medication use, etc. The validated Chinese version of the MMSE was used for screening the elderly. A total of 3,176 home-living residents (≥55 years old) were included in the study, out of which 1,107 were males and 2,069 females (average age for male: 70.54 ± 9.25 years; average age for female: 69.26 ± 9.65 years). Within all the respondents, 2,517 were married and lived with their spouses at the time of study while the other 659 were either widowed, divorced, never married or refuse to tell their marriage status. Within all the subjects, 1,019 claimed themselves having education less than 6 years; 1,005 admitted to have more than 10 years of education; and 1,152 were in between class sixth to tenth. Among the 3,176 participants with valid MMSE Scores**,** 266 people (102 men and 164 women) were identified as cognition impaired, with a prevalence of 8.38% for both genders, 9.21% for men and 7.93% for women, respectively. Furthermore, they found that several significant risk factors, including social factors (education, number of children, marriage status, and family structure, physiological factors (age, blood glucose level, and obesity), life style factors (physical exercise, diet & chronic diseases, and genetic factor Apo E) were associated with CI onset. Thus this study confirms the high prevalence of CI among the elderly population in the Shanghai urban in China[18].

In a study, the data was collected from participants coming to attend a "Caregiver Day" organized by the various Departments in Thailand. Of 88 participants who were approached in the present study, 16 (18%) did not respond and 72 (82%) returned evaluable questionnaires. The mean age of caregivers was 51.6 years and 62 of them were women. The Caregiver Burden Inventory (CBI) is a multidimensional instrument designed for caregivers of older adults suffering from dementia. It consists of five dimensions: time - dependence burden (5 items), developmental burden (5 items), physical burden (4 items), social burden (5 items), and emotional burden (5 items). The answers range from 'not at all descriptive' to 'very descriptive'. A total score higher than 24 indicated a overall high caregiver burden. In terms of CBI, the median and interquartile range of the time dependant burden, developmental burden, physical burden, social burden and emotional burden scores were 12, 5, 4, 2 and 2 respectively. The total CBI score was 25. Overall, responses in time-dependence burden were distributed almost equally in the five possible scales. In developmental and physical burden, a caregiver's rate score was mainly from 0-2. The scores in social and emotional burden ranged mainly between 0-1 [19]thus indicating a high burden on caregivers.

In another cross sectional study done in Brazil on caregivers of elderly having cognitive deficit, caregiver burden was assessed. It was conducted between January and July 2009. Seventy elderly (aged 65 and older) were assessed for cognitive deficit using the MMSE; their 70 caregivers were evaluated by the Zarit Burden Scale (ZBS) and the Self Reporting Questionnaire (SRQ). The sampling criteria included being 65 years old or older, of both gender, residents of Ribeirão Preto, São Paulo, Brazil, living by themselves or

with relatives in the community and having an unpaid family caregiver. Among the total elderly interviewed,53 (75.71%) were females and 17 (24.29%) were males, out of which 6 (8.60%) were 65 – 69 old ,4 (5.80%) were 70 – 74 old, 12 (17.14%) were 75 – 79 old ,48 (68.57%) elderly were 80 years old or older. Educational status was as follows- Illiterate 30 (42.86%), 1 to 4 years of schooling 28 (40.0%), 5 to 8 years 5 (7.14%), 9 to 11 years 4 (5.71%) and 3 (4.28%) more than 12 years of schooling.MMSE was used to assess cognitive impairment and the score ranged from 0 to 30. A questionnaire on caregivers allowed identifying caregivers of older adults with cognitive impairment in the following aspects: gender, age, marital status, kinship, whether the individual attended a formal course on care, hours dedicated to care, and support activities. Among the 70 caregivers, majority i.e. 49 (70.00%) were in age group 59 years and below and 30% were aged 60 years and above. Regarding the relation with cognitively impaired persons, a small proportion of them (11.42%) were spouses, majority of them (57.14%) were children, In-laws were 12.86%, grandchildren were 5.71% and others were 12.86%. Caregiver burden was assessed using translated version Zarit caregiver burden scale. Twenty two items were used to evaluate the perceived impact of providing care to physical and emotional health, social activities and financial condition. The average score was 30 which indicated mild to moderate burden among caregivers of cognitively impaired elderly[20].

Thus to summarise,

Study area	**Sample size**	**Study setting**	**Tools used**	**MMSE Score**	**Prevalence of cognitive impairment (%)**	**Caregiver burden**
Kerala	1934	Community based	MMSE, CAMDEX-Section B and Section H	cut off ≤23	3.34	Assessed using CAMDEX-H
AIIMS Delhi	1586	Hospital based	ECAQ, ADL-IADL	<5cut off	5.12	Not assessed
Taiwan	2119	Community based	MMSE	Cut off ≤ 24	22.2	Not assessed
Malaysia	522	Community based	ECAQ	cut off≤5	6.0	Not assessed
Canada	10,263	Multicentric study(36 cities)	MMSE.	Cut off ≤ 24	16.8	Not assessed
USA(ADAMS study)	1770	Community based	MMSE, Blessed dementia rating scale.	Cut off ≤ 24	2-20(Range)	Not assessed

Brazil (SAO PAULO)	1681	Community based	MMSE, Pfeffer functional assessment scale	cut off based on educational levels score ≤5.	3.5-12.20	Not assessed
Portugal	1286	Community based	MMSE,GHQ, ADL-IADL	cut off based on educational levels score ≤5	5.2-11.4	Not assessed
Northern Portugal	713(urban), 433(rural)	Community based	MMSE, Blessed dementia rating scale.	cut off based on educational levels score 1SD below the MMSE Score	12.3	Not assessed
Shanghai (Luwan district)	3176	Community based	Chinese version of MMSE.	cut off ≤25	8.38	Not assessed
Thailand	88each of cognitively impaired	Old age home	Caregiver burden inventory	--	--	Assessed

	elderly and their caregivers					
Brazil	N=70each of cognitively impaired elderly and caregivers	Old age home	Zarit caregiver burden inventory, SRQ	--	--	Assessed

METHODOLOGY

Source of data: The study area was Urban Health Centre (UHC), Ashok Nagar which is the field practice area of Department of Community Medicine, J. N .Medical College,Belgaum. The seven areas coming under Ashok Nagar UHC are Shiva-Basav Nagar,Markhandeya Nagar, Ashok Nagar, Azam Nagar, Ayodhya Nagar,Karnataka State Reserve Police Quarters and Jawaharlal Nehru Medical College Quarters.

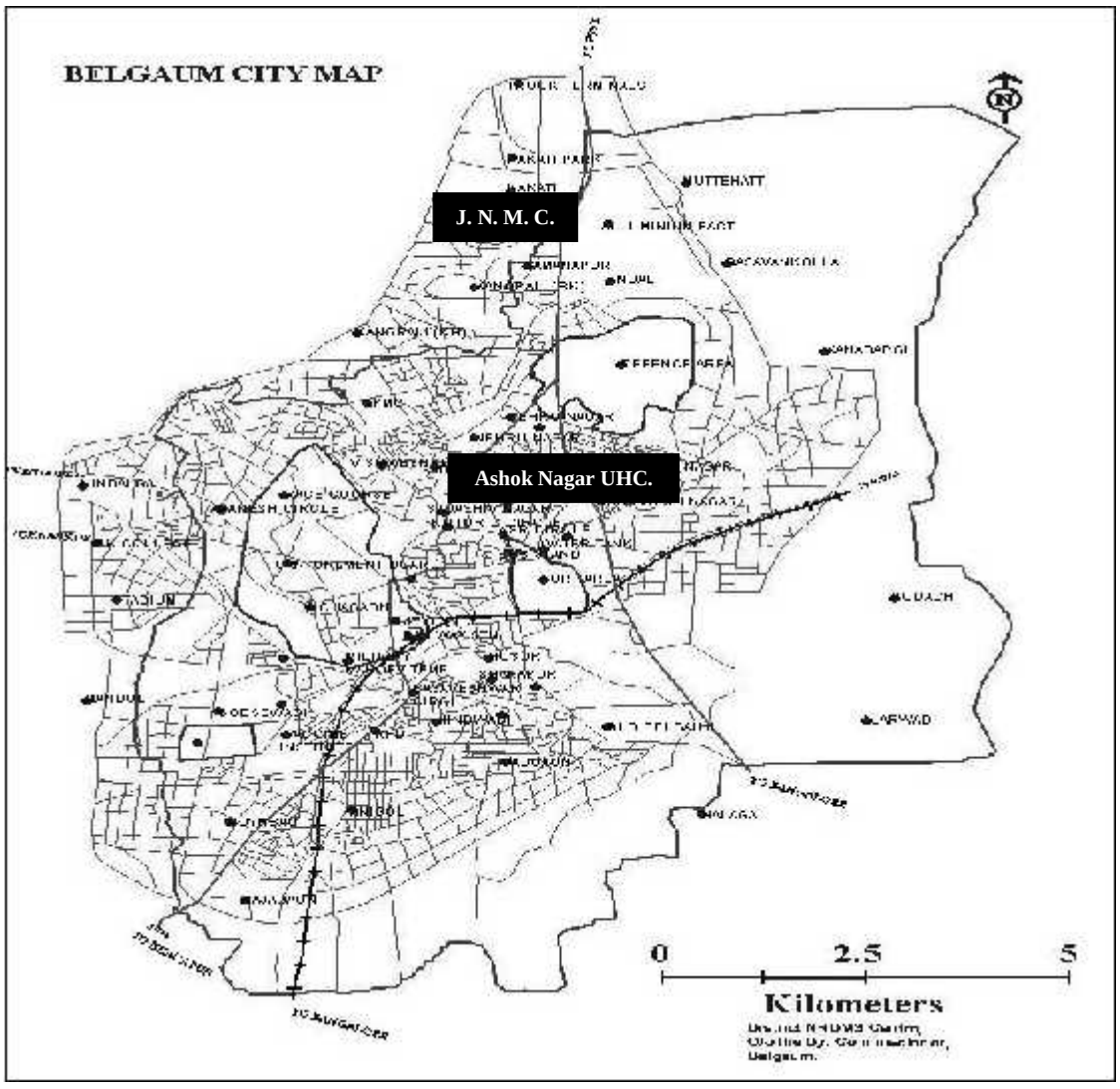

Figure-1 Map of Belgaum city showing urban area of Ashok Nagar.

Study design: A community based cross sectional study.

Study period: 1st January to 31st December 2012.

Sample size: The sample size was calculated by using the formula

$n = 4pq/d^2$

Where p=prevalence of cognitive impairment =3.36%[9]

q=100-p

=100-3.36

=96.64%

d=absolute error =1%

$$n = \frac{4 \times 3.36 \times 96.64}{1^2}$$

= 1298.84

≈1300

Total population covered by Ashok Nagar UHC is 27081 (According to 2001 census).

Therefore the persons aged 60 years and above were

$\frac{27081 \times 7.2}{100} = 1949.8 \approx 1950$

The corrected sample size, n^1 is

$$n^1 = \frac{n}{1+\frac{n}{N}} = \frac{1300}{1+\frac{1300}{1950}} = \frac{1300}{1+0.666}$$

$$= \frac{1300}{1.66} = 783$$

=783

A sampling frame was prepared and using a random number table 783 elderly will be selected from 1950.

Inclusion criteria:

1. Person aged 60 years and above
2. Permanent residents of the study area (residing for one year or more)

Exclusion criteria:

Person aged 60 years and above who are deaf, dumb or visually impaired.

Ethical Clearance

The present study was approved by J. N. Medical College Institutional Ethics Committee on Human subjects' Research. (Ref: MDC/PG/742 dated 21/10/2011)

Data Collection:

Elderly residing in urban field practice area of Ashok Nagar were interviewed; Socio-demographic profile of the study participant was collected using a predesigned pretested questionnaire by personal interview at the study participants' residence. To assess the cognitive impairment MMSE [29, 30] was carried out. For those who were illiterate a vernacular adaptation of MMSE i.e. HMSE [31] was used to assess cognitive impairment. In all of the elderly subjects IADL [32] Scale was applied. For those participants who fell in the category of cognitive impairment their caregivers were assessed for burden using Zarit Caregiver Burden Scale [33].

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Analysis: Codes were prepared for each options of the questionnaire. Data was entered in Excel sheet to prepare a master chart. SPSS version 18.0 software (Trial version) was used for analysis of the data. Tables and graphs were prepared by using Microsoft Windows 2010 software.

- Numerical socio-demographic variables were analyzed by means and standard deviations. Categorical data regarding socio-demographic factors and prevalence of cognitive impairment were summarized using percentages.
- Chi square test was used to find the association between various socio demographic variables and prevalence of cognitive impairment. Fischer's Exact Test was used for row by column tables.

Definition of study variables

Age: Age was recorded to the nearest completed years.

Illiterate: A person who cannot read and write.

Primary school: Person who has studied from first to seventh standard.

High school: Person who has studied eighth to tenth standard.

Pre-university / Diploma: Person who has studied up to Pre-University College second year or a diploma course.

Graduate: Person who has obtained any degree from the university.

Post graduate: person who has obtained a master's degree from the university.

Retired-a person who has ceased to work after attaining the age of 65 years and is eligible to claim pension.

***Socio-economic status*:**

Per capita income was classified using Modified B G Prasad's classification[21].

Social class.	**Prasad's classification 1961 (per capita income in Rupees/month)[21]**	**Modified Prasad's classification In study period 2012 (per capita income in Rupees/month)**
I	100 and above	4800 and above
II	50—99	2400 – 4779
III	30-49	1440 – 2399
IV	15-29	720 –1439
V	<15	719and below

Modification was done with the aid of multiplication factor (MF), which was obtained as below:

$$MF = \frac{\text{Value of consumer price index average for the study period (2012)}}{100} \times 4.93$$

$$= 969.21 /100 \times 4.93 = 48$$

As our study period was from 1st January to 31st December 2012, the mean consumer price index for the period was considered.

Average consumer price index for year 2012 was 969.21[34].

Nuclear family: The family consisting of married couple along with their dependent children.

Joint family: it consists of number of married couples and their children who live in the same household.

Three generation family: it consists of three generations related to each other by direct descent and living together.

Broken family - is one where the parents have separated or when death has occurred of one or both the parents.

Problem family–Problem families are those which lag behind the rest of the community. In these families the standards of life are generally far below the accepted minimum and parents are unable to meet the physical and emotional needs of the children[1].

Height: Height was measured without any footwear to the nearest 0.1cm using a standard calibrated bar. The elderly participants stood straight looking straight with heels, buttocks and back touching the vertical limb of the instrument. The horizontal movable limb was then lowered until it touched the head firmly and height was noted in centimeters[35].

Weight: Body weight was measured without any foot wear with minimal clothing to the nearest 0.1kg using a standard portable weighing machine and the scale was zeroed before each session and then weight was recorded in kilograms[35].

Body mass index: Body mass index was calculated using weight in kilograms divided by height in meters squared (kg/mt^2). The World Health Organization (WHO) recommended appropriate BMI for Asian population and their cut –off values were used for classification[22].

< 18.5kg/m^2 – underweight

18.5 to 22.9 – increasing but acceptable risk (normal BMI)

≥ 23 – increased risk (high BMI) [22].

Blood pressure: for recording blood pressure a standard mercury sphygmomanometer with the appropriate cuff size was used. The blood pressure was measured in sitting position. Three readings were taken within three minutes and mean of the three readings was recorded.

Morbidity –The WHO has defined morbidity as "any departure, subjective or objective, from a state of physiological wellbeing"

Classification of morbidities-these were classified according to

ICD-10.

Cognition: Thinking skills that include language use, calculation, perception, memory, awareness, reasoning, judgment, learning, intellect, social skills, and imagination [23, 24]

Classification of cognitive impairment [25]

MMSE/HMSE Score	Interpretation
0-10	Severe cognitive impairment
11-20	Moderate cognitive impairment
21-25	Mild cognitive impairment
26-31	Normal

Dementia- decline in mental ability severe enough to interfere with daily life [36].

CAREGIVER -A person who provides support and assistance, formal or informal, with various activities to persons with disabilities or long-term conditions, or persons who are elderly. This person may provide emotional or financial support, as well as hands-on help with different tasks[23].

RESULTS

The data obtained was tabulated and analyzed under the following headings:

I. Socio-demographic profile.

II. Morbidity profile.

III. Prevalence of Cognitive impairment and associated factors.

IV. Instrumental activity of daily living scale.

V. Caregiver's Profile and burden.

I. SOCIO-DEMOGRAPHIC PROFILE.

Table No 1**: Age distribution of study participants**

Age (in years)	Number	Percentage
60 – 69	536	68.45
70 – 79	192	24.52
80 – 89	49	6.26
≥ 90	6	0.77
Total	783	100

In the present study 783 participants were interviewed, out of which 536 (68.45%) were between 60 – 69 years age group, 192 (24.52%) were between 70 – 79 years of age, 49 (6.26%) were between 80 – 89 years of age and 6 (0.77%) were aged above 90 years. The mean age ± SD of the study subjects was 66.6 ± 6.78 years with median age 65 years and the range was 60 – 107 years.

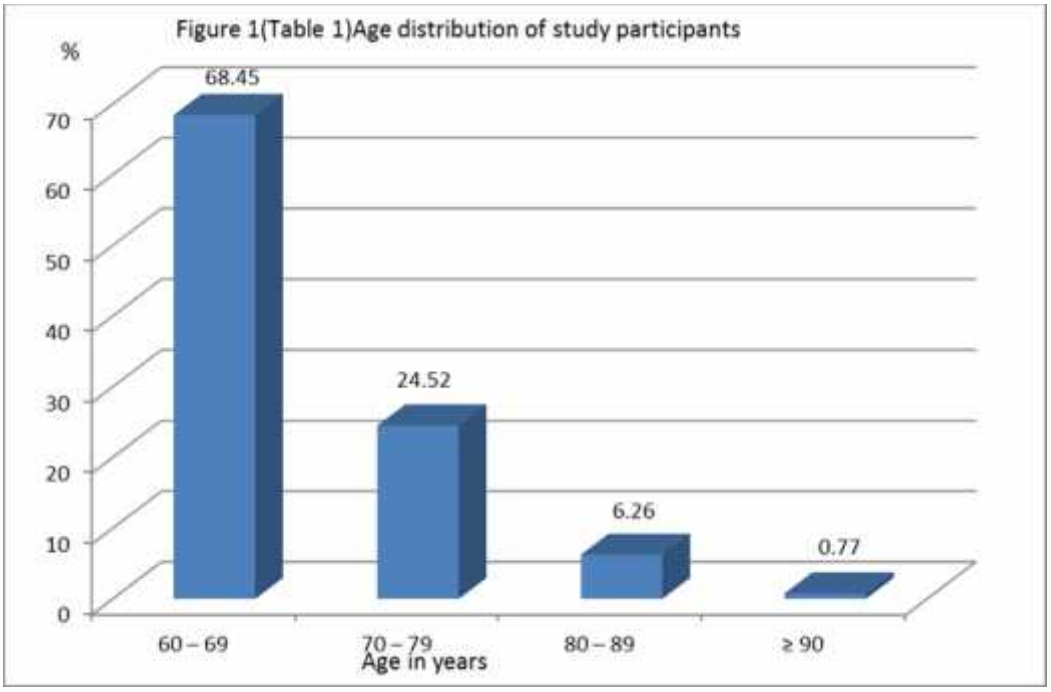


Table No 2: **Sex distribution of study participants**

Sex	**Number**	**Percentage**
Male	329	42.01
Female	454	57.99
Total	783	100

Out of the total participants, 329 (42.01%) were males and 454 (57.99%) were females. The mean age ± SD of the male subjects was 68.3 ± 7.41 years with median age 66 years and the range was 60 – 107 years. The mean age ± SD of the female subjects was 65.4 ± 6.02 years with median age 64.5 years and the range was 60 – 97 years.

Table No 3: Distribution of elderly according to religion

Religion	Number	Percentage
Hindu	523	66.79
Muslim	258	32.95
Christian	2	0.26
Total	783	100

Out of the total elderly studied, 523 (66.79%) were Hindus, 258 (32.95%) were Muslims and 2 (0.26%) were Christians.

Table No 4: **Literacy status of study participants**

Literacy status	Number	Percentage
Illiterate	64	8.17
Primary	419	53.52
High School	236	30.14
Pre-University	33	4.21
Diploma	1	0.13
Graduate	23	2.94
Post-Graduate	7	0.89
Total	783	100

Our study revealed that 719 (91.82%) were literates. Among them majority of the participants have studied up to primary school 419 (53.52%), 236 (30.14%) were educated upto high school,23(2.94%) were graduates and 7 (0.89%) elderly had obtained a post graduate degree.

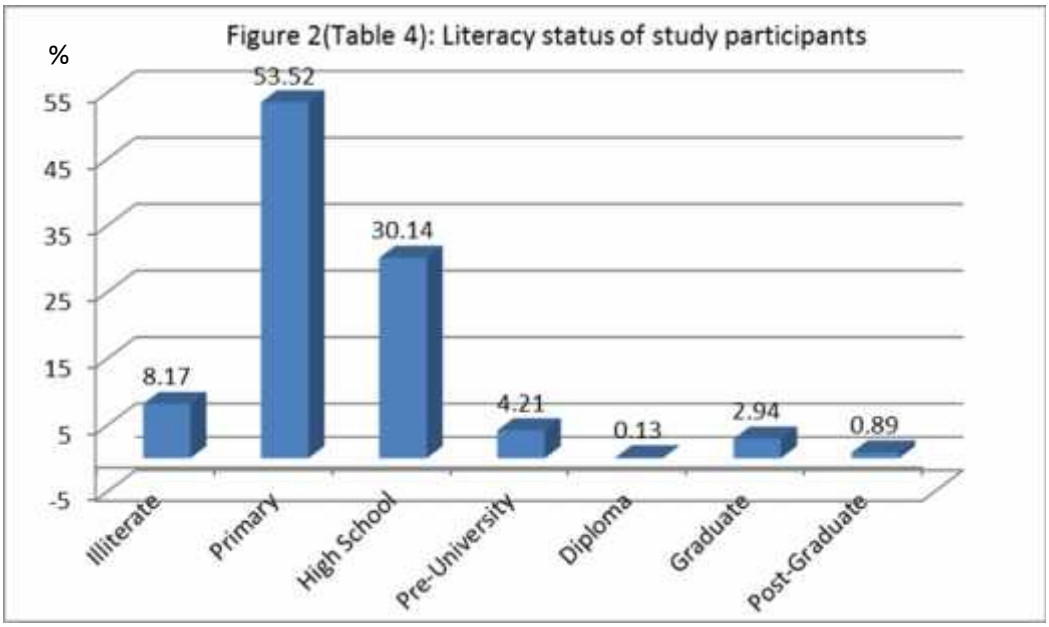


Table No 5: **Distribution of elderly according to their occupation**

Occupation	Number	Percentage
Housewife	435	55.56
Private Sector	175	22.34
Retired	130	16.60
Government Sector	43	5.50
Total	783	100

In our study, 435 (55.56%) were housewives, 175 elderly (22.34%) were working in private sector for earning their daily livelihood, 130 (16.60%) were retired from service and 43 (5.50%) were working in government sector.

Table No 6: **Distribution of elderly according to type of family**

Type of family	Number	Percentage
Nuclear	711	90.80
Joint	66	8.42
Three generation	2	0.26
Broken	2	0.26
Problem	2	0.26
Total	783	100

The majority of the elderly, 711 (90.80%) were living in nuclear families, 66 (8.42%) elderly were living in joint families, 2 (0.26%) each participants belonged to three generation, broken and problem families respectively.

Table No 7: **Marital status of study participants**

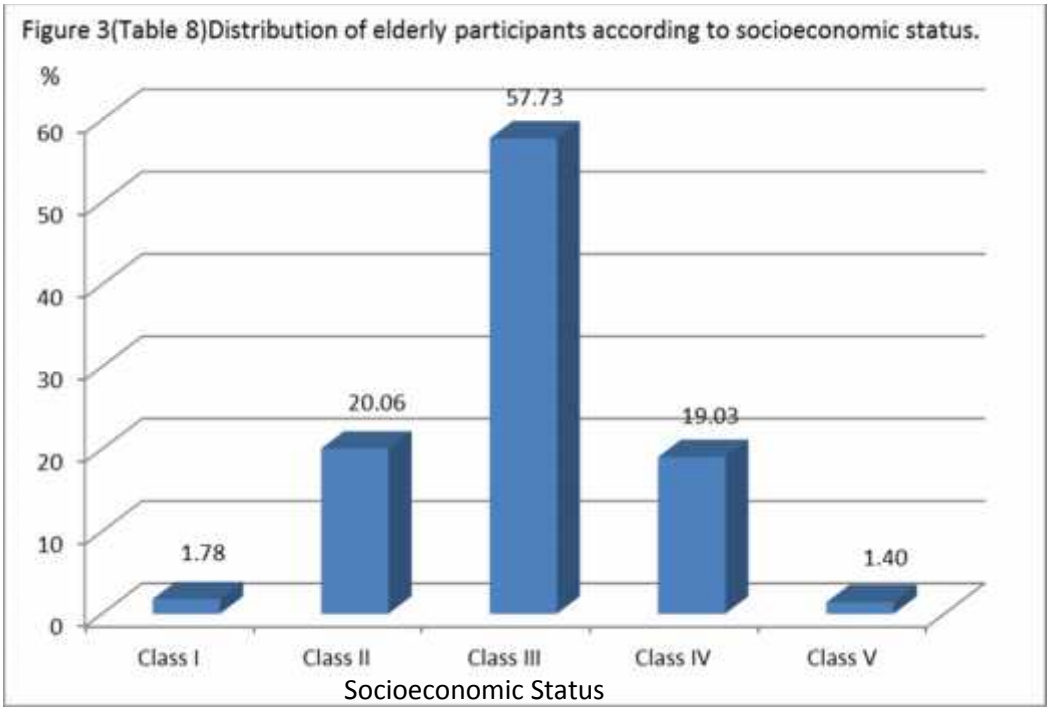
Marital status	Number	Percentage
Married	591	75.47
Widow/widower	165	21.08
Unmarried	27	3.45
Total	783	100

Of the 783 participants in our study, 591 (75.47%) of the elderly were married and living with their spouse, 165 (21.08%) were widows or widowers and 27 (3.45%) participants were unmarried.

Table No 8: **Distribution of elderly participants according to socioeconomic status.**

Socioeconomic status	Number	Percentage
Class I	14	1.78
Class II	157	20.06
Class III	452	57.73
Class IV	149	19.03
Class V	11	1.40
Total	783	100

As regards to socio-economic status, 14 (1.78%) belonged to class I, 157 (20.06%) belonged to class II, majority of the study participants 452 (57.73%) to class III, 149 (19.03%) belonged to class IV and 11 (1.40%) participants belonged to class V.



History of forgetfulness: Among 783 elderly studied, 624 (79.70%) had a history of forgetfulness during their daily routine, whereas 159 elderly (20.30%) had no history of forgetfulness.

Difficulty to perform daily routine: Among the total elderly studied, 674 (86.10%) had no difficulty to perform their daily routine and remaining 109 (13.90%) had difficulty to perform daily routine.

Dependence on relatives for daily activity: Of the total elderly studied, 703 (89.80%) were not dependant on their relatives for the daily activity but 80 (10.20%) did depend on the relatives for daily routine.

Table No 9: **Distribution of study participants according to tobacco chewing habit.**

Tobacco chewing habit	Number	Percentage
Current user	222	28.36
Past user	96	12.26
Non user	465	59.38
Total	783	100

Among the total elderly studied, 222 (28.36%) were currently chewing tobacco, 96 (12.26%) had chewed tobacco in the past and 465 (59.38%) did not have the habit of chewing tobacco.

Table No 10: **Distribution of study participants according to smoking habit**

Smoking habit	Number	Percentage
Current user	143	18.26
Past User	46	5.87
Non user	594	75.87
Total	783	100

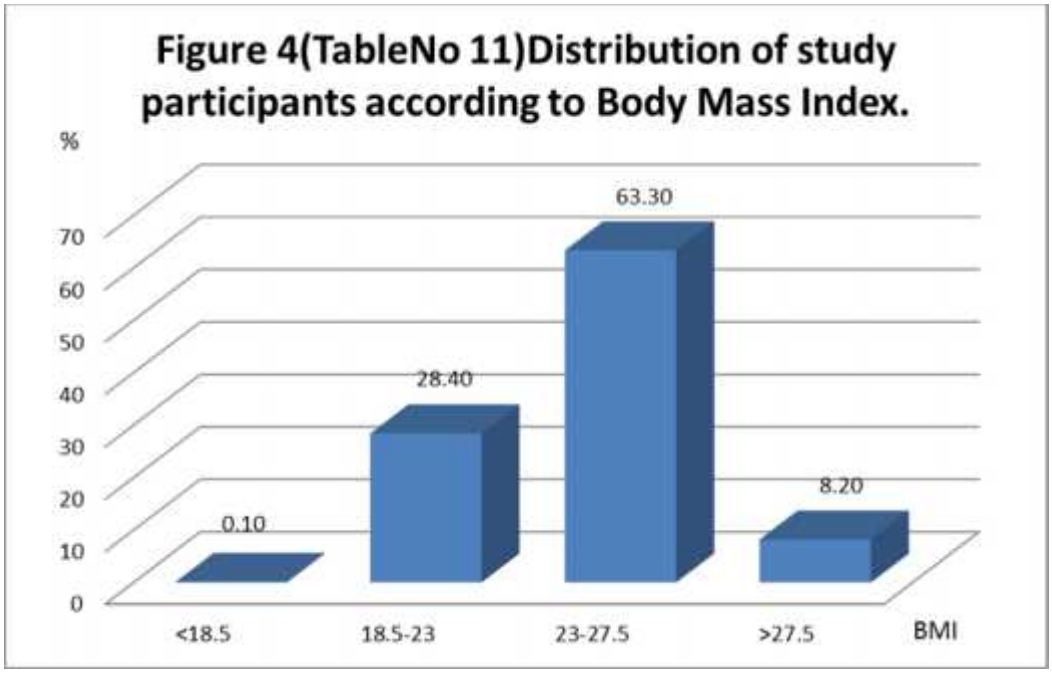
Of the total participants studied, 143 (18.26%) were currently smoking, 594 (75.87%) did not smoke, whereas 46 (5.87%) had past history of smoking cigarette/beedis.

Family history of hypertension, Diabetes Mellitus and Dementia--in the present study, 403 (51.46%) had family history of hypertension, 375(48.02%) Diabetes Mellitus and 44 (5.61%) elderly had family history of dementia.

Table No 11: **Distribution of study participants according to Body Mass Index.**

Body Mass Index	Number	Percentage
<18.5	1	0.10
18.5-23	222	28.40
23-27.5	496	63.30
>27.5	64	8.20
Total	783	100

Among the elderly studied, 1 (0.12%) was underweight, 222 (28.40%) had normal body mass index, 496 (63.30%) participants were grade I obese and 64 (8.20%) elderly had grade II obesity. The mean BMI ± SD of the subjects was 24.3 ± 2.2 with median 24.2 and the range was 18.0 - 31.0 kg/m^2. The mean BMI ± SD of the male subjects was 24.2 ± 2.1 with median 24.2 and the range was 18.6 to 30.1 kg/m^2.The mean BMI ± SD of the female subjects was 24.4 ± 2.2 with median 24.2 and the range was 18.0 to 31.0 kg/m^2.



II) Morbidity profile

Table No 12**: Distribution of study participants according to number of morbidities.**

Number of morbidities	Number	Percentage
None	18	2.30
One	421	53.70
> One	344	44.00
Total	783	100

Of the total participants, 765 (97.70%) were suffering from one or the other morbidity,421 (53.70%) suffered from one morbidity and 344 (44.00%) had more than one morbidity.

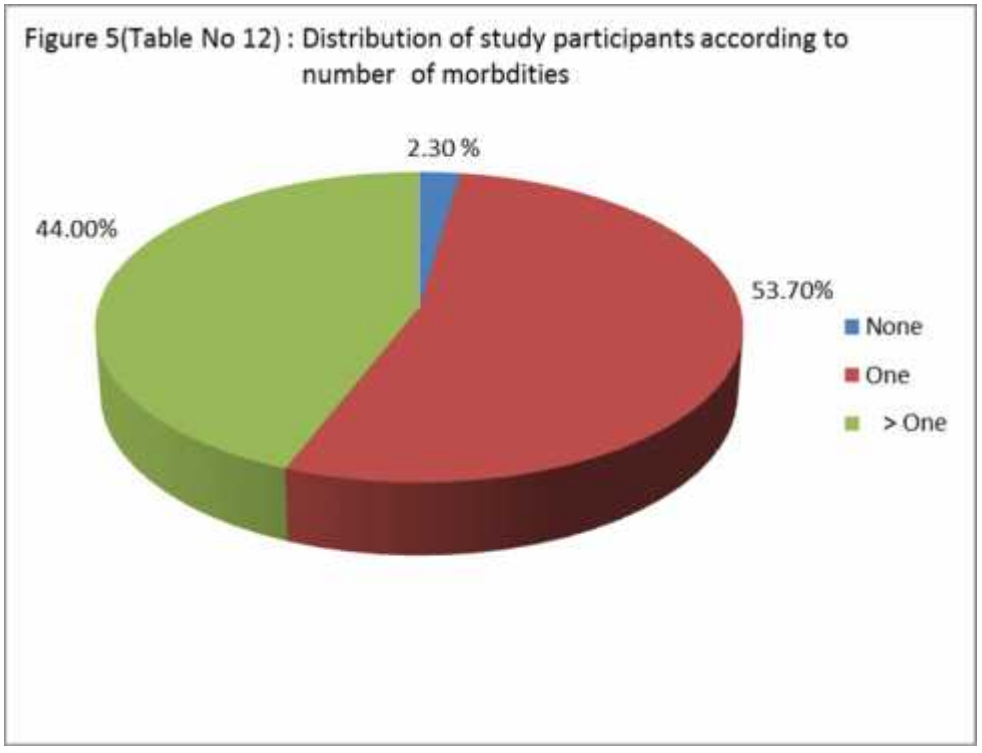


Table No 13: **Diseases of the blood and blood forming organs and certain disorders involving the immune mechanism**.

n=765

Disease	ICD- code	Number	Percentage
Iron deficiency anaemia	D 50	512	66.92
Vitamin B-12 Deficiency	D 51	97	12.67
Total		609	79.59

In the present study, majority 512 (66.92%) of elderly suffered from iron deficiency anaemia and 97 (12.67%) from vitamin B-12 deficiency.

Endocrine, nutritional and metabolic diseases –in our study diabetes mellitus was the only endocrine disease noted in 385(50.32%) of study participants.

Table No 14: **Diseases of the circulatory system**

n=765

Disease	ICD- code	Number	Percentage
Essential Hypertension	I 10	428	55.94
Secondary hypertension	I 15	11	1.43
Acute myocardial infarction	I 21	7	0.91
Hypertensive heart disease	I 11	6	0.78
Hypotension	I 95	2	0.26
Angina pectoris	I 20	1	0.13
Chronic ischaemic heart disease	I 25	1	0.13
Total		456	59.48

In the present study 428 (55.94%) elderly had primary hypertension, 11 (1.43%) had secondary hypertension, 7 (0.91%) had an attack of myocardial infarction, 6 (0.78%) were suffering from hypertensive heart disease, 2 (0.26%) suffered from hypotension and 1(0.13%) each had a history of angina pectoris and chronic ischaemic heart disease.

Table no 15: **Diseases of the respiratory system**

n = 765

Disease	**ICD CODE**	**Number**	**Percentage**
Acute lower respiratory tract infection	J 15	95	12.41
Bronchial asthma	J 45	11	1.43
Total		106	13.84

In this study 95 (12.41%) of the participants had acute lower respiratory tract infection and 11 (1.43%) were asthmatics.

Diseases of the musculoskeletal system and connective tissue

In our study, 186 (24.31%) elderly had complaints of joint pain and muscle aches.

Diseases of the genitourinary system

In the present study 10 (1.30%) elderly had history of stress and urge urinary incontinence.

III) Prevalence of Cognitive impairment and associated factors.

Table No 16: Distribution of study participants according to MMSE/HMSE score.

MMSE/HMSE Score	Number	Percentage
11-20 (Moderate CI)	5	0.64
21-25 (Mild CI)	50	6.38
26-31 (No CI)	728	92.98
Total	783	100

In the present study, 728 (92.98%) elderly scored between 26to 31 in MMSE/HMSE, 50(6.38%) scored between 21to 25 and 5 (0.64%) scored between11-20.The mean ± SD score was 27.9 ± 1.72 with median 28 and the range was from 20 to 31. The mean score ± SD for elderly with no cognitive impairment was 27.6 ± 1.41 with a range from 26-31 and mean score among elderly with cognitive impairment was 22.9 ± 1.51 with a range from 19-25. The overall prevalence rate of cognitive impairment in our study was 7.02%.Out of which 6.38% had mild and 0.64% had moderate cognitive impairment respectively. None of the elderly had severe cognitive impairment.

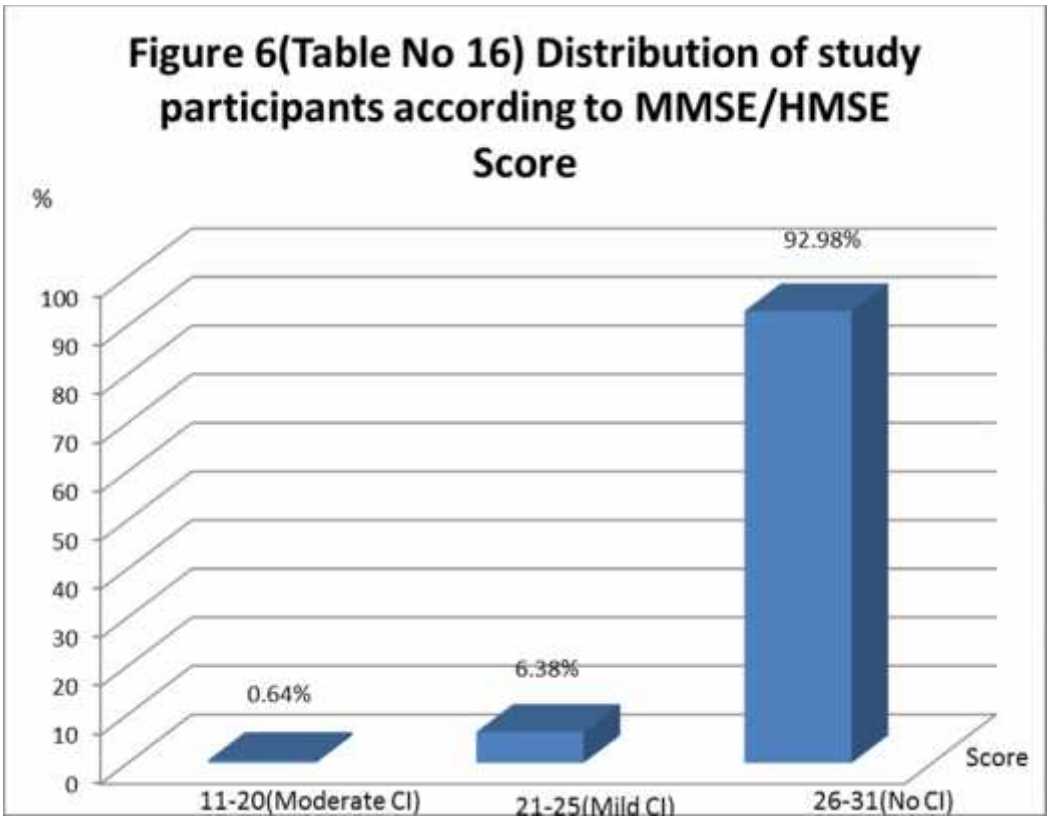


Figure 6(Table No 16) Distribution of study participants according to MMSE/HMSE Score
%
100
90
80
70
60
50
40
30
20
10
0
92.98%
6.38%
0.64%
Score
11-20(Moderate CI)
21-25(Mild CI)
26-31(No CI)

Table 17: Association between age of study participants and cognitive impairment.

Age (in years)	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
60-69	13	2.43	523	97.57	536	100
70-79	19	9.89	173	90.11	192	100
80-89	20	40.82	29	59.18	49	100
>90	3	50.00	3	50.00	6	100
Total	50	6.39	728	92.97	783	100

Fishers exact p=<0.001

The percentage of cognitive impairment was 50.00% in the study participants who were aged >90 years, followed by 40.82 % in 80-89 years age group,9.89% in 70 -79 years and 2.43% in 60-69 years age group. This difference in the distribution was statistically significant, as the age increased the cognitive impairment also increased (p=<0.001).

Table No 18: Association between sex of study participants and cognitive impairment.

Sex	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Male	11	3.34	318	96.66	329	100
Female	44	9.69	410	90.31	454	100

$\chi 2$ =11.771, df = 1 p=0.003

The percentage of cognitive impairment was 9.69% in female and 3.34% in male. There was statistical significant significance in the percentage of cognitive impairment among male and female (p=0.003).

Table No.19: Association between literacy status of study participants and cognitive impairment.

Literacy status	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Illiterate	22	34.38	42	65.62	64	100
Primary	29	6.92	390	93.08	419	100
High school	3	1.27	233	98.73	236	100
PUC	1	3.03	32	96.97	33	100
Beyond PUC	-	-	31	100	31	100

Fishers exact p= <0.001

The present study revealed that among 64 illiterate elderly, 22 (34.38%) had cognitive impairment .Whereas, out of the 419 elderly studied upto primary, 29 (6.92%) had cognitive impairment. Similarly, out of 236 elderly studied up to high school 3 (1.27%) had cognitive impairment. In the PUC group the percentage of cognitive impairment was 3.03%.The percentage of cognitive impairment was inversely related to literacy status and this was statistically significant ($p<0.001$).

Table no 20: Association between marital status of study participants and cognitive impairment.

Marital status	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Unmarried	2	7.41	25	92.59	27	100
Married	25	4.23	566	95.77	591	100
Widow / widower	28	16.97	137	83.03	165	100

Fishers exact p=<0.001

In the present study, out of the 591 married elderly 25 (4.23%) had cognitive impairment and among the 165 widow/widower 28(16.97%) had cognitive impairment. Whereas, out of 27 unmarried elderly 2 (7.41%) had cognitive impairment. The association between marital status of study participants and cognitive impairment was statistically significant (p=<0.001)

Table No 21: Association between socio-economic status of study participants and cognitive impairment

Socio – economic Status	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Class I	-	-	14	100	14	100
Class II	7	4.46	150	95.54	157	100
Class III	15	3.32	437	96.68	452	100
Class IV	30	20.13	119	79.87	149	100
Class V	3	27.27	8	72.73	11	100

Fishers exact p=<0.001

Out of the 14 elderly belonging to class I, none had cognitive impairment. In class II group, out of 157 elderly, 7 (4.46%) had cognitive impairment .Similarly among 452 elderly belonging to class III, 15 (3.32%) had cognitive impairment and among 149 elderly belonging to class IV 30 (20.13%) had cognitive impairment. Lastly in class V group, out of 11 elderly 3 (27.27%) had cognitive impairment. There was a statistical significant difference between the percentage of cognitive impairment among different socio-economic groups (p=<0.001)

Table No 22: Association between family history of dementia and cognitive impairment.

Family history of dementia	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Yes	10	22.72	34	77.28	44	5.62
No	45	6.09	694	93.91	739	94.38

Fishers exact p=<0.001

Out of the 44 elderly with family history of dementia, 10 (22.72%) had cognitive impairment. Thus family history of dementia was associated with cognitive impairment and was statistically significant (p=<0.001)

Association between type of family of study participants and cognitive impairment: The percentage of cognitive impairment was almost equal in the study participants belonging to joint family (6.39%) and nuclear family (6.06%). There was no association between the type of family and cognitive impairment (p=0.428).

Association between smoking habit in elderly and cognitive impairment: Out of the 144 elderly with the history of smoking, 4 (2.78%) had cognitive impairment. In 46 elderly with past history of smoking 1 (2.17%) had cognitive impairment. Whereas, in 593 elderly with no history of smoking, 50 (8.43%) had cognitive impairment. Thus, smoking was not significantly related to cognitive impairment in elderly (p=0.127)

Association between tobacco chewing and cognitive impairment: The present study revealed that among 222 elderly with current tobacco chewing habit, 16 (7.21%) had cognitive impairment.In 96 elderly with past history of chewing tobacco, 12 (12.50%) had cognitive impairment. Whereas, out of 465 elderly who never chewed tobacco 27 (5.80%) had cognitive impairment. Tobacco chewing was not associated with cognitive impairment among elderly in our study (p=0.144).

IV) INSTRUMENTAL ACTIVITY OF DAILY LIVING SCALE

Table No 23: Distribution of study participants based on the ability to use the telephone

Distribution of study participants based on the ability to use the telephone	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Able to use completely	-	-	90	100	90	100
Dials a few numbers	-	-	66	100	66	100
Answers telephone but doesn't dial	20	4.34	440	95.66	460	100
Unable to use telephone	35	20.95	132	79.05	167	100

$\chi 2$ =66.477, df = 3 p<0.001

All the elderly who were able to use the telephone completely and dial a few numbers were not cognitively impaired. Among the 55 cognitively impaired elderly, 20(4.34%) answered telephone but were unable to dial and 35(20.95%) were unable to use the telephone. This finding was statistically significant (p<0.001).

Table No 24: Distribution of study participants based on the ability to do shopping.

Distribution of study participants based on the ability to do shopping	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Able to shop independently	9	3.13	278	96.87	287	100
Shops independently for small purchases	6	2.31	253	97.69	259	100
Needs to be accompanied on any shopping trip	12	7.94	139	92.06	151	100
Unable to shop	28	48.27	58	51.73	86	100

***χ2* =101.484, df = 3 p<0.001**

Among the cognitively impaired elderly who were able to do shopping a small percentage 9(3.13%) were able to go shopping independently and a few 6(2.31%) shopped independently for small purchases, whereas 12(7.94%) needed to be accompanied on any shopping trip and 28(48.27%) were unable to shop. Whereas 728 elderly who were not cognitively impaired, 287(96.87%) were able to shop independently and 253(97.69%) shopped independently for small purchases. Thus with regards to shopping, majority of the cognitively impaired elderly were unable to shop and almost always needed someone to accompany them for a shopping trip and this difference was statistically significant (p<0.001).

Table No 25: Distribution of study participants according to the ability to prepare food.

Distribution of study participants based on the ability to prepare food.	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Prepares and serves meals with no difficulty	3	4.34	66	95.66	69	100
Prepares meals if supplied with ingredients	3	1.70	174	98.26	177	100
Heats and serves the prepared meal	4	2.86	136	97.14	140	100
Needs to have meals prepared and served	45	11.30	352	88.70	397	100

***χ2* =23.473 df = 3 p<0.001**

Among the 55cognitively impaired elderly, 3(4.34%) prepared and served meals with no difficulty, 3(1.70%) prepared meals if supplied with ingredients, 4(2.86%) heated and served the prepared meal and 45(11.30%) need to have meals prepared and served. Whereas among the 728 who were not cognitively impaired, 66(95.66%) prepared and served meals with no difficulty, 174(98.26%) prepared meals if supplied with ingredients, 136(97.14%) heated and served the prepared meal and 352(88.70%) needs to have meals prepared and served. It was statistically significant (p<0.001).

Table No 26: Distribution of study participants based on the ability of house keeping

Distribution of study participants based on the ability of housekeeping.	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Maintains house alone	2	3.13	62	96.87	64	100
Performs light daily tasks	4	8.00	46	92.0	50	100
Performs daily tasks but cannot maintain acceptable level of cleanliness	3	1.45	204	98.55	207	100
Needs help with all home maintenance tasks	8	10.81	66	89.19	74	100
Does not participate in home maintenance tasks	38	9.80	350	90.20	388	100

***χ2* =17.596 df = 4 p=0.001**

Among the 55 elderly who were cognitively impaired,

2(3.13%) maintained house alone, 4(8.0%) performed light daily tasks, 3(5.50%), needed help with all home maintenance tasks, 8(10.81%) performed daily tasks but cannot maintain acceptable level of cleanliness and 38(9.80%) did not participate in home maintenance tasks. As regards to housekeeping, majority of the cognitively impaired elderly did not participate in home maintenance tasks. Whereas those elderly who were not cognitively impaired were able to perform daily tasks but were not able to maintain acceptable level of cleanliness and this difference was statistically significant (p=0.001).

Table No 27: Distribution of study participants based on the ability to do laundry.

Distribution of study participants based on the ability to do laundry.	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Does personal laundry completely	-	-	53	100	53	100
Launders small items	9	3.03	288	96.97	297	100
Laundry must be done by others	46	10.62	387	89.38	433	100

***χ2* =19.848 df = 2 p<0.001**

Among the 55 cognitively impaired elderly none of the elderly were able to do personal laundry, 9 (3.03%) laundered small items and for 46(10.62%) the laundry must be done by others. Whereas among the 728 elderly who were not cognitively impaired, 53(100%) were able to do their personal laundry, 288 (96.97%) laundered small items and for 387(89.38%) the laundry must be done by others. This result was statistically significant (p<0.001).

Table No 28: Distribution of study participants based on the mode of transport.

Distribution of study participants based on the mode of transport	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Travels independently on public transport	1	0.86	115	99.14	116	100
Arranges own travel	2	4.20	46	95.80	48	100
Travels on public transport when accompanied by another	18	4.31	399	95.69	417	100
Travel limited to taxi	14	9.27	137	90.73	151	100
Does not travel	20	39.21	31	60.79	51	100

***χ2* =94.118 df = 4 p<0.001**

Among the 55 cognitively impaired elderly, 1(0.86%) travelled independently on public transport, 2(4.20%) arranged their own travel, 18(4.31%) travelled on public transport when accompanied by another, 14(9.27%) travel was limited to taxi and 20(39.21%) did not travel at all. Majority of the cognitively impaired elderly did not travel at all, and a few travelled only by means of a taxi, whereas the elderly with no cognitive impairment majority used public transport and a few travelled on public transport when accompanied by another person and this difference was statistically significant (p<0.001).

Table No 29: Distribution of study participants based on the responsibility of own medication.

Distribution of study participants based on the responsibility of own medication.	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Takes medications at right time in right dose	24	4.30	535	95.70	559	100
Takes responsibility if medication is prepared in advance in separate dosage	17	8.90	174	91.10	191	100
Is not capable of dispensing own medication	14	42.42	19	57.58	33	100

***χ2* =70.734 df = 2 p<0.001**

Among the 55 cognitively impaired elderly, 24(4.30%) took medications at right time in right dose, 17(8.90%) took responsibility if medication is prepared in advance in separate dosage and 14(42.42%) were not capable of dispensing own medication. Majority of the elderly participants took medications at the right time in right doses. There was difference with regards to taking medications among cognitively impaired and other elderly and this difference was statistically significant (p<0.001).

Table No 30: Distribution of study participants based on the ability to handle finances

Distribution of study participants based on the ability to handle finances	Cognitive impairment					
	Yes		No		Total	
	No	%	No	%	No	%
Manages financial matters independently	5	1.95	251	98.05	256	100
Manages day to day purchases but not banking	35	7.13	456	92.87	491	100
Incapable of handling money matters	15	41.67	21	58.33	36	100

***χ2* =76.241 df = 2 p<0.001**

Among the 55 elderly who were cognitively impaired, 5(1.95%) managed financial matters independently, 35(7.13%) managed day to day purchases but not banking and 15(41.67%) were incapable of handling money matters. Out of 728, 251(98.05%) managed financial matters independently, 456(92.87%) managed day to day purchases but not banking and 21(58.33%) were incapable of handling money matters. As regards to handling finances, majority of the elderly managed day to day purchases but not banking. The cognitively impaired elderly were incapable of handling finances and this difference was statistically significant (p=<0.001).

Upbringing of children affected among the cognitively impaired persons:

Out of 55 cognitively impaired elderly, 24 (43.64%) family members felt that the upbringing of children was affected.

Marriage prospectus affected in family having cognitively impaired persons. Among the 55 cognitively impaired elderly, 15 (27.27%) families had marriage prospectus affected due to the presence of a cognitively impaired person at home.

Pension allowances: In the present study, out of the 435 who were above the age of 65 years, 351 (80.68%) were getting pension and among them 18 (4.13%) had difficulty in getting the pension allowances.

V) CAREGIVERS PROFILE AND BURDEN

Table No 31: Age distribution of caregivers.

Age (in years)	Number	Percentage
<30	17	30.91
31-40	29	52.73
41-50	6	10.91
>50	3	5.45
Total	55	100

Among the caregivers 22 (40.00%) of them were males and 33 (60.00%) were females. Out of 55 cognitively impaired elderly, 17 (30.90%) caregivers were aged <30 years, 29 (52.72%) were in the age group of 31-40 years, 6 (10.90%) were between 41-50 years of age and 3 (5.45%) were more than 50 years of age. The mean age ± SD of the caregivers was 36.1 ± 8.0 years with median 35years and the range was 23 - 62 years. The mean age ± SD of the male caregivers was 39.7 ± 6.6 years with median 39.5years and the range was 30-56 years. The mean age ± SD of the female caregivers was 33.6 ± 8.0 years with median 34 years and the range was 23 to 62 years.

Table No 32: Distribution of caregivers according to relation of cognitively impaired person

Relation of cognitively impaired person with caregiver	Number	Percentage
Daughter	23	41.83
Son	22	40.00
Daughter in law	9	16.36
Owner	1	1.81
Total	55	100

Among the 55 caregivers, 23 (41.83%) of them were daughters, 22 (40.00%) of them were sons of the cognitively impaired elderly, 9 (16.36%) were daughter-in-laws and one person was the owner of cognitively impaired elderly.

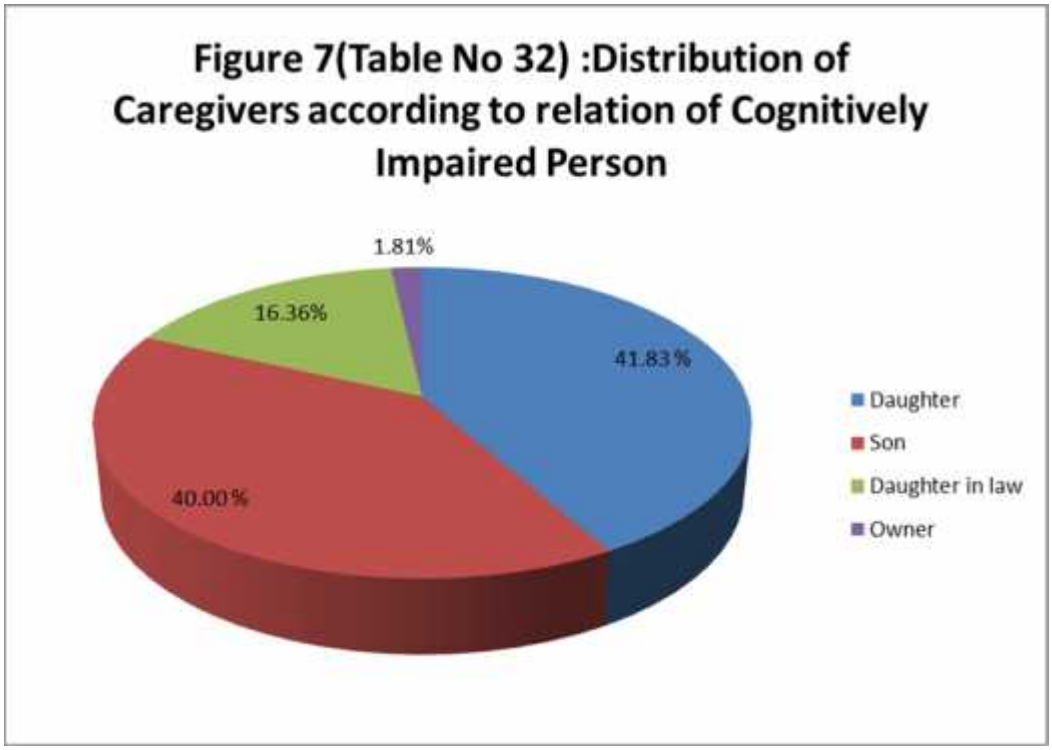


Table No 33: Distribution of caregivers according to literacy status

Literacy status	Number	Percentage
Primary	7	12.72
High School	15	27.27
Pre-University	24	43.63
Diploma	1	1.84
Graduate	8	14.54
Total	55	100

Out of 55 caregivers, 7 (12.72%) were educated up to primary school, 15 (27.27%) up to high school, 24 (43.63%) till pre university, 1 (1.84%) had studied diploma course and 8 (14.54%) were graduates.

Table No 34: Distribution of caregivers according to occupation

Occupation	Number	Percentage
Housewife	23	41.82
Private	20	36.36
Government	12	21.82
Total	55	100

Among the caregivers, 23 (41.82%) were housewives, 20 (36.36%) were working in a private set up and 12 (21.82%) in government sector.

Table No 35: Distribution of caregivers according to how often do you feel (general)?

How often do you feel?	Number	Percentage
There is not enough time for yourself	19	34.54
Overtaxed with responsibilities	29	52.73
Like you've lost control over your life	7	12.73
Total	55	100

Among the caregivers, 19(34.54%) felt that they had no enough time for themselves, 29(52.73%) felt overtaxed with responsibilities and 7 (12.73%) felt that they had lost control over their life.

Table No 36: Distribution of caregivers according to how often do you feel (caring)?

In regard to the relative for whom you are caring, how often do you feel (caring)?	Number	Percentage
Uncertain about what to do for your relative	39	70.90
Like you should do more for your relative	14	25.46
Like you could do a better job of caring	2	3.64
Total	55	100

Among the caregivers, 39 (70.90%) were uncertain about what to do for their relative, 14 (25.46%) of them felt that they should do more for the elderly and 2(3.64%) felt that they could do a better job of caring.

Table no 37: Distribution of caregivers according to how often do you feel?

When you are with the relative for whom you are caring, how often do you feel?	Number	Percentage
A sense of strain	4	7.27
Anger	22	40.00
Embarrassment	27	49.09
Uncomfortable about having friends over	2	3.64
Total	55	100

Among the caregivers, 4 (7.27%) felt a sense of strain, 22 (40.00%) nearly always got angry on the elderly, 27(49.09%) felt embarrassed and 2(3.64%) were not at all comfortable to have friends over in the presence of cognitively impaired person at home.

Table No 38: Distribution of caregivers according to how often do you feel that your relationship with the relative for whom you're caring negatively impacts?

How often do you feel that your relationship with the relative for whom you're caring negatively impacts	Number	Percentage
Your social life	32	58.18
Other relationships with family and friends	20	36.36
Your health	2	3.64
Your privacy	1	1.82
Total	55	100

Among the caregivers, 32(58.18%) had negative impact on their social life in the presence of cognitively impaired person at home, 20(36.36%) had other relationships with family and friends affected, 2(3.64%) had health problems and 1(1.82%) caregiver told privacy was affected.

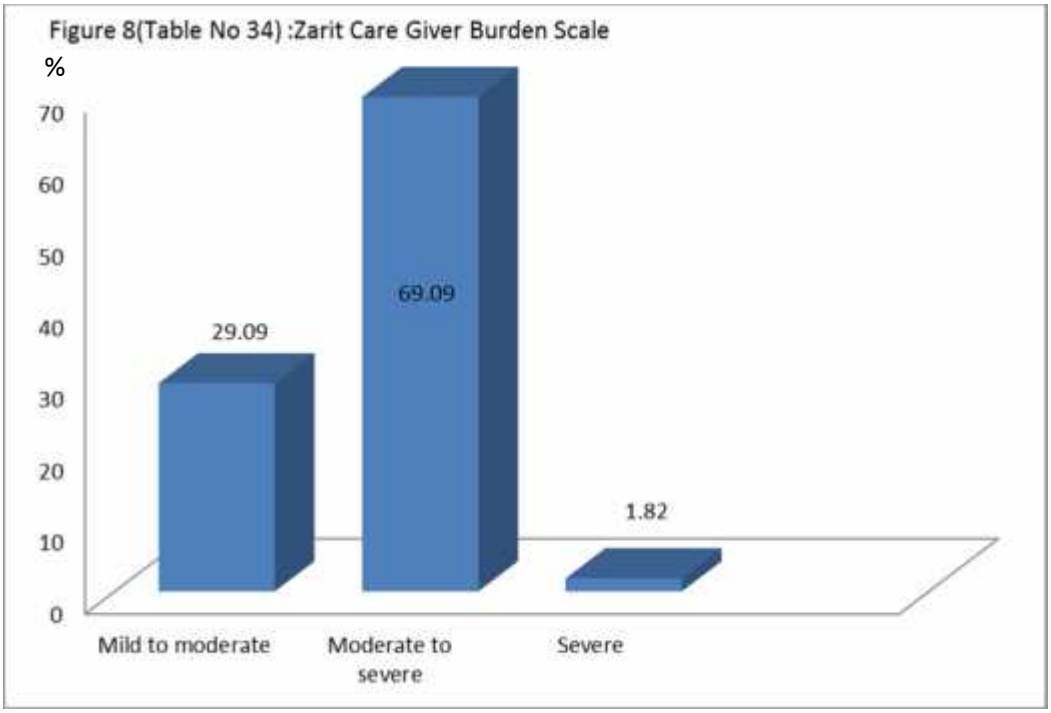
Table no 39: Distribution of caregivers according to how often do you?

How often do you?	Number	Percentage
Feel you receive excessive help requests	9	16.36
Feel all the responsibility falls on one caregiver	23	41.81
Fear the future regarding your relative	19	34.55
Fear not having enough money to care for your relative	4	7.28
Total	55	100

In the present study among the 55 caregivers, 9(16.36%) received excessive help requests by the cognitively impaired elderly in the family, 23 (41.81%) of them felt that all the responsibility fell on one caregiver, 19(34.55%) had a fear about the future of the relative and 4(7.28%) feared of not having enough money to care for their relative.

Table No 40: Zarit Caregiver Burden Scale

Caregiver burden	Number	Percentage
Mild to moderate	16	29.09
Moderate to severe	38	69.09
Severe	1	1.82
Total	55	100



In the present study 16 (29.09%) of the caregivers had a Zarit Caregiver Burden scale score of 21 to 40 and experienced mild to moderate burden, 38 (69.09%) had a score of 41 to 60 and experienced moderate to severe burden and only 1 (1.82%) caregiver had a score of 61-88 and experienced severe burden. None of the caregivers had no or minimal burden. The mean score ± SD of the caregiver was 45.2 ± 8.7with median 44 and the range was 28 - 66. The mean score ± SD of the male caregivers was 44.3 ± 7.5with median 44 and the range was 28 - 60. The mean score ± SD of the female caregivers was 45.8 ± 9.4 with median 45 and the range was 28 to 66.

DISCUSSION

The present study was undertaken in Ashok Nagar Urban Health Centre, which is the urban field practice area of Community Medicine Department, J.N.Medical College, Belgaum. The study population was 783 elderly.

I) Socio-demographic profile of study participants

Table No 1: Age distribution of study participants.

In the present study 783 participants were interviewed, out of which 68.45% were between 60 – 69 years age group, 24.52% were between 70 – 79 years of age, 6.26% were between 80 – 89 years of age and 0.77% were aged above 90 years. The mean age ± SD of the study subjects was 66.6 ± 6.78 years with median age 65 years and the range was 60 – 107 years. In a study done in urban area of Catanduva, Sao Paulo state of Brazil, about 37.10% were in age group 65-69 years, 28.40% were 70-74 years, 16.10% were 75-79 years, 12.0% in 80-84 years and 6.50% in 85-96 years age group[15].

Table No 2: Sex distribution of study participants:

Out of the total 783 participants, males were 42.01% and 57.99% were females. In a study done in Northern Israel, males were 49.37% and 50.63% were females[26].

Table No 3: Distribution of elderly according to religion:

Majority of the elderly (66.79%) were Hindus in our study and rest (32.95%) were Muslims and (0.26%) Christians. In a study conducted in Kerala, distribution of elderly according to religion was Hindus were 47.8%, Muslims 7.0% and Christians 45.2%[9].

Table No 4: Literacy status of study participants:

Our study revealed that 91.82% were literates. Among them majority of the participants have studied up to primary school 53.52%, 30.14% were educated upto high school, 2.94% were graduates and 0.89% elderly had obtained a post graduate degree. Literacy status of the study participants seen in Kerala study was 44.0% elderly had studied up to primary school, 27.90% elderly up to secondary, 6.90% up to higher secondary, graduates were 5.70% and 4.3% were post graduates and professionals[9].

Table No 5: Distribution of elderly according to their occupation.

In our study, a total percentage of 55.56% were housewives, about 22.34% were working in private sector for earning their daily livelihood, 16.60% were retired from service and 5.50% were working in government sector.

Table No 6: Distribution of elderly according to type of family:

The majority of the elderly 90.80% were living in nuclear families; about 8.42% elderly were living in joint families and 0.26% each participant belonged to three generation, broken and problem families respectively.

Table No 7: Marital status of study participants

Of the 783 participants in our study, majority of 75.47% of the elderly were married and living with their spouse, about 21.08% were widows or widowers and 3.45% participants were unmarried. Results seen among study participants of Kerala study, were 59.46% were married and 36.81% were widow/widower[9].

Table No 8: Distribution of elderly participants according to socioeconomic status: As regards to socio-economic status, a small portion(1.78%) belonged to class I, 20.06% belonged to class II, majority of the study participants 57.73% to class III, 19.03% belonged to class IV and 1.40% participants belonged to class V. Similar results were seen among study participants in Kerala, where 6.20% belonged to class I, 15.20% belonged to class II, 27.71% to class III, 30.24% to class IV and 20.68% to class V[9].

Table No 9 and 10: Distribution of study participants according to tobacco chewing and smoking habits

Among the total elderly studied, around 28.36% were currently chewing tobacco and 18.26% were currently smoking. In a study done in Taiwan 17.74% elderly had a habit of smoking cigarettes and 8.68% chewed betel quid[11].

Table No 11: Distribution of study participants according to Body Mass Index.

Among the elderly studied, 0.12% were underweight, about 28.40% had normal body mass index, whereas majority (63.30%) participants were grade I obese and 8.20% elderly had grade II obesity.In a study done in Taiwan 5.33% had BMI<19kg/mt^2, about 45.54% had BMI of 19-24 and 49.12% had a BMI of >25[11]. In another study done in New Delhi a BMI of 18.5-25 was detected in 52.05% elderly. About 33.04% were overweight and 14.90% had a BMI <18.5[10].

II)Morbidity profile.

Table No 12 to 15: **Distribution of study participants according to morbidities.**

Of the total participants, majority (97.70%) were suffering from one or the other morbidity, 53.70% suffered from one morbidity and 44.00% from more than one morbidity. Among the 1586 elderly in the Delhi study, 87.01% subjects had experienced one or more acute illnesses and 3.40% did not have any symptom suggestive of a chronic illness or a pre-existing disease[11].

The five leading causes of morbidity among our study participants were: iron deficiency anaemia in 66.92%, hypertension in 55.94%, diabetes mellitus in 50.32%, 24.31% elderly had complaints of joint pain and muscle aches, 12.67% had vitamin B-12 deficiency and acute lower respiratory tract infection was seen in 12.41%.In a study done in Delhi, the morbidities seen were: cataract among 48.50%, hearing defects in 31.62%, depression in 20.03% and urinary incontinence among 19.55%, [11]. In a study done in Kerala the five leading causes of morbidities included hypertension (41.50%), diabetes mellitus (36.00%), cardiac disease (24.00%), arthritis (19.50%) and stroke (14.60%) [9]. In a study done in Taiwan the results revealed that the leading causes of morbidities were: 42.61% had hypertension, 21.94% had hyperlipidaemia, 17.69% had heart disease and 16.09% had diabetes [11].

III) Prevalence of Cognitive impairment and associated factors

Table No 16: **Distribution of study participants according to MMSE/HMSE score:** In the present study, 92.98% elderly scored between 26 to 31 in MMSE/HMSE, about 6.38% scored between 21to 25 and 0.64% scored between11-20. The mean ± SD score was 27.9 ± 1.72 with median 28 and the range was from 20 to 31. The mean score ± SD for elderly with no cognitive impairment was 27.6 ± 1.41

with a range from 26-31 and mean score among elderly with cognitive impairment was 22.9 ± 1.51 with a range from 19-25.The overall prevalence rate of cognitive impairment in our study was 7.02%.Out of which 6.38% had mild and 0.64% had moderate cognitive impairment respectively. None of the elderly had severe cognitive impairment.

In a study done in Kerala of the 1934 screened with MMSE, 83.10% scored above the cut off score of 23 and 16.90% scored at or below the cut off score of 23. The mean score ± SD for all the subjects was 23 ± 0.2. Their mean score ± SD for cognitively impaired elderly was 17 ±5.24.The overall prevalence of cognitive impairment was 3.34%[9].In a study done in Taiwan,2727 participants were screened with MMSE,45.90% scored more than the cut-off point of 24 and 54.10% scored below the cut-off of 24.The mean score ± SD were 26.9 ± 2.5 for normal cognition and 18.0 ± 3.8 for cognitively impaired.The overall prevalence of cognitive impairment was 22.2%[11].In a study done in USA, out of 1770 elderly,814(45.98%) were screened with MMSE,37.71% scored above 25,67.43% scored below the cut off score 25.The mean score ± SD for elderly who scored above 25 was 27.84 ± 2.93,for CIND group score ± SD was 24.75 ± 3.27 and among the dementia group score ± SD was 15.94 ± 4.27.The overall prevalence of cognitive impairment progressed from 2-20%[14].

Table No 17 to 22: Association between socio-demographic factors and cognitive impairment.

The prevalence of cognitive impairment was associated significantly with socio-demographic variables like age (p=<0.001), sex (p=0.003),marital status(p<0.001), literacy status (p= <0.001), socioeconomic status (p=<0.001) and family history of dementia (p=<0.001). The prevalence of cognitive impairment was not associated with type of family, smoking habit and tobacco chewing habit. In a study done in

Taiwan, the prevalence of cognitive impairment was significantly associated with socio-demographic factors like age (p=0.000), sex (p=0.000), literacy status (p=0.000) and marital status (p=0.000)[11].In another study done in Brazil, the prevalence of cognitive impairment was significantly associated with socio-demographic factors like age (p=0.0000), gender(0.0133) and literacy status (p=0.0000)[15].

IV) Instrumental activity of daily living scale.

Table No 23 to 30: Instrumental activity of daily living scale.

In our study the functional activities were tested by IADL, among the cognitively impaired elderly all the functional activities were affected more than normal cognition individuals. This difference was statistically significant. The activities affected were ability to use telephone (χ^2 =66.477,df = 3, p<0.001), ability to do shopping (χ^2 =101.484, df = 3, p<0.001), ability to prepare meals (χ^2 =23.473,df = 3,p<0.001), ability of housekeeping (χ^2 =17.596,df = 4, p=0.001), ability to do laundry (χ^2 =19.848,df = 2,p<0.001),ability to travel independently (χ^2 =94.118,df = 4,p<0.001), responsibility of dispensing their own medications (χ^2 =70.734,df =2,p<0.001) and ability to handle finances (χ^2 =76.241,df = 2,p<0.001).

In a study done in Korea, the results of logistic regression analysis adjusted for age, sex, and education showed that there were significant differences between the two groups on the total S-IADL score (OR=2.07; 95% CI=1.59-2.71; p<0.001) and IADLs, such as the ability to use the telephone (OR=10.55; 95% CI=2.66-41.81; p=0.001), prepare meals (OR=3.33; 95% CI=1.65-6.70; p=0.001), take medication (OR=4.40; 95% CI=1.26-15.35 p=0.020). MCI patients showed significantly more impairment in the areas of using the telephone, preparing meals, taking medication,

managing belongings, keeping appointment, talking about recent events and leisure/hobbies than normal elderly controls[27].

V) Caregiver's profile and burden

Table No 31 to 40: Caregiver's profile and burden.

Among the 55 caregivers, 40.00% of them were males and 60.00% were females. Out of 55 cognitively impaired elderly, 30.90% caregivers were aged <30 years, 52.72% were in the age group between 31-40 years, 10.90% were between 41-50 years of age and 5.45% were more than 50 years of age. The literacy status of caregivers was as follows:12.72% were educated up to primary school, 27.27% up to high school, 43.63% till pre university, 1.84% had studied diploma course and 14.54% were graduates. Relation to cognitively impaired elderly 41.83% of them were daughters, 40.00% of them were sons, 16.36% were daughter-in-laws and one person was the owner.

In a study done in Brazil, among the 70 caregivers, 70.00% were in age group 59 years and below and 30% were aged 60 years and above. Regarding the education of caregivers, illiterates were 2.86%, 1 to 4 years of schooling 45.71%, 5 to 8 years 28.57%, 9 to 11 years 18.57% and 5.71% more than 12 years of schooling. Regarding the relation with cognitively impaired persons, 11.42% were spouses, 57.14% were children, In-laws were 12.86%, grandchildren were 5.71% and others were 12.86%[20]

In another study done in Egypt, on 288 elderly and their caregivers, 86.80% were males and 13.20% were females As regards to literacy status of caregivers 5.55% of caregivers were illiterate, 13.20% were able to read and write, 18.06% had read up to primary school, 55.21% up to secondary and 7.98% up to high school.Relation of the

cognitively impaired elderly,58.30% were wives, 8.0% were husbands, 28.50% were daughters and 5.20% were sons [28].

Table No 35-40: Zarit Care Giver Burden Scale.

Among the caregivers, about 34.54% felt that they had no enough time for themselves, about 52.73% felt overtaxed with responsibilities and 12.73% felt that they had lost control over their life. Majority (70.90%) caregivers were uncertain about what to do for their relative, about 25.46% of them felt that they should do more for the elderly and 3.64% felt that they could do a better job of caring. Few (7.27%) of the caregivers felt a sense of strain, 40.00% nearly always got angry on the elderly, 49.09% felt embarrassed and 3.64% were not at all comfortable to have friends over in the presence of cognitively impaired person at home. Among the caregivers, 58.18% had negative impact on their social life in the presence of cognitively impaired person at home, 36.36% felt other relationships with family and friends were affected, 3.64% had health problems and 1.82% caregiver told privacy was affected. Nearly 16.36% received excessive help requests by the cognitively impaired elderly in the family, 41.81% of them felt that all the responsibility fell on one caregiver, 34.55% had a fear about the future of the relative and 7.28% feared of not having enough money to care for their relative.

In this study 29.09% of the caregivers had a Zarit Care Giver Burden scale score of 21 to 40 and experienced mild to moderate burden, 69.09% had a score of 41 to 60 and experienced moderate to severe burden and only 1.82% caregiver had a score of 61-88 and experienced severe burden. The mean score ± SD of the caregiver was 45.2 ± 8.7 with median 44 and the range was 28 - 66.

In a study done in Brazil, the average Zarit caregiver burden score was 30 which indicated mild to moderate burden among caregivers of cognitively impaired elderly[20]. In a study done in Egypt, 10.10% caregivers experienced mild burden, 26.0% experienced moderate burden and 63.90% severe burden. The mean ± SD of caregiver burden score was 35 ± 14.1[28].In another study done in Brazil the average score was 30 which indicated mild to moderate burden among caregivers of cognitively impaired elderly. The mean ± SD of caregiver burden score was 30.3 ±17.3[20].

CONCLUSION

Majority of the elderly were young old (60-69years) in our study. The prevalence of cognitive impairment in India is between 2-4% among elderly living in an urban area[9] .This figure has been rising as the years have been progressing .The magnitude of the problem of cognitive impairment was 7.02% in our study area which was slightly higher compared to the national study data. The present study revealed that, a strong positive family history of dementia, low socio-economic status and low level of educational status were directly related to cognitive impairment among the elderly. As regards to the caregivers of cognitively impaired elderly, majority of them experienced a lot of physical, emotional, psychological stress and strain. Maximum of the caregivers were over taxed with responsibilities and felt that all responsibility fell on one caregiver.

LIMITATIONS

The limitations of the study are:

- Assessment of morbidity was done based on history and clinical examination.
- Our results cannot be generalized, as the study was conducted in one urban field practice area.
- Further evaluation of cognitively impaired elderly by the psychiatrist to know the etiology for dementia was not undertaken.

RECOMMENDATIONS

Based on the findings of our study, the following recommendations are being suggested for the overall improvement of health of the elderly:

- Establishment of Preventive Geriatric Clinics at the Urban and Primary Health Centres.
- Periodic health check-ups of the elderly at the geriatric clinic.
- Yearly screening of the elderly for early detection of cognitive impairment using MMSE, more so concentrating on those with positive family history of dementia, poor socioeconomic status, low educational level and living alone by themselves.
- Health education programs should be organized in the community for the elderly regarding principles of active ageing and common morbidity and disability conditions.
- Behaviour Change Communication campaign should be undertaken in the community to change the knowledge, attitude and practice of caregivers of the elderly.
- Programs for prevention of cognitive impairment to be launched by the Government and Non -Governmental agencies in order to prevent disability due to cognitive impairment and thus improve the quality of life of the elderly.

- Responsibility of care-giving to the elderly should be shared equally among all the household members to ease the burden on one caregiver.

- Rehabilitative services for the elderly such as Old age homes, Pension schemes, Meals on wheels, monthly house to house supply of medications and Geriatric Clubs should be established.

SUMMARY

The present cross sectional study was undertaken to know the prevalence of cognitive impairment among elderly residing in an urban area of Belgaum and to assess the burden of cognitively impaired elderly on caregivers in Ashok Nagar Urban Health Centre, an urban field practice area of Department of Community Medicine, J.N.Medical College, Belgaum. The duration of the study was from 1st January to 31st December 2012.The study population included 783 elderly residing in the study area. After obtaining informed consent the elderly were interviewed using predesigned and pretested structured questionnaire.

Among 783 elderly studied, majority (68.45%) were between 60 – 69 years age group, and a few (0.77%) participants were above 90 years of age.

Males were 42.01% and rest were females. Out of the total elderly studied majority (66.79%) were Hindus, rest were Muslims and Christians reflecting the population distribution of the study area. Most (91.82%) of them were literates, with a larger proportion (55.56%) being housewives. With respect to occupation 16.60% were retired and 90.80% belonged to nuclear families. Majority (75.47%) were married and living with their spouse but 21.08% were widows/widower. Most of them (76.76%) belonged to class III and IV socio-economic status according to Modified B.G.Prasad classification. Among the total elderly, 624 (79.70%) had a history of forgetfulness during their daily routine, 109 (13.90%) had difficulty to perform daily routine and 80 (10.20%) elderly did depend on the relatives for daily routine. Of the total elderly, 28.36% were currently chewing tobacco and 18.26% were currently smoking. In the present study, 51.46% had family history of hypertension, 48.02% diabetes mellitus and 5.61% elderly had

family history of dementia. As regards to BMI, majority (63.30%) of the elderly participants had grade I obesity and 8.20% elderly had grade II obesity.

With regards to morbidity, about 97.70% were suffering from one or the other morbidities and 44.00% had more than one morbidity. The major morbidities noted in our study were Iron deficiency anaemia among 66.92%, hypertension among 55.94%, diabetes mellitus among 50.32%, joint pain and muscle aches in 24.31%, vitamin B-12 deficiency in 12.67% elderly and acute lower respiratory tract infection (12.41%).

The prevalence of cognitive impairment was 7.02% in our study area. Among them 6.38% had mild cognitive impairment and 0.64% had moderate cognitive impairment. The prevalence of cognitive impairment increased with age ($p<0.001$) and was more among females probably attributed to the high life expectancy among women and was statistically significant ($p=0.003$). The percentage of cognitive impairment was inversely related to literacy status and socioeconomic status and this was statistically significant ($p<0.001$). The association between marital status and a positive family history of dementia of study participants and cognitive impairment was statistically significant ($p=<0.001$). Most of the cognitively impaired study participants could not perform daily routine tasks like using telephone ($p<0.001$), do shopping ($p<0.001$), meal preparation ($p<0.001$), housekeeping ($p=0.001$), laundry ($p<0.001$), difficulty in travelling ($p<0.001$), difficulty to take their own medications ($p<0.001$) and difficulty in handling finances ($p<0.001$). Out of 55 cognitively impaired elderly, (43.64%) of the family members felt that the upbringing of children was affected and 27.27% families had marriage prospectus

affected due to the presence of a cognitively impaired person at home. Among the elderly who were more than 65 years of age 80.68% were getting pension and 4.13% had difficulty in getting the pension allowances.

In the present study a major proportion (60.00%) of the caregivers were females, with 52.72% in the age group of 31-40 years,41.83% of them were daughters and 40.00% of them were sons of the cognitively impaired elderly. Among the caregivers 43.63% were educated up to pre-university and 36.36% were working in a private sector. In our study a good number of caregivers (29.09%) had a Zarit Caregiver Burden Scale score of 21 to 40 and experienced mild to moderate burden, majority (69.09%) had a score of 41 to 60 and experienced moderate to severe burden, a few (1.82%) had a score of 61-88 and experienced severe burden. Caregivers experienced emotional, financial, social and occupational burden.

LIST OF REFERENCES

1. Park K. Park's Textbook of Preventive and Social Medicine. 22nd Edition Jabalpur: Banarasidas Bhanot publishers 2013; 449, 549,634-37.

2. Ageing :Myth and Reality,Department of Communities, Child Safety and Disability Services,Queensland government 2012; 4 - 40

3. Gowri GB. Attitudes towards old age and ageing as shown by humor. *Gerontologist* 2003;17(2): 220-6.

4. Ferris S. Mild cognitive impairment- an early stage of cognitive impairment. Dementia 2004;(5):1-5.

5. Population Reference Bureau. Today's Research on Ageing 2012; 25:1-6

6. Gerontology- Meaning, Scope and Implications for Adult Education Journal of Education and Practice 2013;4 (2):12-18

7. Misiaszek CB.Geriatric Medicine Survival Handbook(online).URL: http//www.fhs.mcmaster.ca/medicine/geriatric/docs/Geriatric_Handbook08.pdf/[Cited 12/9/12].

8.Ray S, Nambiar D,Lakshmi JK, Sheikh K,Reddy SK.Aging in Asia- Findings from New and Emerging Data Initiatives 2012:(1)1-12.

9) Shaji S, Bose S, Verghese A. An epidemiological study ofdementia in a rural community in Kerala, India. British Journal of Psychiatry 1996; 168: 745-749.

10) Dey AB,Soneja S,Nagarkar K. Evaluation of the health and functional status of older Indians as a prelude to the development of a health programme.The National Medical Journal of India 2011;14 (3):5-8.

11)Wu S M,Lan.H T,Chen C M. Socio-demographic and health-related factors associated with cognitive impairment in the elderly in Taiwan:Biomedcentral Public Health 2011;(1)11-22.

12)Krishnaswamy S,Khadir K,Azmaan R.Prevalence of Dementia in elderly Malays in an urban settlement in Malaysia.Neurology Journal of SouthEast Asia1997;(2):15-16.

13) Graham JE, Rockwood K, Eastwood R, Beattle BL, Gauhier S, Toukko H et al. Prevalence and severity of cognitive impairment with and without dementia in an elderly population. Lancet 1997; 349: 1793-96.

14) Plassman BL, Langa KM, Fisher GG, Heringa SG, Weir DR, Ofstedal MB et al. Cognitive Impairment without Dementia in Older Adults. Annals Of Internal Medicine 2008; 148: 427- 34.

15)Herrera E,Caramelli P,Silveria BS. Epidemiologic survey of dementia in a community dwelling Brazalian population-Alzhiemers disease and associated disorders 2002;16 (2):103-108.

16)Paul C, Riberio O, Santos P. Cognitive impairment in old people living in community.Archives of Gerontology and Geriatrics 2010;(51):121-124.

17)Nunes B, Dsilva R, Cruz V. Prevalence and pattern of cognitive in Rural and urban populations from Northern Portugal. Biomedcentral Neurology.2010;(10):42.

18)Zhuang PJ, Wang G, Cheng Q. Cognitive impairment and associated risk factors among elderly in the Shanghai urban area.A pilot study from China.Transnational Neurodegeneration 2012;(1):22.

19) Weerasak M, Rungnirand P, Jintana A, Varalak S, Prasert A, Somboon I

Caregiver Burden and Needs of Dementia Caregivers in Thailand: A Cross-Sectional Study.J Med Assoc Thai 2010; 93(5):2-5

20) Gratao MC, Talmelli D, Haas JV. Assessment of caregiver burden with elderly having cognitive deficit. Acta Paul Enferm 2012;25(6):908-13.

21)Dudala RH, Arlappa H. International Journal of Research and Development of Health, An Updated Prasad's Socio Economic Status Classification for 2013. April 2013; (1):2.

22)Nishida C. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies The Lancet January 10, 2004; 363:157-163.

23) A glossary of terms for community health care and services for older persons WHO/WKC/Tech.Ser./04.2

24) http://www.alz.org/alzheimers_disease_stages_of_alzheimers.asp.

25). Vertesi A, Lever JA, Malloy DW, Standardized MMSE examination, use and interpretation. Canadian Family Physician 2001; (47):2018-23.

26)Afgin E, Massarva M, Schechtman E. High Prevalence of Mild Cognitive Impairment and Alzheimer's Disease in Arabic Villages in Northern Israel, Impact of Gender and Education. J Alzheimers Dis 2012 ; 29(2):431–39.

27)Ahn S, Kim H, Kim S. Impairment of Instrumental Activities of Daily Living in Patients with Mild Cognitive Impairment. Official Journal of Korean Neuropsychiatric Association,Psychiatry Invest ;2009(6):180-184.

28)Salama AA, El-Soud AA. Caregiver burden from caring for impaired elderly,a cross sectional study in rural Egypt.Italian journal of public health 2012;(9):4:2-4

29)Kurlowicz L, Wallace M, The mini mental state examination-The Hartford Institute of Geriatric Nursing: (online)www.hartford.ign@nyu.edu

30)Folstein M, Folstein SE, McHugh. Mini Mental State Examination,a practical method of grading the cognitive state of patients for the clinician. Journal of psychiatric research1975; 12(3):189-98.

31) Ganguli M, Ratcliff G, Chandra V, Sharma S, Gilby JE, Pandav R.A Hindi version of the MMSE: the development of a cognitive screening instrument for a largely illiterate rural elderly population in India. International Journal of Geriatric Psychiatry1995;(10):367-377

32)Lawton MP, Brody EM. "Assessment of older people: Self-maintaining and instrumental activities of daily living." Gerontologist1969;(9):179-86 .

33) Zarit SH, Reever KE, Bach-Peterson J. Relatives of the impaired elderly: correlates of feelings of burden. Gerontologist1980;20(6):649-55.

34)All India Consumer Price Index. [Internet] Available at: http://cyberjournalist.org.in/manisana/aicpinew.html. [Accessed on 12.05.2013].

35)Physical Status: The use and interpretation of Anthropometry. Technical Report Series No. 854. Geneva: World Health Organization; 1995: 3-7.

36)Definition of dementia(online)cited on 20september2012 URLhttp//www.alz.org/dementia.asp/.

ANNEXURE I – PROFORMA

Prevalence of cognitive impairment in elderly population residing in an urban area

1. Name:_____ _____	2. Age:_____	3)Gender: 1-Male 2-Female
4. Addrees_____ _____		
5. Education: 1) Illiterate 2) Primary 3) High school 4) PUC 5) Diploma 6) Graduate 7)Post graduate		
6. Occupation:		
7. Per capita income		
8. Type of family: 1) Joint 2) Nuclear 3)Three generation 4)Broken 5)Problem		
9. HISTORY OF a) Forgetfulness 1-Present 2-Absent b) Difficulty in performing daily routine 1-Yes 2-No c) Dependence on relatives for daily activities 1-Yes 2-No		
10. PAST HISTORY --- A. Diabetes 1-Present 2-Absent B. Hypertension 1-Present 2-Absent		
11. PERSONAL HISTORY ---- a) Smoking 1-Currently smoking 2-Smoking in the past 3-Never b) Tobacco Chewing 1-Currently chewing 2-Chewed in the past 3-Never chewed tobacco		
12. FAMILY HISTORY -A. Diabetes 1-Yes 2-No B. Hypertension 1-Yes 2-No C. Dementia 1-Yes 2-No D. Marital Status 1. Unmarried 2. Married 3. Widow/Widower 4. Divorcee		

PHYSICAL EXAMINATION

GENERAL PHYSICAL EXAMINATION			
A) Pallor	1) Present	2) Absent	
B) Icterus	1) Present	2) Absent	
C) Cyanosis	1) Present	2) Absent	
D) Built and nourishment	1) Poor	2) moderate	3) Well built and nourished
E)Height----------cm			

F)Weight----------kg

G)BMI----------kg/mt^2

H)Blood Pressure----------mm of Hg

SYSTEMIC EXAMINATION

E) Nervous System	1-Yes	2-No
F) Cardiovascular System	1-Yes	2-No
G) Respiratory System	1-Yes	2-No
H) Per Abdomen	1-Yes	2-No

The Mini-Mental State Examination

Maximum Score:

Orientation

5 ( ) what is the (year) (season) (date) (day) (month)?

5 ( ) Where are we (country) (state) (district) (area) (galli)?

Registration

3 ( ) Name 3 objects: 1 second to say each. Then ask the patient

all 3 after you have said them. Give 1 point for each correct answer.

Then repeat them until he/she learns all 3. Count trials and record.

Trials _____

Attention and Calculation

5 ( )Serial 7's. 1 point for each correct answer. Stop after 5 answers.

Alternatively spell "world" backward.

Recall

3 ( )Ask for the 3 objects repeated above. Give 1 point for each correct answer.

Language

2 ( ) Name a pencil and watch.

1 ( ) Repeat the following "No ifs, ands, or buts"

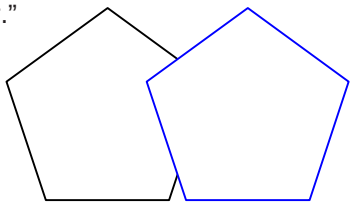
3 ( ) Follow a 3-stage command:

"Take a paper in your hand, fold it in half, and put it on the floor."

1 ( ) Read and obey the following: CLOSE YOUR EYES

1 ( ) Write a sentence.

1 ( ) Copy the design shown.



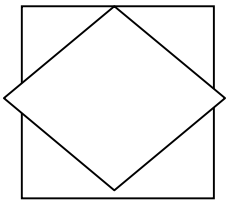
_____ Total Score

ASSESS level of consciousness along a continuum _____

Alert Drowsy Stupor Coma

10. HINDI MENTAL STATE EXAMINATION (HMSE)		**CORRECT**	**WRONG**
1	Is it morning or afternoon or evening?	1	2
2	What day of the week is today?	1	2
3	What date is it today?	1	2
4	Which month is today?	1	2
5	What season of the year is this?	1	2
6	Under which post office does your town come?	1	2
7	Which district does your town fall under?	1	2
8	Which town are you from?	1	2
9	Which galli or which numbered area is this	1	2
10	Which place is this?	1	2

11.	(I went to Delhi and brought three things –Mango, chair and coin) Can you tell me what Are the three things I brought from Delhi? **1 2 3**
12	(a) Now can you tell me names of the days of the week starting from Sunday? **1 2 3 4 5** (b) Now can you tell me names of the days backwards? **1 2 3 4 5**
13-15	What are the names of the three things Which I told you have brought from Delhi? **1 2 3**
16.	(Show the subject the wrist watch and pen) Can you tell me these objects? 1-Yes 2-No ***(If yes, Items 17 & 18 apply)*** ***(If No, Item 17(a) apply)***
17.	a) Show him the wrist watch and say what is this 1-Correct 2-Wrong b) If necessary, Identification of watch by Touching what is this? 1-Correct 2-Wrong
18.	a) Show him the pen and say – What is this? 1-Correct

	2-Wrong b) If necessary, Identification of watch by Touching what is this? 1-Correct 2-Wrong
19.	Now I am going to say something, listen carefully and repeat it exactly as I say after I finish Phrase: "NEITHER THIS NOR THAT" 1-Correct 2-Wrong
20.	Now look at my face and do exactly what I do. Close your eyes? 1-Correct 2-Wrong
21.	First you take the paper in your right hand, then with your both hands, fold it into half once and then give the paper back to me. **1 2 3**
22.	Now say a line about your house? (something specifically about your houses) NOT INCLUDED IN HMSE TOTAL 1- If Given 0- Not Given.
23.	Here is a drawing; you must copy this drawing exactly as shown in the space provided here. Score: Must draw two four sided figure =1 One figure should be mostly inside the other =2 Orientation of the figures should be obviously Appropriate =3 Total score = / 31 

24. INSTRUMENTAL ACTIVITY OF DAILY LIVING SCALE (IADL)
(A)**Ability to use the telephone**
1) Operates telephone on own initiative; looks up and dials numbers 1- Yes 2-No
2) Dials a few well known numbers 1- Yes 2-No
3) Answers telephone but does not dial 1- Yes 2-No
(4) Does not use telephone at all 1- Yes 2-No
(B)**Shopping**
1) Takes care of all shopping needs independently 1- Yes 2-No
2) Shops independently for small purchases 1- Yes 2-No

3) Needs to be accompanied on any shopping trip 1-

Yes 2-No

4) Completely unable to shop 1-

Yes 2-No

(C)Food preparation

(1) Plans, prepares and serves adequate meals independently 1-

Yes 2-No

(2) Prepares adequate meals if supplied with ingredients 1-

Yes 2-No

(3)Heats, serves and prepares meals or prepares meals but does not maintain adequate diet

1-Yes 2-No

(4)Needs to have meals prepared and served 1-

Yes 2-No

(D) Housekeeping

(1)Maintains house alone or with occasional assistance

1-Yes 2-No

(2)Performs light daily tasks like dish washing, bed making

1-Yes 2-No

(3)Performs light daily tasks such but cannot maintain acceptable level of cleanliness

1-Yes 2-No

(4)Needs help with all home maintenance tasks

1-Yes 2-No

(5)Does not participate in any housekeeping tasks

1-Yes 2-No

(E)Laundry

(1) Does personal laundry completely

1-Yes 2-No

(2) Launders small items; rinses stockings etc

1-Yes 2-No

(3) All laundry must be done by others

1-Yes 2-No

(F)Mode of transportation

(1) Travels independently on public transportation or drives own car

1-Yes 2-No

(2) Arranges own travel via taxi, but does not otherwise use public transportation

1-Yes 2-No

(3) Travels on public transportation when accompanied by another

1-Yes 2-No

(4) Travel limited to taxi or automobile with assistance of another

1-Yes 2-No

(5) Does not travel at all

1-Yes 2-No

(G)<u>Responsibility for own medications</u>

(1) Is responsible for taking medication in correct doses at correct time

1-Yes 2-No

(2) Takes responsibility if medication is prepared in advance in separate dosage

1-Yes 2-No

(3) Is not capable of dispensing own medication

1-Yes 2-No

(H)<u>Ability to Handle Finances</u>

(1)Manages financial matters independently (budgets,writes cheques,pays rent ,bills goes to bank),collects and keeps track of the income.

1-Yes 2-No

(2)Manages day to day purchases ,but needs help with banking, major purchases etc

1-Yes 2-No

(3)Incapable of handling money

1-Yes 2-No

(I) Is the upbringing of the children affected because of a cognitively impaired person at home?

1-Yes 2-No

(J) Are marriage prospectus of off springs affected because of a cognitively impaired person in the family?

1-Yes 2-No

(K) Do elderly patients get an allowance? 1-Yes 2-No

If yes,

(L) Any difficulty faced in getting these allowances? 1-Yes

2-No

25. CAREGIVERS PROFORMA

1. Name: _____ 2. Age: _____

3. Sex: 1-Male 2-Female 4. Relation with care receiver: _____

5. Educational status:_____ 6. Occupation: _____

26. ZARIT CAREGIVER BURDEN SCALE

Instructions: Read each statement and rate it on a scale from 0 (never) to 4 (nearly always)

In general, how often do you feel?	**Never**				**Nearly always**
1) There is not enough time for yourself ==========➔	0	1	2	3	4
2) Overtaxed with responsibilities ==========➔	0	1	2	3	4
3) Like you've lost control over your life ==========➔	0	1	2	3	4

In regard to the relative for whom you are caring, how often do you feel?	**Never**				**Nearly always**
4) Uncertain about what to do for your relative ==========➔	0	1	2	3	4
5) Like you should do more for your relative ==========➔	0	1	2	3	4
6) Like you could do a better job of caring ==========➔	0	1	2	3	4

When you are with the relative for whom you are caring, how often do you feel ?	**Never**				**Nearly always**
7) A sense of strain ==========➔	0	1	2	3	4
8) Anger ==========➔	0	1	2	3	4
9) Embarrassment ==========➔	0	1	2	3	4
10) Uncomfortable about having friends over ==========➔	0	1	2	3	4

How often do you feel that your relationship with the relative for whom you're caring negatively impacts?	**Never**				**Nearly always**
	0	1	2	3	4
11) Your social life	0	1	2	3	4
====➔	0	1	2	3	4
12) Other relationships with family and friends ====➔ 13) Your health ====➔ 14) Your privacy ====➔	0	1	2	3	4

How often do you:	**Never**				**Nearly always**
15) Feel you receive excessive help	0	1	2	3	4
requests ====➔	0	1	2	3	4
16) Feel all the responsibility falls on one	0	1	2	3	4
caregiver ====➔	0	1	2	3	4
17) Fear the future regarding your relative					
====➔ 18) Fear not having enough money to care for your relative ====➔ 19) Fear not being able to continue caring for your relative 20) Wish to leave the care of your relative to someone else					

21) How much does your spouse/loved one depend on you as the caregiver?	**Never**				**Nearly always**
	0	1	2	3	4

Please rate your overall level of burden in caring for your spouse/relative:	**No Burden at all**				**Burden**
(1) Mild Burden	0	1	2	3	4
====➔	0	1	2	3	4
	0	1	2	3	4

(2) Moderate Burden ====➔ (3) Severe Burden ====➔ (4) Extreme Burden ====➔	0	1	2	3	4

Interpretation:

a. No or minimal burden: 0 to 20

b. Mild to moderate burden: 21 to 40

c. Moderate to severe burden: 41-60

d. Severe burden: 61 to 88

ANNEXURE II

INFORMED CONSENT

PREVALANCE OF COGNITIVE IMPAIRMENT IN ELDERLY POPULATION RESIDING IN AN URBAN AREA

INVESTIGATORS: REG.NO. BD0111003

OBJECTIVE/ PURPOSE OF THE STUDY:
You are being invited to participate in this study to find the prevalence of cognitive impairment in elderly population residing in an urban area. I am conducting a study in Ashok nagar, under the guidance of Associate Professor of Community Medicine, JNMC, KLE University, Belgaum.

Procedure:
I will be interviewing elderly population aged 60 years and above using the Mini Mental State Examination. Those patients who are illiterate will be assessed by Hindi Mini Mental State Examination. Assessment of the burden among caregivers of cognitively impaired elderly will also be done. No laboratory investigations will be done. The interview will take not more than 45 minutes per participant.

Possible benefits:
You will not be eligible for any kind of monetary benefits or free services by virtue of your participation in the study.

Possible risks:
Methods applied to do the study are safe. No risk is involved in the study.

Cost of participation:
The cost of the study will be borne by the researcher. You will not have any costs attached to your participation.

Legal rights:
By signing this consent form you are not waiving any of your legal rights.

Privacy and Confidentiality:
The results of the study may be published in journals for scientific purposes. However your identity will not be revealed. All information collected will be coded so that no one other than the investigator will know your identity.

Withdrawal from the study:
You can withdraw from the study at any time if you wish to do so.

Authorization to publish the results:

The researcher may use the information gathered from this study for presentation in scientific meetings. However your identity will not be revealed.

Questions:

If you have any queries regarding the study, you can contact . If you have any questions about rights as a research participant you can contact Dr P. V. Patil, Chairman, J. N. M. C Institutional Ethics Committee on human subjects' research on 0831-2471350.

Consent Statement

I have been explained all the contents of this consent form in my local language and having understood and clarified all my queries about the study to the best of my knowledge, I here by give my voluntary consent for participation in the study. I do sign the informed consent form in front of an eyewitness whom I recognize.

Name and Signature/ left thumb impression of the participant:

Name and Signature of the interviewer:

Name and Signature/ left thumb impression of the eyewitness:

Date:

ANNEXURE –III

ETHICAL CLEARANCE LETTER

K.L.E.SOCIETY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELGAUM-590010 (KARNATAKA-INDIA)
(Affiliated to KLE University, Belgaum)

Website: http/www.jnmc.edu
E-Mail : domejnmc@sancharnet.in
: jnmc@sancharnet.in

Phone: (+ 91-(0)831 Office : 2471350
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/PG/ **Date: 21/10/2011**

To,

R E G . N O . B D 0 1 1 1 0 0 3

Postgraduate Student,

Department of Community Medicine,

J.N.Medical College,

BELGAUM.

Sub: Institutional Ethical Clearance for the study.

Dear Dr.

With reference to the above, I wish to inform you that the research project "**PREVALENCE OF COGNITIVE IMPAIRMENT IN ELDERLY POPULATION RESIDING IN AN URBAN AREA**", is Ethical and justifiable and has been cleared by the departmental Ethical Committee and College Dissertation and Research Committee.

(Dr. P.V. Patil),
Chairman
College Ethical Dissertation
And Research Committee,
J.N.Medical College, Belgaum.

ANNEXURE IV- KEY TO MASTER CHART

Sex –Male =1,Female=2

Literacy Status-Illiterate =1, Primary=2, High school=3

PUC=4, Diploma=5, Graduate=6, Post graduate=7.

Occupation-Retired=1, Government service=2, Private service=3,

Housewife=4

Socioeconomic status class I=1, class II=2,class III=3,Class IV=4,Class

V=5

Type of family- Joint =1, Nuclear=2, Three generation=3, Broken=4,

Problem=5

History of forgetfulness- Yes =1, No=2.

Difficulty to perform daily routine Yes=1, No=2.

Dependence on relatives for daily activities Yes=1, No=2.

Past History of Diabetes Yes=1, No=2.

Past History of Hypertension Yes=1, No=2.

Habits-Currently Smoking=1, Smoking in the past=2, Never smoked=3.

Chewing Tobacco-Currently chewing=1, Chewed in the past=2, Never chewed=3.

Family History of Diabetes Present =1, Absent =2.

Family History of Hypertension Present=1, Absent =2.

Family History of Dementia- Present=1, Absent =2.

Marital Status-Unmarried=1, Married=2, Widow/widower=3.

Morbidity-Yes=1, No=2.

IADL-Ability to use the telephone.

Operates telephone on own initiative; looksup and dials numbers =1

Dials a few well known numbers=2

Answers telephone but does not dial=3

Does not use telephone at all=4

Shopping-Takes care of all shopping needs independently=1

Shops independently for small purchases=2

Needs to be accompanied on any shopping trip=3

Completely unable to shop=4.

Food preparation- Plans, prepares and serves adequate meals Independently=1.

Prepares adequate meals if supplied with Ingredients=2.

Heats, serves and prepares meals or prepares meals but

does not maintain adequate diet=3.

Needs to have meals prepared and served=4

Housekeeping – Maintains house alone or with occasional assistance=1

Performs light daily tasks like dish washing, bed making =2

Performs light daily tasks such but cannot maintain

acceptable level of Cleanliness=3

Needs help with all home maintenance tasks=4

Does not participate in any housekeeping tasks=5.

Laundry- Does personal laundry completely=1

Launders small items; rinses stockings=2

All laundry must be done by others=3

Mode of transportation-

Travels independently on public transportation or drives own car=1

Arranges own travel via taxi, but does not otherwise use public transportation=2

Travels on public transportation when accompanied by another=3

Travel limited to taxi or automobile with assistance of another=4

Does not travel at all=5

Responsibility of own Medications-

Is responsible for taking medication in correct doses at correct time=1

Takes responsibility if medication is prepared in advance in separate Dosage=2

Is not capable of dispensing own medication=3.

Ability to handle finances-

Manages financial matters independently (budgets,writes cheques,pays rent ,bills goes to bank),collects and keeps track of the income=1.

Manages day to day purchases , but needs help with banking, major Purchases=2.

Incapable of handling money=3

Is the upbringing of the children affected because of a cognitively impaired person at home? Yes=1, No=2.

Are marriage prospectus of off springs affected because of a cognitively impaired person in the family?

Yes=1, No=2.

Do elderly patients get an allowance.

Yes=1, No=2.

Any difficulty faced in getting these allowances?

Yes=1, No=2.

CAREGIVERS PROFORMA.

.Sex of Caregiver-Male=1, Female=2.

Relation of caregiver with cognitive impaired elderly-

Son=1, Daughter=2, Daughter in law=3,

Owner=4.

Literacy status of caregiver- Illiterate =1, Primary=2, High school=3

PUC=4, Diploma=5, Graduate=6, Post graduate=7.

Occupation of Caregiver- Government service=1, Private service =2,

Housewife=3.