"ASSESSMENT OF DEPRESSION AMONG ELDERLY RESIDING IN AN URBAN AREA: A CROSS SECTIONAL STUDY"

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ENDORSEMENT BY THE HEAD OF DEPARTMENT, PRINCIPAL / HEAD OF THE INSTITUTION

This is to certify that the dissertation entitled **"ASSESSMENT OF DEPRESSION AMONG ELDERLY RESIDING IN AN URBAN AREA: A CROSS SECTIONAL STUDY"** is a bonafide and genuine research work done by **REG. NO.BD0113004.**

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LIST OF ABBREVIATIONS USED

ADL	–	Activities of daily living
ANOVA	–	Analysis of Variance
BMI	–	Body Mass Index
CF	–	Correction Factor
CI	–	Confidence Interval
DALY	–	Disability Adjusted Life Years
DBP	–	Diastolic Blood Pressure
df	–	Degree of freedom
DM2	–	Diabetes Mellitus type 2
GDS	–	Geriatric Depression Scale
HTN	–	Hypertension
ICD	–	International Classification of Diseases
Kgs	–	Kilograms
m	–	metre
OR	–	Odds Ratio
PHC	–	Primary Health Centre
PUC	–	Pre-University College
SBP	–	Systolic Blood Pressure
SD	–	Standard Deviation
SEAR	–	South East Asian Region
SES	–	Socio Economic Status
SPSS	–	Statistical Package for Social Sciences
WHO	–	World Health Organization
χ^2	–	Chi – square test

ABSTRACT

BACKGROUND AND OBJECTIVES

Depression in elderly is often overlooked as a clinical diagnosis, since it is assumed to be a normal response to ageing. In India, its prevalence ranges from 11 to 32% and is found to be significantly higher than the rest of the world. Burden of this disease is progressively increasing in urban population. Despite the known effectiveness of treatment for depression, the majority of people in need do not receive it. Earlier recognition of depression and its risk factors can reduce the morbidity and improve the quality of life. Hence this study was undertaken to assess depression and its associated risk factors among elderly residing in urban area.

METHODOLOGY

A community based cross sectional study, conducted from January to December 2014 among urban adults aged 60 years and above residing in Ashok Nagar area, Belagavi. A total of 850 participants were included in the study.

After obtaining the ethical clearance, pilot study was conducted. Written informed consent was obtained from every participant. Data was collected by house to house visit using a predesigned questionnaire, which included Socio-demographic details, KATZ Activity of Daily Living scale (KATZ ADL) and Geriatric Depression Scale-15 (GDS- Short Form). Statistical analysis was done using χ^2 test, Z test, Univariate and Multiple logistic regression analysis to find out the risk factors associated with depression and 'p' value less than 0.05 was considered significant.

RESULTS

Among 850 elderly studied, 409 (48.1%) were men and 441(51.9%) were women. The age ranged from 60 to 85 years with mean age of 68 years. Most (89.4%) of them, were literates, with a larger proportion (39.5%) being housewives, 73.3% belonged to nuclear families and 66.1% of participants had their own house. Around half (51.2%) of the population belonged to Class III socio-economic status. About 26.2% elderly were sedentary and 16.6% had difficulty to perform daily activities.

The prevalence of depression was found to be **36.7%**, with a higher preponderance in women than men (40.8% vs 32.3%). It was found to increase with advancing age. Significant association with depression were found with history of stressful events, personal or family history of depression and with problems in family. Disrupted marital status, lower socio economic status, chewing tobacco, alcohol consumption, presence of hypertension, diabetes, sedentary lifestyle and obesity were also significantly associated with depression. Depression was found to increase with increase in dependence in activities of daily living.

CONCLUSION AND INTERPRETATION

The present study revealed that the prevalence of depression was considerably high in the urban population in South India, with a significant gender difference. A positive family history of depression, disrupted marital status, low socio-economic status, substance abuse, chronic diseases and sedentary lifestyle were related to depression among the elderly studied. Mental wellbeing of the elderly in India needs to be given consideration in the health policy of the country.

KEYWORDS: Depression, Risk factors, Elderly, Geriatric Depression Scale, Activities of daily living, Urban area.

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INTRODUCTION

Ageing is a universal phenomenon. It is a series of processes which begins with life and continues throughout the life cycle, ending with death. It involves two opposing type of changes, evolution or growth and involution or atrophy. Both go on concurrently throughout life but atrophy predominates in old age. Tremendous advances in Medicine, Science and technology are continuing at a remarkable pace and offer real hope for a better and healthier future of mankind. This resulted in increased life expectancy which can be seen as a success story for public health policies and socio-economic development, but it also challenges society to evolve, in order to maximize the health and functional capacity of older people as well as their social participation and security. While extending our lifespan is desirable in itself, it is much more so if it can be accompanied by freedom from additional years of suffering with poverty, pain or disability.[1]

It was the "World Assembly on Ageing" held at Vienna in 1982, which marked the beginning of increasing concern about the ageing process and its socio-economic implications. The year "1989" was declared as the "International Year of the Aged".[2] The theme of "World Health Day" in 2012 was "Ageing and Health".[3] This reflects the concern of the world community for the aged.

The dramatic increase in life expectancy achieved during the 20th century is certain to have profound consequences for humanity. Half a century ago, the great majority of the global population died before the age of 50 years. Today, the great majority survives well beyond that age. Average life expectancy in developing countries is now 64 years and is projected to reach around 71 years by

the year 2020. Increased longevity without quality of life is an empty prize. While the ideal vision for everyone maybe to lead a physically and mentally healthy life well into old age, every year millions die prematurely or are disabled by diseases and conditions that, to a large extent, are preventable[4].

The definition of 'elderly' is commonly associated with the age one can retire or begin to receive pension benefits, so, the age 60 or 65 years are often used. The United Nations has agreed that 60 years and above may be usually denoted as old age[5]. Between 2000 and 2050, the proportion of the world's population over 60 years will double from about 11% to 22%. The absolute number of people aged 60 years and above is expected to increase from 605 million to 2 billion over the same period.

India's current population is 1.15 billion, out of which, population with age 60 years and above is projected to increase dramatically from 8% in 2010 to 18.4% in 2025.[4] India's population can now be classified as ageing since, United Nation defines a population as ageing, when proportion of elderly in population becomes 7% or more[6]. The Indian aged population is currently the second largest in the world[7]. By one measure, nearly 45% of India's disease burden is projected to be borne by elderly in 2030[8].

The overall prevalence of mental and behavioral disorders tend to increase with age due to the normal ageing of the brain, deteriorating physical health and cerebral pathology. Psychiatric morbidity among elderly people is frequent, severe and diverse leading to severe compromising of quality of life. Disorders such as depression, anxiety, cognitive and psychotic disorders have a high prevalence in this segment of the population. Depression is found to be the commonest geriatric psychiatric disorder[8]. International Classification of

Diseases (ICD-10) classifies depression under Mood (affective) disorders[9]. Prevalence of depression among elderly in the world is found to be 10 to 20%. It is found to be the 3rd leading contributor to global burden of disease (DALY-Disability Adjusted Life Years) in 2004. By the year 2020, it may increase to 5.7% of total burden and occupy 2nd place[10]. In India, its prevalence ranges from **11 to 32%** and is found to be significantly higher than the rest of the world[7].

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration. Moreover, depression often comes with symptoms of anxiety. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities. At its worst, depression can lead to suicide. Almost 1 million lives are lost yearly due to suicide, which translates to 3000 suicide deaths every day[11].

In elderly, depression is often overlooked as a clinical diagnosis, since it is assumed to be a normal response to ageing. Older adults may be reluctant to seek services for depression because of mental illness related stigma. They may also fear loss of financial security and independence, embarrassment, isolation, or incompetence. Hence, resulting in under-diagnosis. Despite the known effectiveness of treatment for depression, the majority of people in need do not receive it.

In India, depression is found to be more prevalent in urban areas than rural areas[7]. This may be due to the family system in India which is rapidly changing from rural joint family system to urban nuclear families because of the impact of many factors such as Industrialization, migration, diversification of

occupation and increasing participation of women in workforce. This has resulted in decreased chances for family support to the elderly. Urbanization leads to many problems such as increased cost of living, thereby the dependents are seen as a burden. They feel a sense of social isolation because of disjunction from various bonds like work relationship and diminishing of relatives and friends, mobility of children to far off places for jobs, etc.

The situation of elderly still worsens under the presence of chronic diseases, physical incapability and financial stringency. These may lead to depression reducing their quality of life to a great extent. If this problem is not addressed, it may result in increased suffering, dysfunction, morbidity and economic burden not only on the individual but also upon the family and the nation as a whole. Countries that invest in healthy ageing can expect a significant social and economic return for the whole community[4].

Only few studies have been conducted at community level to determine the prevalence of depression and associated risk factors in urban areas. Comprehensive community based data on depression is unavailable due to absence of a nationwide registry of the elderly. Studies are also lacking in finding the effect of depression on activities of daily living. For a realistic and need based planning of mental health care services, an assessment of prevalence of depression among elderly population living in the urban community is required. Therefore, this study is undertaken to first detect the prevalence of depression and its associated risk factors which will help other researchers to take some interventional studies to address the problem of depression among elderly.

OBJECTIVES

The objectives of the present study were:

1. To assess the prevalence of depression among elderly residing in an urban area.
2. To know the risk factors associated with depression among elderly.

REVIEW OF LITERATURE

Important life events that happen as we get older may cause feelings of uneasiness, stress, and sadness. For instance, the death of a loved one, moving from work into retirement, or dealing with a serious illness can leave people feeling sad or anxious. After a period of adjustment, many older adults can regain their emotional balance, but others do not and may develop depression.

Depression is a common problem among older adults, but it is NOT an inevitable part of aging. Unfortunately, many fail to recognize the symptoms of depression and do not seek medical help. The effects of depression go far beyond mood as it also impacts one's energy, sleep, appetite, interest in work, hobbies, relationships and physical health. Any co-existing chronic conditions like Diabetes, Hypertension, Thyroid disorders, Dementia, Stroke, Cancer etc., can also make its symptoms worse. Elderly are more prone for being pre-occupied with thoughts of dying, feeling hopeless or worthless, slowing of speech, reduced hearing abilities and inability to perform activities of daily living which increases the risk of developing depression.It is a serious illness which when left untreated, can lead to suicide.

Most common forms of Depression: [12]

1. **Major depression:** Severe symptoms that interfere with one's ability to work, sleep, study, eat, and enjoy life.

2. **Dysthymic disorder, or dysthymia:** Depressive symptoms that last a long time (2 years or longer) but are less severe than those of major depression.

3. **Minor depression:** Similar to major depression and dysthymia, but symptoms are less severe and may not last as long.

According to the observations made by the World Health Organization, the **correlates of depression** in old age were reported as[13]:

1. Genetic susceptibility

2. Chronic disease and disability

3. Pain, frustration with limitations in activities of daily living

4. Personality trait (dependent, anxious or avoidant)

5. Adverse life-events (widowhood, separation, divorce, bereavement, poverty, social isolation)

6. Lack of adequate social support

Screening tools for depression commonly used in elderly population[14]

1. **Geriatric Depression Scale (GDS):** It is a very useful tool in a variety of epidemiological and clinical settings. It originally contained 100 items, but this number was condensed to 30 questions (GDS Long Form) and then to 15 questions (GDS-Short Form). By several studies it was determined that, overall, the short form was an adequate substitute for the long form. Advantage of this test is the "yes/no" question format, which may be more acceptable in the elderly population. After thorough review of literature which studied the accuracy, validity and reliability of GDS-Short Form, we incorporated it in this present study.

2. **Beck Depression Inventory (BDI)** [15]**:** It is a 21-question multiple-choice inventory used for measuring the severity of depression. However, there is no evidence that the BDI is more valid or reliable than other depression scales.

3. **Montgomery-Asberg Depression Rating Scale:** It consists of 10 questions but does not assess somatic symptoms, which may be important in the elderly population.

4. **Zung Self-Rating Depression Scale:** It has been used widely in epidemiological studies and consists of 20 items. It uses graded responses (i.e., never, sometimes, usually, always) that may be confusing to elderly patients.

5. **Hamilton Rating Scale for Depression:** The HAM-D is a 21-item rating scale used to systematize clinical observations of features related to depression. But it has not been well validated in the geriatric population.

REVIEW OF STUDIES ON DEPRESSION:

In an urban area of **Raichur, Karnataka** a cross sectional study conducted on 182 participants (aged 60 and above) from July-October 2012 using Geriatric Depression Scale (GDS-30) revealed prevalence of depression to be **32.4%**. Mean age was 68.07 $\pm$ 12.98. Significant association of depression was found with low socio-economic status (65.2%), unemployment (54.4%), disrupted marital status (68%), illiteracy (55%) and substance abuse (58%). Association with age and gender were not significant. Since the sample size was small, the results cannot be extrapolated to general population.[16]

A cross sectional study done in the urban slums of **Dharwad, Karnataka** from November 2011-May 2012 included 218 elderly participants with the mean age of 65.1 years, revealed the prevalence of depression to be **29.36%** using GDS-30 scale. Females (31.39%) were found to be affected more than males (25.93%).Depression was found to be significantly higher among those who lacked adequate sleep (82.81%), lost their spouse (57.81%), physically inactive (76.56%), lacked social participation (45.31%), not engaged in daytime activities (60.94%) and with history of chronic diseases (54.69%). This study also evaluated GDS as an easy to administer and culturally acceptable tool to assess depression in a community. Role of risk factors leading to Depression among the

elderly was well studied in the sample population. Small sample size makes the results less representative to a large population.[17]

A community based study was conducted in an urban slum of **Mumbai** in the year 2007 to assess the epidemiological factors associated with geriatric population and depression. A sample size of 196 included all elderly aged above 60 years in the study area. Depressed elderly (using Geriatric Depression Scale) constituted **45.9%** of the study population and was more in females (57.8%). The significant variables associated with depression were poor socio-economic status, widowed, separated or unmarried status, non-working or dependency and illiteracy. Depressed elderly were more inclined towards substance abuse (58.13%), had disturbed sleep patterns (61.6%) and mostly suffered from acute/chronic illness.[18]

A cross sectional study was done during the year 2010 in **Surat city of Gujarat** on 105 persons who were aged over 60 years, using Becks Depression Inventory scale, revealed the prevalence of depression to be **39.04%**. The mean age of the participants was 69 ± 8.84 years. This study included elderly from old age homes, slums and residents of affluent areas. Higher rates were found in persons residing in old age homes (45.7%) and in affluent areas (34.3%). Significantly higher depression was found among elderly who were single (never married), widowed, divorced or separated (74.4%). This association was not observable in the slum area. There were no significant differences which could be attributed to gender. Since this study was conducted over a short period with a small sample size the results cannot be applied to general population.[19]

A large population-based cross sectional study included 25,455 participants aged 20 and above from the Chennai Urban Rural Epidemiology Study (CURES), randomly recruited from 46 of the 155 corporation wards of **Chennai** city in South India from June 2001-August 2012. Using Patient Health Questionnaire-12 (PHQ-12), the prevalence of depression was found to be **15.1%**. This low prevalence could be due to inclusion of subjects with age 20 and above. In the age group of 60 years and above, prevalence was noted to be **28.15%**.The study found an increasing trend in the prevalence of depression with age. Significant association was also found with female gender (females 16.3% vs. males 13.9%) and lower socio-economic status [Odds ratio 2.44 (1.24–4.81)]. The most common symptom was depressed mood (30.8%), followed by tiredness (30.0%), suicidal thoughts (12.4%) and speech/ motor retardation (12.4%).The strength was that it was a population based study having a very large sample size which included adults of all age groups.[20]

In **Ludhiana**, a cross sectional study was conducted in the year 2011 including 3038 elderly (>60 years old) residing in rural and urban areas. Physical impairment in the subjects was assessed with the Everyday Abilities Scale for India (EASI), depression by the 15-item Geriatric Depression Scale (GDS-15), and cognitive impairment by the Mini-Mental State Examination (MMSE). The prevalence of depression in the study population was **8.9%**. It was significantly higher in urban residents with nuclear families, females, older elderly, poor, functionally or cognitively impaired and in those who were living alone. In the multivariate analysis, unmarried/widowed status, unemployment, and illiteracy

did not emerge as risk factors. Strength of this study is the large sample size and comparison of rural and urban area residents.[21]

In a rural community of **West Bengal**, a cross sectional study was conducted in the year 1997 among 183 elderly population to know the prevalence of psychiatric morbidities, found 60% of the population were having psychiatry problems with higher morbidity in women compared to men (77.6% and 42.4% respectively). There was significantly more morbidity in population in the age group 70-74 years and ≥80 years. The total mental morbidity rate was as high as 61.2%. Depression was the commonest illness of among elderly in this sample, the prevalence being **52.2%**. Women had a higher rate of depression (70.4%). Another significant finding was the high rate of morbidity amongst the widowed persons (63.4%).[22]

In **New Delhi**, a cross-sectional study was conducted in the year 2001 among 1586 subjects aged ≥ 60 years of age (1035 men and 551 women) who attended the Geriatric Clinic of the All India Institute of Medical Sciences. Among all the psychiatric illness, depression accounted **50%.** Impairment of daily activities and cognition accounted for 6.9% and 5.1% of the diagnoses. The study had large proportion of men which might reflect the health seeking behavior for psychiatric illness. Though the study was done on large sample, but it did not reflect true prevalence of the disease in the community.[23]

A cross-sectional study was carried out in **Karachi** from July-September 2008 with individuals (n = 953) recruited through multi-stage cluster sampling technique, using the 15-item Geriatric Depression Scale (GDS). Prevalence of depression was found to be **40.6%**, with a higher preponderance in women than men (50% vs. 32%). Elderly currently not living with their spouses were 60% more depressed than those living with their spouses [Adjusted OR = 1.6 (95% CI = 1.3-2.1)]. Elderly who did not consider their children as future support were twice as likely to be depressed as those considering their children to be old age security [Adjusted OR = 2.1 (95% CI = 1.4-3.1)]. An increase in one male adult child showed 10% decrease in depression after adjusting for other variables [Adjusted OR = 0.9 (95% CI = 0.8-0.9)]. The strength of the study is that it aimed to find out the role of social support available to the elderly in detail. It didn't include homeless elderly, those living at old age homes and depressed elderly admitted in hospitals which could have given the complete picture.[24]

A cross-sectional study was conducted in **Iran** in the year 2013 involving 337 elderly subjects (193 females) who were selected using cluster sampling. Depressive symptoms and nutritional status were determined by the Geriatric Depression Scale (GDS) and the Mini-Nutritional Assessment (MNA) scores questionnaires, respectively. Study revealed a high prevalence of depression (43.62 %) which was associated with worsening of nutritional status (**48.01%**). GDS had a significant negative dependence with the MNA for the entire sample ($r=-0.58$, $p<0.0001$). However, there was no significant correlation between age and GDS or MNA scores. Women were found to be more depressed than men (27.9% and 15% respectively). The elderly subjects living in urban areas were

more depressed than those living in rural areas (39.46% and 3.85% respectively). The strength of this study is that it tried to find association of depression and nutritional status.[25]

Another cross sectional study conducted in **Tehran, Iran** included 244 residents aged 60 years or older from 17 nursing homes during 2010 to 2012, assessed for depression using 15-item GDS. The average age was 75.8 (±8.7) years, 53.3% were female (of whom 74.2% were housewives), 43.4% illiterate, and 32.0% were divorced or were living separately. The percentages of non-depressed, mild, moderate and severe depression were 9.8%, **50.0%, 29.5% and 10.7%,** respectively. Multivariate analysis showed that dissatisfaction with personnel of nursing homes and food quality had odds ratios of 2.91 (95% CI 1.33-6.36) and 2.64 (95% CI 1.44-4.87) respectively. Moreover, those who were sedentary had significantly higher risk of a more severe depression in comparison with those who did not [OR of 2.25 (95% CI 1.50-3.38) and 1.98 (95% CI1.24-3.18)] respectively). Study results cannot be generalized to general population since it is facility based.[26]

A cross-sectional study was conducted from August 2009 to June 2012 in Edirne, **Turkey**, and included 912 elderly individuals over 60 years of age with mean age of 68.05 ± 6.6 years. Data was collected using a survey form, the Katz Activities of Daily Living Scale, the Multidimensional Scale of Perceived Social Support, the European Quality of Life-5 Dimensions scale and the Geriatric Depression Scale (GDS). Data was analyzed using Spearman's correlation analysis. The level of depression were found to be lower ($p<0.05$). The quality of

life and geriatric depression improved with decreased number of drugs taken daily, the number of hospitalizations and the number of children and younger age. This study stressed on the importance of early detection/diagnosis of chronic diseases and depression using reliable scales, such as the GDS, and to develop primary, secondary and tertiary preventive health strategies to improve health conditions of elderly individuals to improve their quality of life. The strength of this study is the use of various scales, inclusion of history of hospitalization and drugs.[27]

A cross-sectional study done in 2011 included 3,174 inhabitants aged 60–64 years old in a rural area of **Korea**. Cognitive function was evaluated by the Korean version of the Mini-Mental State Examination (MMSE-K), and depression was measured using the short form of the Geriatric Depression Scale (GDS-15). The overall prevalence of cognitive impairment was 17.4%, that of depression was **26.0%**, and the comorbidity was 7.1%. Female gender, living with one housemate, and high GDS-15 score were significantly associated with increased cognitive impairment. Increased depression was significantly associated with bereavement and receiving benefits from the Medical Aid Program. Employed status, more years of schooling, and higher MMSE-K scores were significantly associated with decreased depression. The correlated risk factors were associated with all three conditions i.e., for cognitive impairment, depression and comorbidity.[28]

Data from 3 cross-sectional studies done in **Sweden** from 2000-2004 in which a total of 392 individuals living in community and residential care facilities were analyzed to know the prevalence of depression. The mean age of the study participants was 86.2 years and 72% were women. Depressive symptoms were assessed with the 15-item Geriatric Depression Scale (GDS-15), functional capacity with the Berg Balance Scale (BBS), and ADLs with the Barthel ADL Index. Results showed that 75% were dependent in ADLs, **42%** had depression, and 39% had dementia. Multiple linear regression analyses with comprehensive adjustments were performed between GDS-15 and BBS, GDS-15 and Barthel ADL Index, and GDS-15 and each individual ADL task, separately. GDS-15 score was associated with BBS score (unstandardized b = − 0.03, p = 0.008), but not with Barthel ADL Index score (unstandardized b = − 0.07, p = 0.068). Dependency in transfer (unstandardized b =−1.03, p=0.007) and dressing (unstandardized b =−0.70, p=0.035) were associated with depressive symptoms. Use of valid scales for assessing depression, activities of daily living and functional capacity forms the strength of this study. By merging data from three studies, the study sample is neither representative of the very old population or of residential care facility populations, which may limit the external validity of the results. Also, the females were proportionately higher.[29]

Another study done in **United States of America** from 2000-2002, assessed depressive symptom using Geriatric Depression Scale (GDS) and sleep parameters using actigraphy. Baseline were measured in 2,510 non-depressed men (67 years or older). Depressive symptoms were reassessed an average of 3.4 ± 0.5 years later. Of the 2,510 men without evidence of depression at baseline,

116 (**4.6%**) were depressed (GDS ≥ 6) at the follow-up examination. There was an association between poor self-reported sleep quality and higher odds of being depressed at follow-up (multivariable odds ratio [MOR] = 1.53, 95% CI). Strength of this study is that it looked into the effect of sleep pattern on depression and has a large sample size with good follow-up (> 90%). Since this study included only older, community-dwelling, primarily Caucasian men, therefore the results may not be applicable to other populations.[30]

In **Egypt**, a cross sectional study conducted from April 2012 to March 2013 involving 200 elderly medical inpatients were assessed for depression by interviews with patients and their family members using the 15-item Geriatric Depression Scale (GDS). Cognitive impairment was assessed by the Mini-Mental State Examination (MMSE) Scale, The prevalence of both depressive symptoms and cognitive impairment was **72%** and 30%, respectively. Significant associations were noticed between each of depressive symptoms and cognitive impairment, and low income and advancing age ($P < 0.01$), respectively. The strength of this study being use of valid scales to screen for depression and cognitive impairment. This study being facility based with a small sample, the results cannot be applied to general population.[31]

In **Florianópolis, Brazil** a cross-sectional population based epidemiological study (The EpiFloripa Elderly survey) was carried out between September 2009 and June 2010 in two stage clusters, census tracts and households, with 1,656 elderly individuals using GDS-15 scale. The prevalence of depressive symptoms were observed in **23.9%.** In the final model, depressive

symptoms were associated with: low levels of schooling [PR = 2.11 (95% CI 1.46-3.05)], being in a worse financial condition than at the age of 50 [PR = 1.33 (95% CI 1.02-1.74)]; cognitive impairment [PR = 1.45 (95% CI 1.21-1.75)]; perceiving their health to be regular [PR = 1.95 (95% CI 1.47-2.60)] or poor [PR = 2.64 (95% CI 1.82-3.83)], functional dependence [PR =1.83 (95% CI 1.43-2.33)] and chronic pain [PR = 1.35 (95% CI 1.10-1.67)]. Factors with protective effects were: physical activity in leisure time [PR = 0.75 (95% CI 0.59-0.94)]; participation in social or religious groups [PR = 0.80 (95% CI 0.64-0.99)] and having sexual relations [PR = 0.70 (95% CI 0.53-0.94)]. High response rate contributed to its internal validity, decreasing the chance of systematic errors, and reproducibility was satisfactory. This study had a large sample size, thereby the results can be extrapolated to the whole population.[32]

A retrospective study based on Systematic review on prevalence of geriatric depression was conducted on the community-based mental health surveys on geriatric depression conducted in continents of **Asia, Europe, Australia, North America and South America** between 1956 and 2005. A total of 65 original research studies that surveyed 99,297 elderly individuals in the age group of 60 years and above. The Median Prevalence Rate of geriatric depression in the **World** was determined to be **10.3%** with Interquartile Range varying between 4.6% and 16.0%. The Median Prevalence Rate of geriatric depression in **Indian** population was determined to be **21.9%** with Interquartile Range varying between 11.6% and 31.1%. The study found that apart from an increase in stress related injuries of brain, there was also an element of social isolation due to the failure of social support and network systems for elderly population in India.[33]

A Systematic Review (January 1966 to June 2001) and Meta-Analysis (January 1967 to June 2001) were performed in which MEDLINE and PsycINFO were searched for articles related to depression which were published around the **World**. The combined results of 20 prospective studies of risk factors for depression among elderly community subjects indicate that five factors (bereavement, sleep disturbance, disability, prior depression, and female gender) were significant risk factors for depression. The median interval between the determinations of risk factor status and depression status was 24 months. Study showed that around **8% to 16%** had depression. The prognosis of these depressive states was found to be poor. A meta-analysis of outcomes at 24 months estimated that only 33% of subjects were well, **33%** were depressed, and 21% had died. This study gives overview of research on depression around the world but the search was limited to articles published in English or French.[34]

METHODOLOGY

Source of data: The study was conducted at Ashok Nagar, which is one of the urban field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, Belagavi.

Map-1: Map of Belagavi city showing urban area of Ashok Nagar.

Map 2: Map of Study area - Ashok Nagar

Study design: A community based cross sectional study.

Study period: 1st January to 31st December 2014.

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

$$n = 4pq/d^2$$

Where p=prevalence of depression=32%[16]

$$q=100-p$$

$$=100-32$$

$$=68$$

d = Absolute error i.e., 10% of p = 3.2

$$n = \frac{4x32x68}{3.2^2}$$

$$= 850$$

Therefore, the sample size is 850.

Total population covered by Ashok Nagar Urban Health Centre is 31,733 (According to CNAA survey-2012)

According to Census 2011, the population above 60 years was 7.2%.

Therefore, the persons aged 60 years and above would be

$$\frac{31,733 \times 7.2}{100} = 2284.77 \approx 2285$$

Systemic random sampling involves a random selection of a house and sampling every K^{th} house (where K represents the constant sampling interval based on the number of households to be sampled from total households in each block). To cover 850 subjects among 2285 individuals, this method of sampling was applied and an elderly person from every 3^{rd} house was selected and included in the study.

Inclusion criteria:

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

Exclusion criteria:

1. Persons aged 60 years and above who are deaf or dumb.
2. Persons with severe illness who are unable to respond to questionnaire.

Ethical Clearance

The present study was approved by J. N. Medical College Institutional Ethics Committee on Human subjects' Research. (Ref: MDC/DOME/102 dated 05/12/2013- Annexure I)

Data Collection:

A questionnaire was prepared which included socio-demographic details such as age, sex, address, educational status, main work status (occupation), marital status, socio-economic status, personal habits, dietary habits, physical activity, etc. To assess depression, Geriatric Depression Scale Short Form (GDS-15) was used. To assess the activities of daily living we included Katz Index of Independence in Activities of Daily Living (KATZ ADL), which ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding (Annexure III). The questionnaire was pre-tested during a pilot study on 50 elderly individuals (5% of the sample size) to assess the flow and clarity of questions. Changes were made accordingly in the final questionnaire.

Personal interview was conducted by me at the study participant's residence in their local language (Kannada/Hindi) using the pretested questionnaire. Only one elderly person from each household was enrolled in the study. In the presence of two or more eligible elderly persons in a household, balloting was done to select one of them. Age was confirmed with the help of documents such as Ration card / *Aadhar* card / Voter Id, etc. Those who met the eligibility criteria and agreed to participate were introduced to the study, its objectives, procedures and possible consequences. The data was collected after obtaining the informed consent in their local language, in the presence of an eye witness.

Instruments used for data collection:

The instruments included in the study were, stethoscope, mercury sphygmomanometer with standard adult cuff, weighing scale and non-stretchable measuring tape. All the instruments were standardized and regularly checked for their validity and reliability, during the period of data collection.

Analysis:

Codes were prepared for each options of the questionnaire. The data was tabulated and master chart was prepared (Annexure IV). Statistical Package for Social Sciences (SPSS) version 21.0 software was used for analysis of the data. Tables and graphs were prepared by using Microsoft Windows 2013 software.

- Numerical socio-demographic variables were analyzed by means and standard deviations.
- Categorical data regarding socio-demographic factors and prevalence of depression were summarized using percentages.
- Pearson's Chi square test, Z test, Univariate and Multiple logistic regression analysis were used to find the risk factors associated with depression.
- A probability value (p value) of less than 0.05 was considered as significant.

Assessment of Depression:

Geriatric Depression Scale (GDS-15 Short Form)[35]:

It is a most widely used scale to assess depression in elderly both for clinical and research purposes developed by Yesavage et al. Of the 15 items, 10 indicated the presence of depression when answered positively, while the rest (question numbers 1, 5, 7, 11, 13) indicated depression when answered negatively A score of more than five were considered to have depression, as this cut-off is reported to have high sensitivity and specificity (Annexure III).

GDS Score interpretation:

GDS Score	Interpretation
0-5	No depression
6-10	Suggestive of depression
11-15	Always indicative of depression

Katz Index of Independence in Activities of Daily Living (Katz ADL) [36]:

It is an instrument to assess functional status as a measurement of the person's ability to perform activities of daily living independently. The Index ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding and scored "1" for each. (Annexure III).

KATZ ADL score	Interpretation
0	Completely dependent
1-5	Partially dependent
6	Independent

Definition of study variables:

Age: Age was recorded to the nearest completed years.

Religion: The participant's religion was noted and was grouped as "Hindu", "Muslim", "Christian" and "Others" (Jain, Buddhist, Parsi, etc).

Educational status:

The participants were asked about their highest level of completed education and were grouped into following categories:

1. **Illiterate**: A person who cannot read and write.
2. **Primary school**: A person who has studied from first to seventh standard.
3. **High school**: A person who has studied eighth to tenth standard.

4. **Pre-university**: A person who has studied up to Pre-University College second year.
5. **Diploma:** A person who has studied up to diploma course.
6. **Graduate**: A person who has studied up to graduation and has obtained a degree.
7. **Post graduate**: A person who has completed post-graduation and has obtained a post-graduation degree.

Occupation:

Each study participant was asked about his/her major occupation. This information was collected and grouped as follows:-

1. **Professionals:** This includes doctors, engineers, college lecturers, etc.
2. **Semi-Professionals:** This group includes office goers, clerical jobs, business men, shop owner, etc.
3. **Skilled workers:** Skill based jobs, such as technicians, mechanic, electricians, etc.
4. **Semiskilled worker:** Drivers, conductors, office attenders, security personnel, super visors, etc.
5. **Unskilled workers/ manual workers:** Occupations which involve physical exertion like masonry (stone work), farming, coolie etc.
6. **Housewife:** Woman who takes care of the day to day household duties without being paid.
7. **Retired:** A person who has ceased to work after attaining the age of 65 years and is eligible to claim pension.

Socio-economic status:

Information regarding per capita income (in Rupees / month) was collected and socio-economic status was classified using Modified B. G. Prasad's classification for the study period (2014).

Socio-Economic Class	**Prasad's classification 1961 (per capita income in Rupees/month)[37]**	**Modified Prasad's classification 2014 (per capita income in Rupees/month)**
I	100 and above	5571 and above
II	50-99	2786-5570
III	30-49	1671-2785
IV	15-29	836-1670
V	<15	Below 836

$$\text{Monthly Per Capita Income} = \frac{\text{Total monthly income of family}}{\text{Total members of family}}$$

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

As our study period was from 1st January to 31st December 2014, the mean consumer price index for the period was considered.

Average consumer price index for year 2014 was 1130[37].

$$CF = \frac{\text{Value of consumer price index average for the study period (2014)}}{100} \times 4.93$$

$$= \frac{1130 \times 4.93}{100} = 55.71$$

Modified B. G. P=Per capita family monthly income of 1961 (B.G. Prasad) x CF

Marital Status: Marital status was classified as "Married", "Unmarried" and "Widowed" and "Separated".

Type of Family:

1. **Nuclear family**: The family consisting of married couple along with their dependent children.
2. **Joint family**: It consists of more than one married couple and their children who live in the same household.
3. **Three generation family:** It consists of three generations related to each other by direct descent and living together.
4. **Broken family** – It is one where the parents have separated or when death has occurred of one or both the parents.

Diet: It includes type of diet i.e. vegetarian or mixed diet.

Physical activity:

The study subjects were questioned about their physical activities and grouped into one of the following group:[38]

1. **Physically inactive/ sedentary:** this group includes activities like watching TV, reading, sleeping, working at computer, office work, and mild house-hold work, etc.
2. **Mild physical activity:** it includes the activities such a house-cleaning, carpentry, gardening, slow walking and activities which includes mild physical exertion.
3. **Moderate physical activity:** it includes brisk walking (20 minute/mile), regular cycling either for house-hold or for recreational purpose, scrubbing the floors, etc.(1 mile = 1.6 kms)
4. **Vigorous physical activity:** Regular jogging, or running, cycling >10 miles/hr, manual digging, etc. or any activity which require severe physical exertion.

Smokeless tobacco use [39]:

Smokeless tobacco user: Subjects those who had used smokeless tobacco (Gutkha, Zarda, Khaini, Pan masala, etc.) in the past or using at present were considered as "smokeless tobacco user".

Current user of smokeless tobacco: The person who used any form of smokeless tobacco products (Snuff, Gutka, Chewing tobacco, etc.,) at least for the last one year.

Past user of smokeless tobacco: The person who used smokeless tobacco earlier but left using it for the last one year.

Never used: Subjects who had never used any form of smokeless tobacco.

Smoking tobacco:

Smokers: Subjects those who had smoked in the past or smoking at present were considered as “smokers”.

Current smoker: The person who smoked beedis or cigarettes at least for the last one year.

Past smoker: The person who smoked beedis or cigarettes earlier but left smoking for the last one year.

Non Smokers: Subjects who had never smoked any form of tobacco (Cigarettes / Beedi) were considered as “non smokers”.

Alcohol Consumption: For the assessment of history of alcohol consumption, period of recall was considered for the past one year.[39]

Alcoholics: Subjects who had consumed any drink containing alcohol either in the past or consuming at present were categorized as “alcoholics”.

Present alcoholic: The person who consumed alcohol at least for the past one year.

Past alcoholic: The person who consumed alcohol earlier but left consuming alcohol for the last one year.

Non Alcoholics: Subjects who had never consumed alcohol.

Social Participation:

Participants were asked regarding participation in social events such as marriages, parties, gatherings, visiting neighbours, etc., and asked to rate their level of participation as:

0: Do not participate

0.5: To some extent participate

1: Actively participate

Utilization of day time:

Participants were asked regarding their engagement in household activities during the daytime and rate as follows:

0: Not engaged in any activities

0.5: To some extent engaged

1: Well engaged

Recreation:

Participants were asked regarding their involvement in recreational activities like reading, watching television, listening to music, talking to family members, playing with kids, etc., and rate as follows:

0: Do not participate

0.5: To some extent participate

1: Actively participate

Sleep satisfaction:

Participants were asked to rate their satisfaction level of their sleep for the past 2 weeks as follows:

0: Not satisfied

0.5: To some extent satisfied

1: Satisfied

Locomotor disability[40]:

Persons having locomotor disability included those with:

a) loss or absence or inactivity of whole or part of hand or leg or both due to amputation, paralysis, deformity or dysfunction of joints which affected his/her "normal ability to move self or objects" and

b) Physical deformities in the body (other than limbs), such as, hunch back, deformed spine, etc.

Participants were asked whether they were able to move about without any difficulty/pain and assessed for any presence of physical deformities which could hinder mobility. Noted as "Present" or "Absent".

Stressful life events in past one year:

Participants were asked regarding presence of any stressful life events in the past one year and grouped as follows:

1. Accident
2. Death of family member
3. Abuse (physical/mental/sexual)
4. Others (relationship problems/neighborhood problems/irrelevant phone calls, etc.)

Personal history of depression: History of depression was assessed either by documentation by physician or if the person is on anti-depressant drugs.

Family history of depression: History of depression in family members was assessed either by documentation by physician or if they are on anti-depressant drugs.

History of Raised Blood Pressure (Hypertension):

History of raised blood pressure was assessed either by documentation by physician or if the person is on blood pressure lowering drugs.[39]

History of Diabetes Mellitus:

History of Diabetes Mellitus was assessed either by documentation by physician or if the person is on oral hypoglycemic agents or insulin or both.[39]

Problem in Family:

Participants were asked regarding presence of any problem in family and grouped as follows:

1. Health related problems (severe debilitating illness/recurrent illness etc.)
2. Social problems (quarrels/family issues/In-law issues, etc.)
3. Economic problems (Loan payment/insufficient money for basic expenditure, etc.)
4. Other problems (food scarcity/drug abuse/suicide, etc.)

Vision problems: Participants were asked regarding diminishing of vision or difficulty in reading or performing routine activities due to vision and noted as "Present" or "Absent".

Hearing problems: Hearing impairment was defined as the inability to hear a normal conversational tone at a distance of 1 mm and noted as "Present" or "Absent".

Abdominal complains: Participants were asked regarding presence of any gastro-intestinal complains such as pain/constipation/diarrhea and noted as "Present" or "Absent".

Urinary system complains: Participants were asked regarding presence of any urinary complains such as difficulty/uncontrolled passage of urine and noted as "Present" or "Absent".

Examination:

Pallor: Palpebral conjunctiva, skin over palm, nail beds, etc., were examined for pallor and noted as "Present" or "Absent".

Icterus: Skin and bulbar conjunctiva was examined for yellowish discoloration and noted as "Present" or "Absent".

Oedema: Face and feet were examined for presence of swelling and noted as "Present" or "Absent".

Oral cavity: Oral cavity was examined to look for presence of dentures, ulcers, stomatitis, gingivitis and glossitis and noted as "Present" or "Absent".

Height: The subject was asked to stand straight without footwear, with heels, buttocks and back straight and arms hanging by side. The height was measured from head to heel. The coinciding reading was measured to the nearest 0.1 cm using a metallic measuring tape.[39]

Weight: The subject was asked to stand straight without footwear, with heels, buttocks and back straight and arms hanging by side. The weight was measured using standard weighing scale.[39]

Calculation of Body Mass Index (BMI in Kg/m^2): Body mass index was calculated as:

$$\textbf{BMI} = \frac{\text{weight in Kgs}}{(\text{height in metre})^2}$$

Based on WHO and International obesity task force (IOTF), BMI cut-off standards for Asia and India, obesity was defined as below[41]:

Body Mass Index	Interpretation
< 18.5	Underweight
18.5-22.9	Normal weight
23-24.9	Overweight
≥ 25	Obese

Blood pressure measurement:

During the course of interview, three measurements of blood pressure of each study participant were measured using mercury sphygmomanometer at an interval of five minutes in sitting position. The reading of blood pressure was obtained after the subject had rested for at least five minutes in the seated position. The first blood pressure measurement was recorded after obtaining socio-demographic information from study subject, while second and third was recorded during clinical examination.

All blood pressure measurements were made on left arm of each subject, using an adult cuff of appropriate size covering 80% of the arm. The sphygmomanometer was kept at the level of the heart. The average of last two SBP and DBP reading in mm of Hg were noted to describe the blood pressure of the participant.[39]

Categorization of subjects by blood pressure levels:

The subjects were divided into "Normotensive", "Pre-hypertensive" or "Hypertensive" on the basis of their blood pressure levels according to JNC VII criteria.[42]

Category	SBP (in mmHg)	DBP (in mmHg)
Normotensive	≤ 120 and	≤ 80
Pre-hypertensive	121 – 139 or	81 – 89
Hypertensive	≥140 or	≥90

RESULTS

The present study was conducted in Ashok Nagar including 850 elderly participants during the period of January to December 2014. The data obtained was tabulated and analyzed under the following headings:

I. Socio-demographic profile

II. Prevalence of dependence in activities of daily living (using KATZ ADL score)

III. Prevalence of Depression and associated factors (using GDS-15 score)

I. SOCIO-DEMOGRAPHIC PROFILE:

Table 1: Age and Sex wise distribution of study participants (N=850)

Age (in years)	Male		Female		Total	
	no.	%	no.	%	no.	%
60 – 69	289	70.7	271	61.5%	560	65.9
70 – 79	93	22.7	142	32.2%	235	27.6
≥80	27	6.6	28	6.3%	55	6.5
Total	**409**	**100**	**441**	**100**	**850**	**100**
χ^2= 9.632 df=2 p=0.008						

In the present study, 850 participants were interviewed, out of which majority were between 60 – 69 years age group i.e., 560 (65.9%) with more men than women (70.7% and 61.5% respectively). In the age group of 70 – 79 years, 235 (27.6%) participants with more women than men (32.2% and 22.7% respectively). Out of 55 (6.5%) elderly in age group ≥80 years of age, both men and women were equal (6.6% and 6.3% respectively). The mean age of the study participants was 68.1 ± 6.37 years (range, 60–85 years). This difference in distribution was statistically significant with χ^2= 9.632 and p =0.008.

Figure 1: Age and Sex wise distribution of study participants (Table 1)

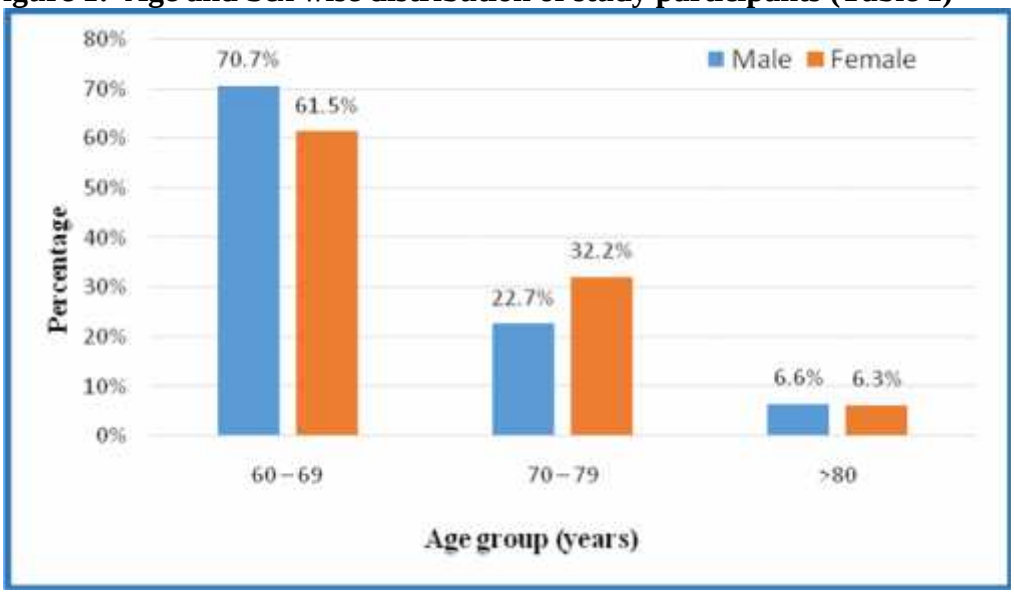


Table 2: **Mean age distribution of study participants according to sex**

Sex	Mean age ± SD (years)	Range (years)
Male	67.1 ± 6.33	60 - 85
Female	69 ± 6.29	60 - 85
Both	68.1 ± 6.37	60 - 85
Z=4.32 p<0.001		

Out of the 850 participants, 409 (48.1%) were males and 441 (51.9%) were females. The mean age of female participants was more than males (69 ± 6.29 and 67.1 ± 6.33 years respectively). This difference in distribution was found to be statistically significant with Z = 4.32 and p<0.001.

Table 3: Distribution of study participants according to religion

Religion	Number	Percentage
Hindu	511	60.1
Muslim	294	34.6
Christian	45	5.3
Total	**850**	**100**

A major number of participants, 511 (60.1%) were Hindus followed by 294 (34.6%) Muslims and 45 (5.3%) Christians.

Figure 2: Distribution of study participants according to religion

(Table 3)

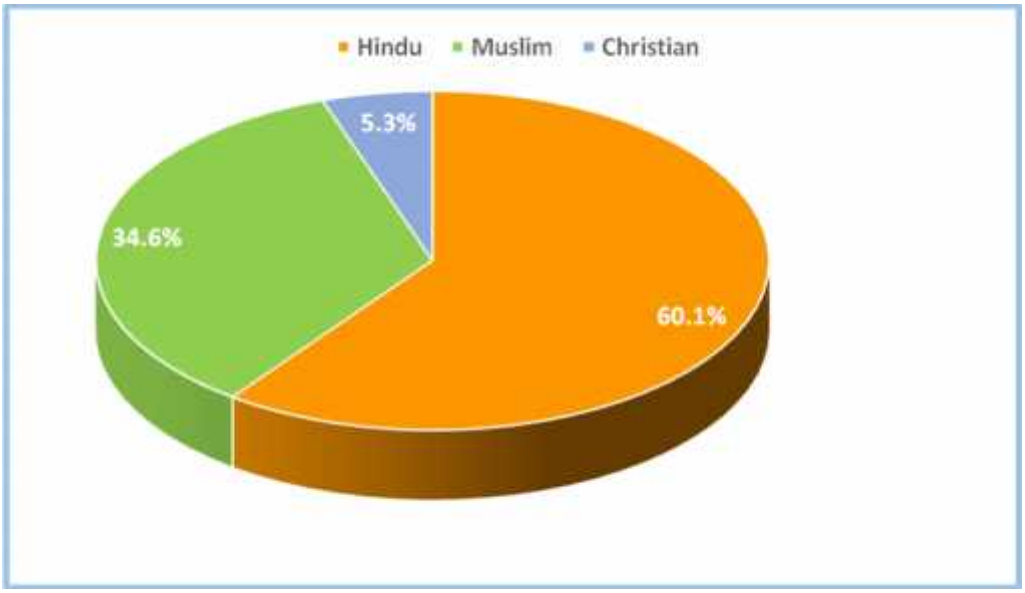


Table 4: **Distribution of study participants according to their literacy status**

Literacy status	Number	Percentage
Illiterate	90	10.6
Primary	375	44.1
High School	267	31.4
Pre-University College	54	6.4
Diploma	38	4.5
Graduate	16	1.9
Post-Graduate	10	1.1
Total	850	100

Our study revealed that 760 (89.4%) were literates. Among them, majority of the participants had studied up to primary school 375 (44.1%), followed by 267 (31.14%) up to high school. About 54 (6.4%) participants studied up to Pre-University College and 64 (7.5%) were educated above PUC level. Around 90 (10.6%) participants were illiterate.

Figure 3: **Literacy status of study participants (Table 4)**

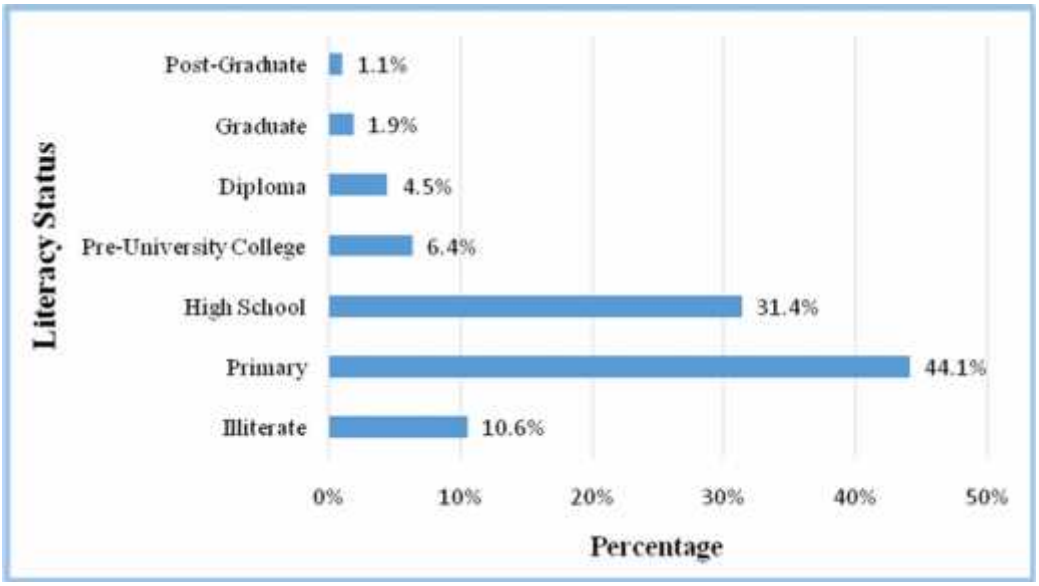


Table 5: Distribution of study participants according to their occupation

Occupation	Number	Percentage (%)
Retired	274	32.2
Professional	26	3.1
Semi- Professional	39	4.6
Skilled	77	9.1
Semi-skilled	48	5.6
Unskilled	50	5.9
Housewife	336	39.5
Total	**850**	**100**

In our study, 336 (39.5%) were housewives, 274 (32.2%) were retired from service and rest 240 (28.2%) were working.

Figure 4: Distribution of study participants according to their occupation (Table 5)

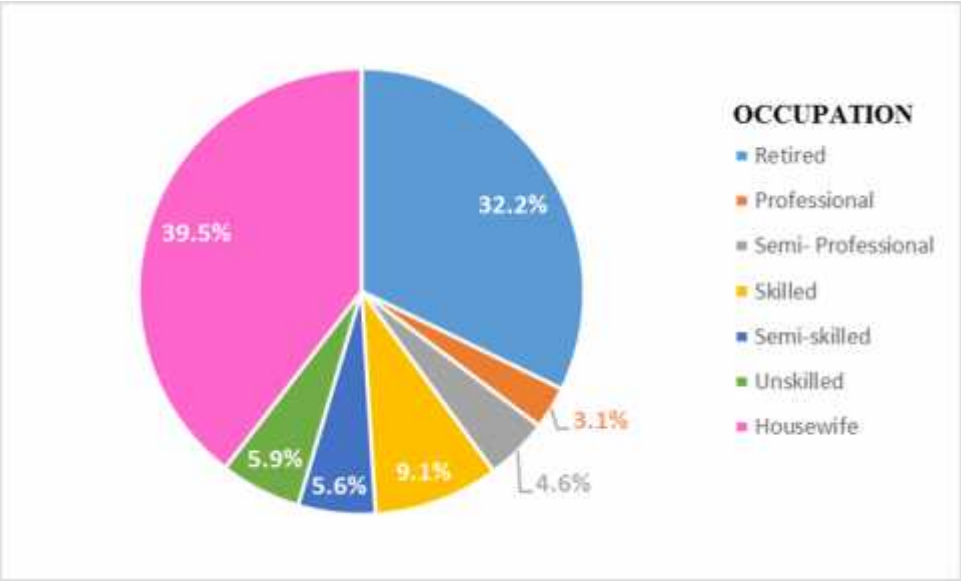


Table 6: Distribution of study participants according to type of family

Type of family	Number	Percentage
Nuclear	623	73.3
Joint	157	18.5
Three generation	61	7.1
Broken	9	1.1
Total	**850**	**100**

The majority of the elderly, 623 (73.3%) were living in nuclear families, 157 (18.5%) living in joint families, 61 (7.2%) belonged to three generation family and 9 (1.1%) to broken family.

Figure 5: Distribution of study participants according to type of family (Table 6)

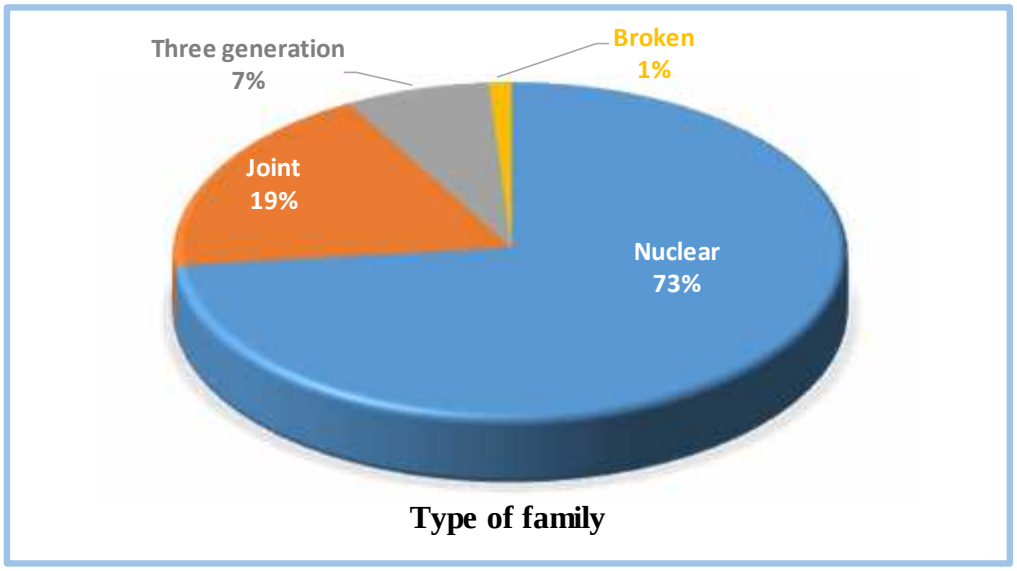


Table 7: Distribution of study participants according to family size

Family size	Number	Percentage (%)
< 4	269	31.6
4 - 8	521	61.3
> 8	60	7.1
Total	**850**	**100**

The majority of elderly, 521 (61.3%) had 4-8 members in their family, followed by 269 (31.6%) who had less than 4 members and 60 (7.1%) had more than 8 members.

Table 8: Distribution of study participants according to type of house

Type of house	Number	Percentage (%)
Kuccha	27	3.2
Semi-Pucca	63	7.4
Pucca	760	89.4
Total	**850**	**100**

A large majority of elderly lived in Pucca house 760 (89.4%), whereas 63 (7.4%) resided in Semi pucca house and remaining 27 (3.2%) in Kuccha house.

Table 9: Distribution of study participants according to ownership of house

Ownership	Number	Percentage (%)
Own house	562	66.1
Rented house	288	33.9
Total	**850**	**100**

Around 562 (66.1%) of participants had their own house to reside and 288 (33.9%) resided in rented house.

Table 10: Distribution of study participants according to socioeconomic status (Acc. To modified B. G. Prasad Classification, 2014)[37]

Socioeconomic status	Number	Percentage (%)
Class I	33	3.9
Class II	159	18.7
Class III	435	51.2
Class IV	192	22.6
Class V	31	3.6
Total	**850**	**100**

As regards to socio-economic status, majority of them, 435 (51.2%) belonged to class III, followed by 192 (22.6%) to class IV, 159 (18.7%) to class II, 33 (3.9%) to class I and 31 (3.6%) belonged to class V.

Figure 6: Distribution of study participants according to socioeconomic status (Table 10)

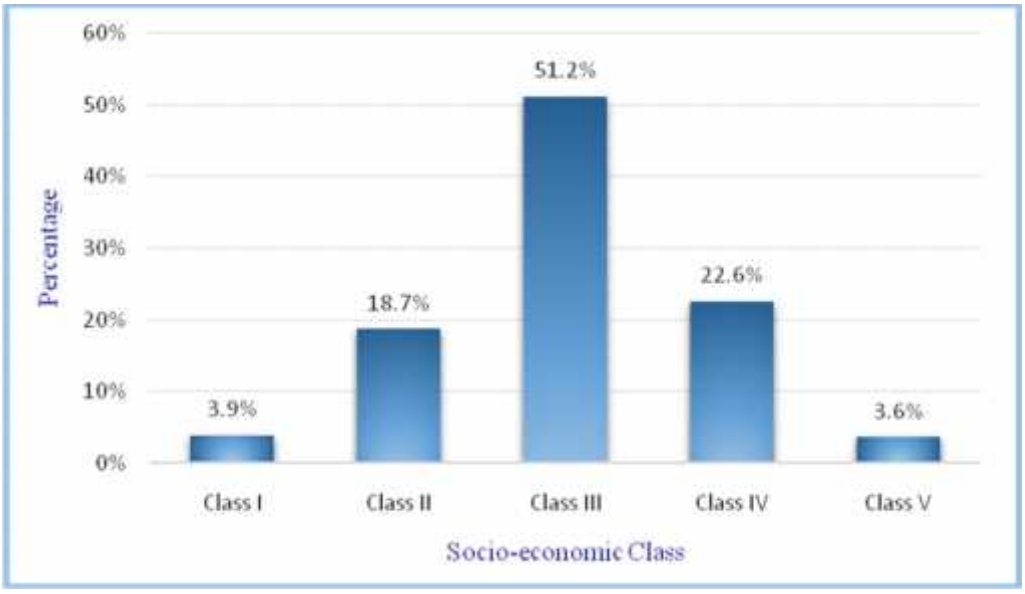


Table 11: Distribution of study participants according to marital status

Marital status	Number	Percentage (%)
Married	632	74.4
Widowed	174	20.4
Unmarried	35	4.1
Separated	9	1.1
Total	**850**	**100**

Of the 850 participants in our study, 632 (74.4%) of the elderly were married, 174 (20.4%) were widows or widowers, 35 (4.1%) participants were unmarried and 9 (1.1%) were separated.

Figure 7: Distribution of study participants according to marital status (Table 11)

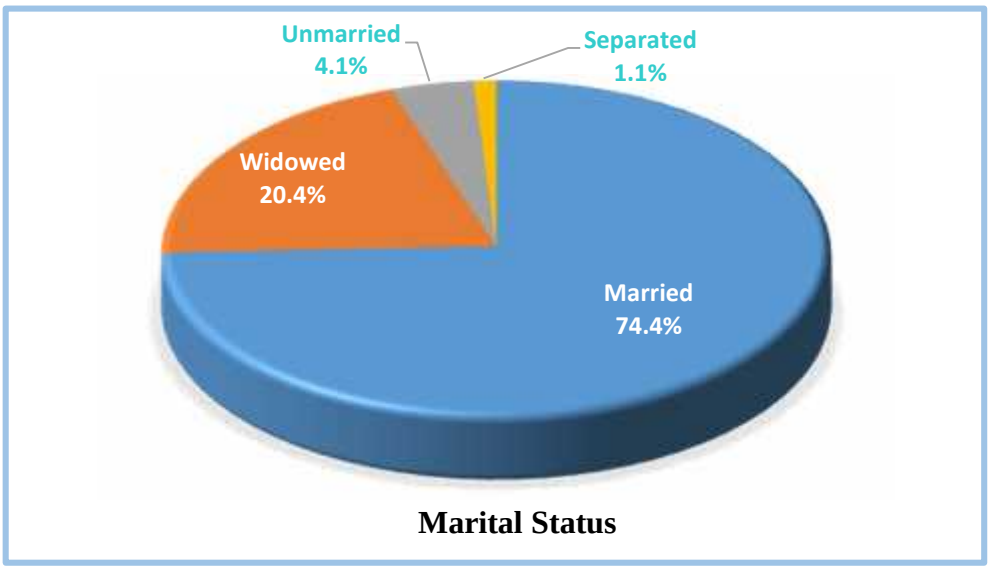


Table 12: Distribution of study participants according to dietary habits

Type of diet	Number	Percentage (%)
Mixed	539	63.4
Vegetarian	311	36.6
Total	**850**	**100**

About 539 (63.4%) elderly consumed mixed diet and remaining 311 (36.6%) consumed vegetarian diet.

Table 13: Distribution of study participants according to physical activity

Physical activity	Number	Percentage (%)
Sedentary	223	26.2
Mild	344	40.5
Moderate	198	23.3
Vigorous	85	10.0
Total	**850**	**100**

Majority of the participants, 344 (40.5%) performed mild physical activities, 198 (26.2%) moderate and 85 (10.0%) vigorous activities. Around 223 (26.2%) elderly were sedentary.

Figure 8: Distribution of study participants according to physical activity (Table 13)

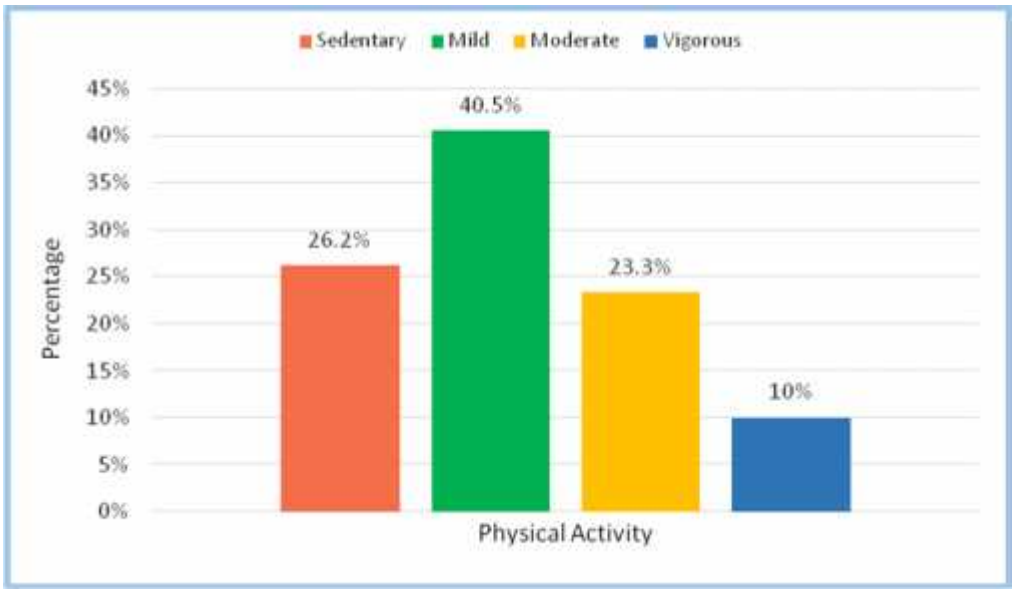


Table 14: Distribution of study participants according to social participation

Social participation	Number	Percentage (%)
Active	256	30.1
To some extent	443	52.1
No	151	17.8
Total	**850**	**100**

Among the elderly interviewed for participation in social gathering, majority of them, 443 (52.1%) participated to some extent followed by 256 (30.1%) actively participated and 151 (17.8%) did not participate.

Table 15: Distribution of study participants according to utilization of day time

Utilization of day time	Number	Percentage (%)
Actively engaged	292	34.4
To some extent	316	37.2
Not engaged	242	28.4
Total	**850**	**100**

Among the elderly interviewed for utilization of day time, 292 (34.4%) were actively engaged, 316 (37.2%) to some extent and 242 (28.5%) did not engage.

Table 16: Distribution of study participants according to participation in recreational activities

Recreational activities	Number	Percentage (%)
Actively participate	309	36.4
To some extent	383	45.1
Do not participate	158	18.5
Total	**850**	**100**

Among the elderly studied, 309 (36.4%) actively participated, 358 (45.1%) to some extent and 158 (18.5%) did not participate in any recreational activities.

Figure 9: Distribution of study participants according to social participation, day time utilization and recreation. (Table14, 15 & 16)

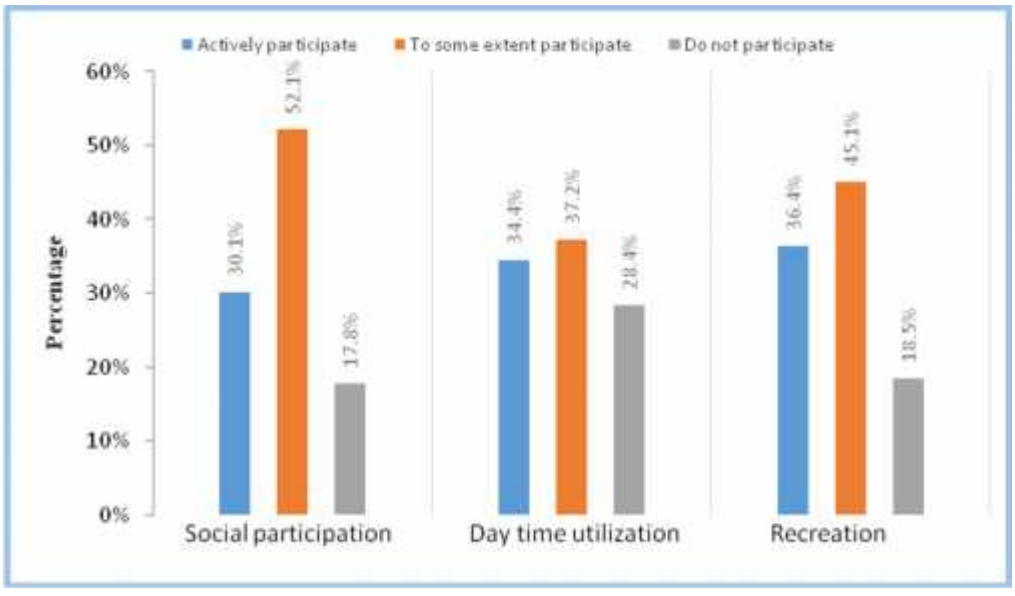


Table 17: Distribution of study participants according to sleep pattern

Sleep pattern	Number	Percentage (%)
Satisfied	190	22.4
To some extent	301	35.4
Not satisfied	359	42.2
Total	**850**	**100**

Among the study participants, majority of them, 359 (42.2%) were not satisfied with their sleep, followed by 301 (35.4%) to some extent and only 190 (22.4%) rated their sleep satisfactory.

Table 18: Distribution of study participants according to locomotor disability

Locomotor disability	Number	Percentage (%)
Present	98	11.5
Absent	752	88.5
Total	**850**	**100**

Around 98 (11.5%) of the total study participants had physical disability which restricted their mobility.

Table 19: Distribution of study participants according to stressful life events in last one year

Stressful life events	Number	Percentage (%)
Accident	43	5.1
Death of family member	151	17.7
Abuse	27	3.2
Others	16	1.9
Absent	613	72.1
Total	**850**	**100**

Among the elderly studied, 151 (17.7%) had recent history of death of family member, 43 (5.1%) had met with an accident, 27 (3.2%) reported abuse and 16 (1.9%) said others.

Figure 10: Distribution of study participants according to stressful life events (Table 19)

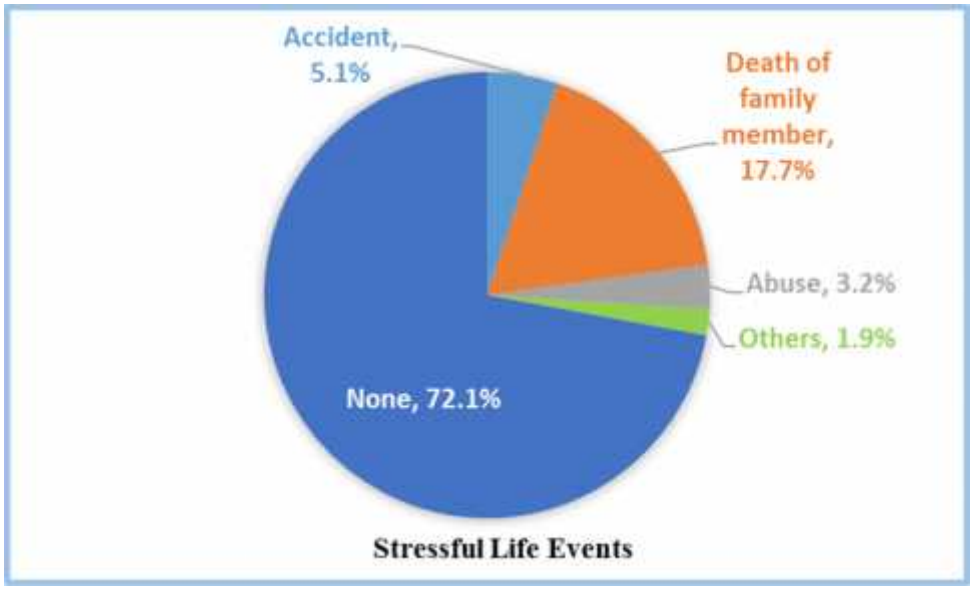


Table 20: Distribution of study participants according to past history of Depression

Past history of Depression	Number	Percentage (%)
Present	53	6.2
Absent	797	93.8
Total	**850**	**100**

History of depression was assessed either by documentation by physician or if the person is on anti-depressant drugs. Among the elderly studied, 53 (6.2%) had past history of depression and remaining 797 (93.8%) did not.

Table 21: Distribution of study participants according to family history of Depression

Family history of Depression	Number	Percentage (%)
Present	56	6.6
Absent	794	93.4
Total	**850**	**100**

In the study participants, 56 (6.6%) had family history of Depression.

Table 22: Distribution of study participants according to presence of chronic medical problems

Chronic medical problems	Number	Percentage (%)
Type 2 Diabetes Mellitus	205	24.1
Hypertension	244	28.7
Both	84	9.9
None	317	37.3
Total	**850**	**100**

Among the elderly studied for chronic medical problems, majority of them, 244 (28.7%) had Hypertension followed by 205 (24.1%) Diabetes Mellitus type 2 and 84 (9.9%) both. Overall 533 (62.7%) had present medical problem.

Figure 11: Distribution of study participants according to presence of chronic medical problems (Table 22)

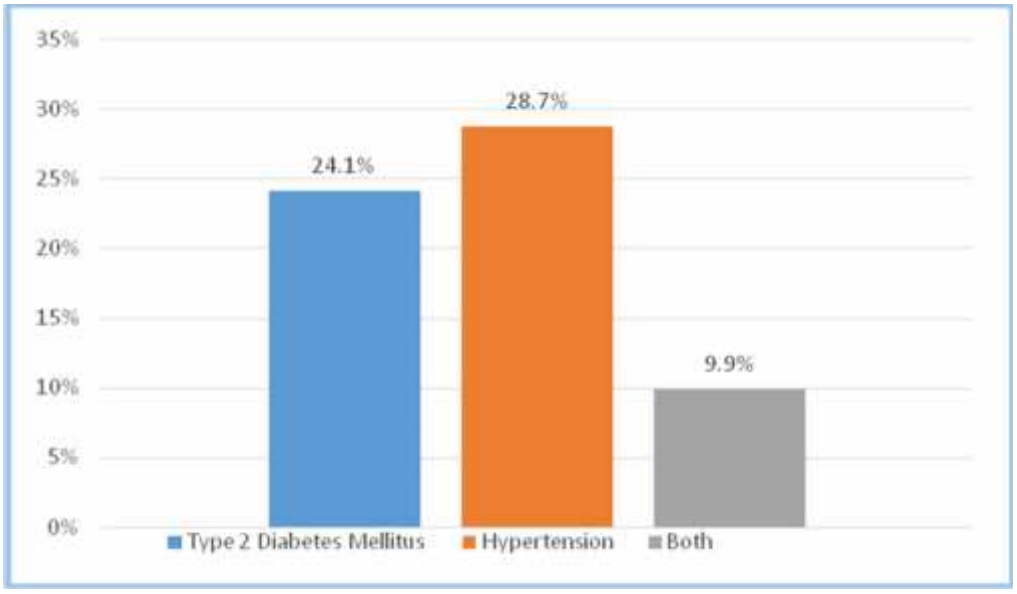


Table 23: Distribution of study participants according to tobacco chewing habit

Tobacco chewing habit	Number	Percentage (%)
Current user	225	26.5
Past user	91	10.7
Never used	534	62.8
Total	**850**	**100**

Among the total elderly studied, 225 (26.5%) were currently chewing tobacco 91 (10.7%) had chewed tobacco in the past and 534 (62.8%) did not have the habit of chewing tobacco.

Table 24: Distribution of study participants according to smoking habit

Smoking habit	Number	Percentage
Current smoker	142	16.7
Past smoker	75	8.8
Never smoked	633	74.5
Total	**850**	**100**

Of the total participants studied, 142 (16.7%) were currently smoking, 633 (74.5%) did not smoke, whereas 75 (8.8%) had past history of smoking cigarette/beedis.

Table 25: Distribution of study participants according to alcohol consumption

Alcohol consumption	Number	Percentage
Current	114	13.4
Past	46	5.4
Never	690	81.2
Total	**850**	**100**

Among the elderly studied, 114 (13.4%) were alcoholic, 46 (5.4%) were alcoholic in past and remaining 690 (81.2%) never consumed alcohol.

Table 26: Distribution of study participants according to problems in the family

Problems in family	Number	Percentage (%)
Health related	188	22.1
Social	80	9.4
Economic	95	11.2
Others*	46	5.4
None	441	51.9
Total	**850**	**100**

*** Food scarcity/drug abuse/suicide**

Among the elderly studied for problems in the family, 188 (22.1%) revealed presence of health related problems, 95 (11.2%) had financial problems, 46 (5.4%) had others and 441 (51.9%) had none.

Figure 12: Distribution of study participants according to problems in the family (Table 26)

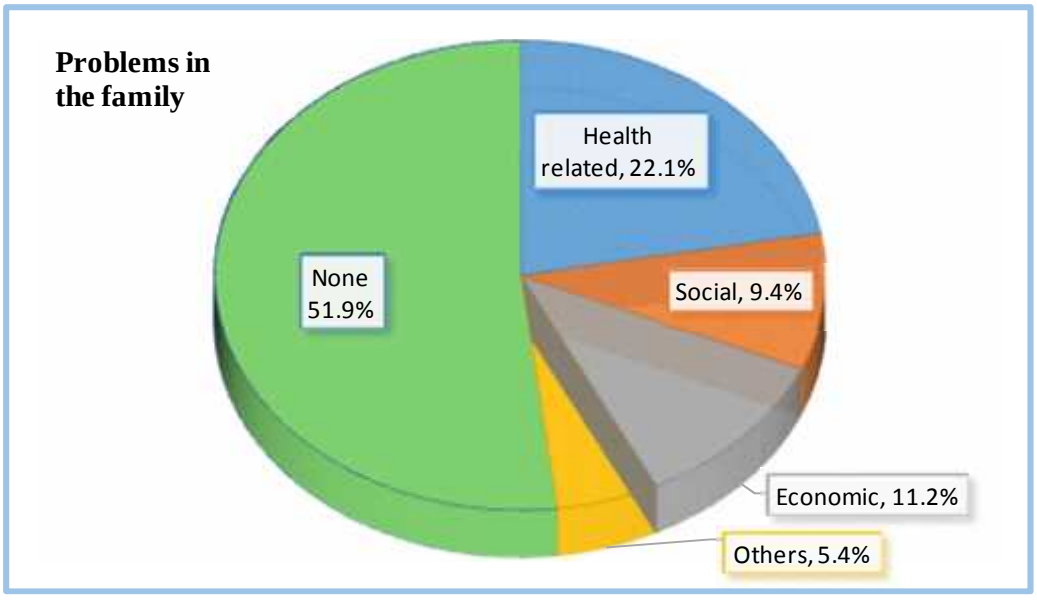


Table 27: Distribution of study participants according to Body Mass Index

Body Mass Index (Kg/m^2)	Interpretation	Number	Percentage
<18.5	Underweight	18	2.1
18.5-22.9	Normal weight	358	42.1
23-24.9	Overweight	103	12.2
≥25	Obese	371	43.6
	Total	**850**	**100**

In the present study, majority 55.8% were having BMI ≥ 23, followed by 42.1% with normal BMI and 2.1% underweight. The mean BMI of the study participants was 24.4 ± 3.93 kg/m^2 and the range was 16 – 37 kg/m^2.

Figure 13: Distribution of study participants according to Body Mass Index (Table 27)

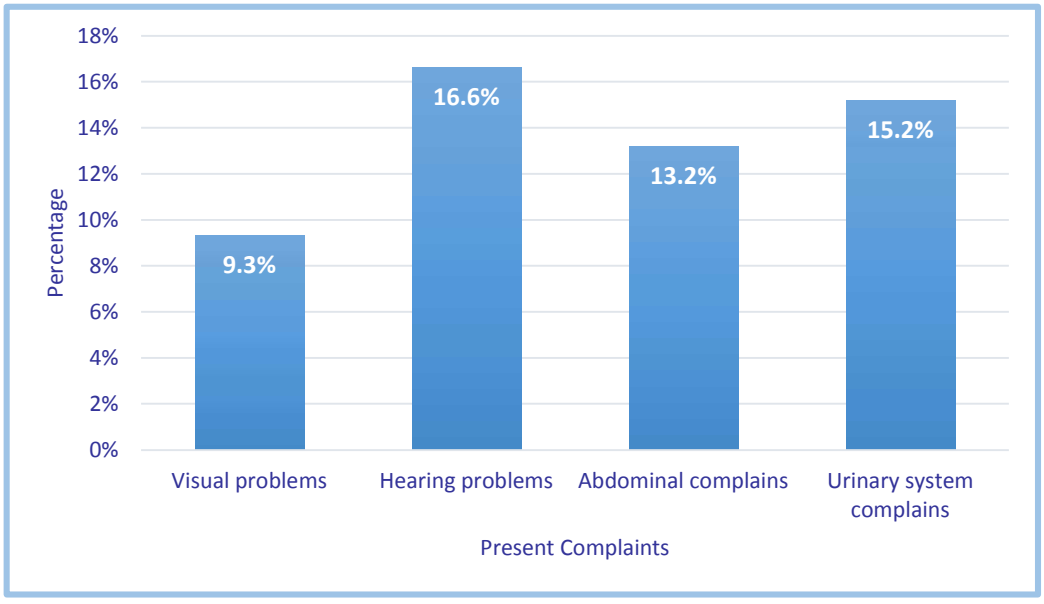
Table 28: Distribution of study participants according to presenting complaints

Presenting complaints*	Present	%
Visual problems	79	9.3
Hearing problems	141	16.6
Abdominal complaints	112	13.2
Urinary system complaints	129	15.2

* Some participants had more than one complaints.

According to the presenting complaints of 850 participants, majority of them, 141 (16.6%) had hearing problems, followed by 129 (15.2%) urinary complaints, 112 (13.2%) abdominal complaints, and 79 (9.3%) visual problems.

Figure 14: Distribution of study participants according presenting complains (Table 28)



Physical examination findings of the study participants

Physical examination of 850 participants revealed presence of Pallor in 561 (68.4%), Icterus in 59 (6.9%), Oedema in 46 (5.4%) and oral problems in 112 (13.2%) elderly.

Distribution of study participants according to blood pressure levels

Among 850 elderly, around 342 (40.2%) were normotensive, 93 (10.9%) pre-hypertensive and 111 (13.1%) hypertensive.

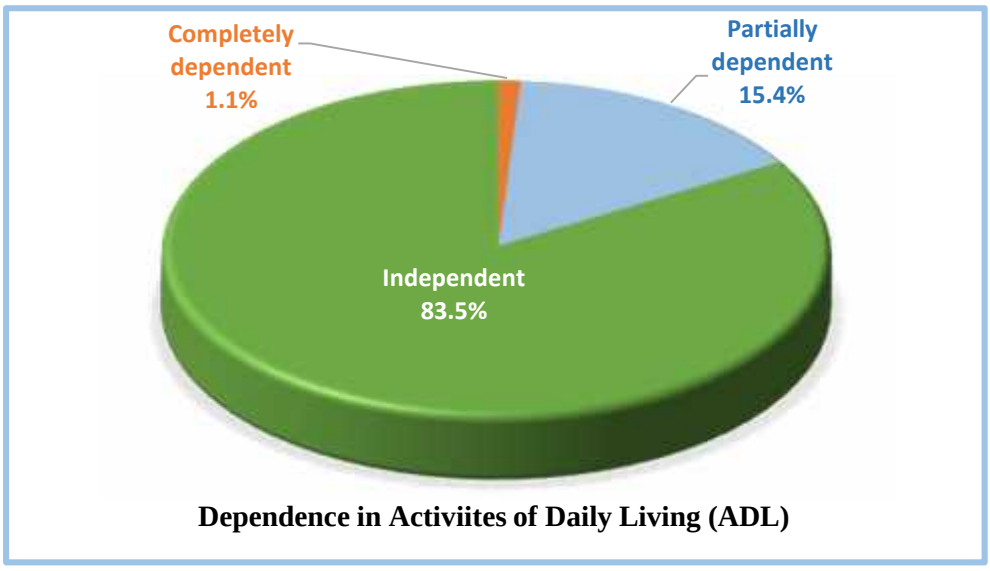
II. Prevalence of Dependence in activities of daily living:

Table 29: Distribution of study participants according to KATZ ADL score

KATZ ADL score	Interpretation	Number	Percentage
0	Completely dependent	9	1.1
1-5	Partially dependent	131	15.4
6	Independent	710	83.5
	Total	**850**	**100**

In the present study, 9 (1.1%) elderly were totally dependent for activities of daily living as they scored 0 on KATZ ADL scale and 131 (15.4%) were partially dependent (score 1 to 5). Around 710 (83.5%) were independent as they had scored 6. The total prevalence of dependence (score 0 to 5) for activities of daily living was found to be **140 (16.6%)**.

Figure 15: Distribution of study participants according to KATZ ADL score (Table 29)



III. Prevalence of Depression and associated factors:

Table 30: Distribution of study participants according to GDS score

GDS Score	Interpretation	Number	Percentage
0-5	No depression	538	63.3
6-10	Suggestive of depression	256	30.1
11-15	Always indicative of depression	56	6.6
	Total	**850**	**100**

In the present study, the overall prevalence of depression (GDS score >5) in the study participants was found to be **312 (36.7%)**, out of which, 256 (30.1%) scored between 6 to 10 suggestive of depression and 56 (6.6%) scored 11 to 15 implying definite depression. Around 538 (63.3%) elderly had no depression (score 0 to 5). The mean GDS score was 4.47 ± 3.48 (range, 1-15).

Figure 16: Prevalence of Depression (Table 30)

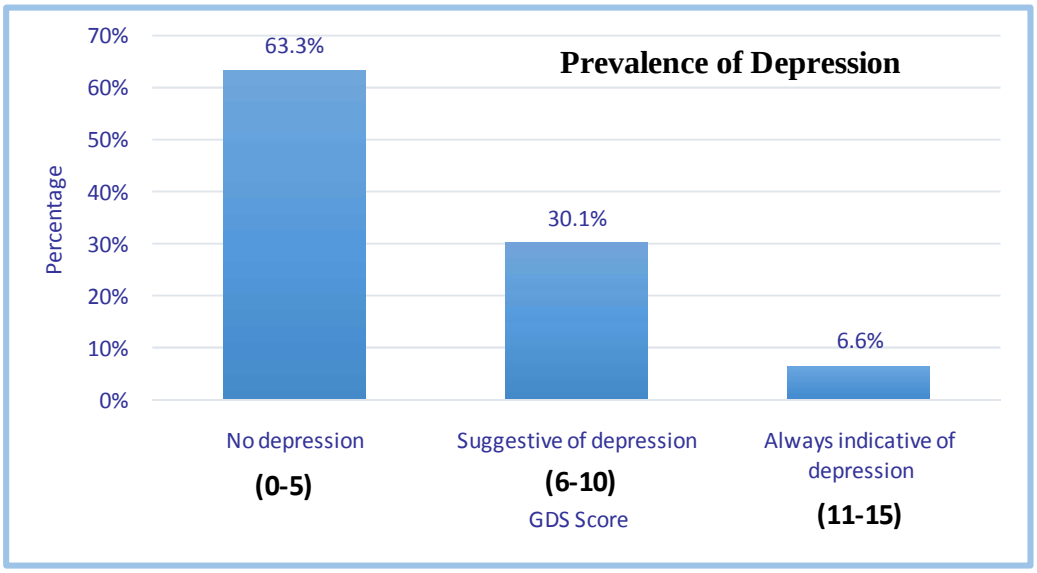


Table 31: Association between depression and dependence in ADL

KATZ ADL Score	Depressed (GDS Score > 5)		Not Depressed (GDS Score ≤ 5)		Total
	no.	%	no.	%	no.
Independent (6)	202	28.5	508	71.5	**710**
Partially dependent (1-5)	101	77.1	30	22.9	**131**
Completely dependent (0)	9	100	0	0	**9**
Total	**312**	**36.7**	**538**	**63.3**	**850**

Highest prevalence of depression was found in all the 9 participants who were completely dependent, followed by 101 (77.1%) partially dependent and in 202 (28.5%) who were independent for doing their activities of daily living. Depression was found to increase with increase in dependence in activities of daily living. This trend was found to be statistically significant (χ^2_{trend} =126.203; p<0.001).

Figure 17: Prevalence of Depression according to dependence in ADL (Table 31)

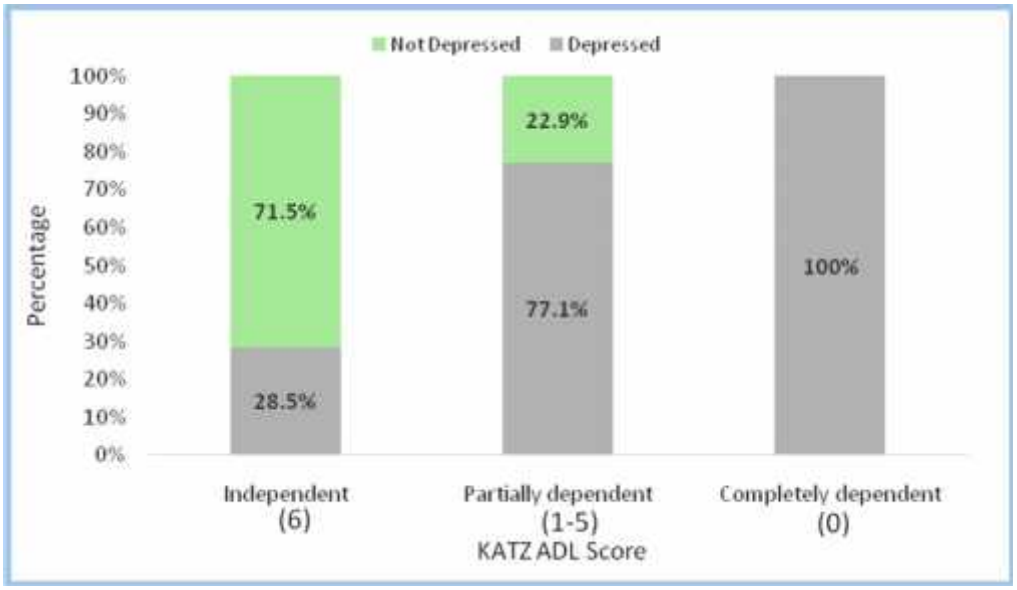


Table 32: Association between age and depression

Age (years)	Depressed (GDS Score > 5)		Not Depressed (GDS Score ≤ 5)		Total
	no.	%	no.	%	no.
60-69	127	22.7	433	77.3	560
70-79	136	57.9	99	42.1	235
≥ 80	49	89.1	6	10.9	55
Total	**312**	**36.7**	**538**	**63.3**	**850**
χ^2 =157.7		**df = 2**		**p<0.001**	

The percentage of depression was highest in the study participants who were aged ≥ 80 years (89.1%), followed by 57.9% in 70-79 years age group and 22.7% in 60-69 years age group. As the age increased, the prevalence of depression also increased and this trend was statistically significant (χ^2_{trend} =157.341 p=<0.001).

Figure 18: Association between age and depression (Table 32)

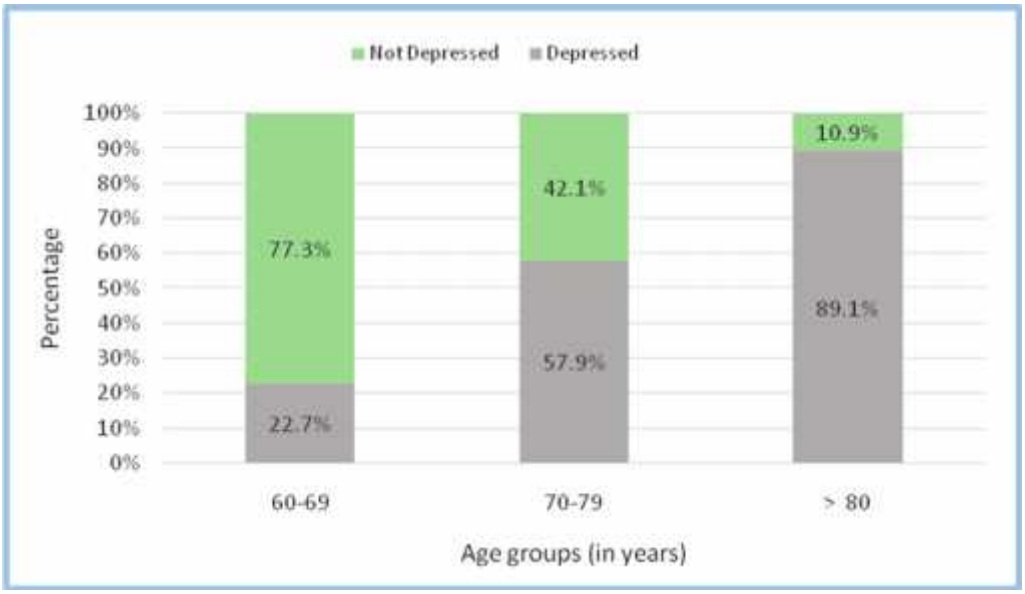


Table 33: Association between age and dependence in ADL

Age (years)	Dependent (KATZ score < 6)		Independent (KATZ Score = 6)		Total
	no.	**%**	**no.**	**%**	**no.**
60-69	6	1.1	554	98.1	560
70-79	83	35.3	152	64.7	235
≥ 80	51	92.7	4	7.3	55
Total	**140**	**16.6**	**710**	**83.5**	**850**
χ^2 =389.7		**df = 2**		**p<0.001**	

In this study, the percentage of dependence in activities of daily living was highest in the participants aged ≥ 80 years i.e., 92.7%, followed by 35.3% in the age group 70-79 years and 1.1% in 60-69 years. As the age increased, the trend of dependence in ADL also increased significantly (χ^2_{trend}= 378.693 p=<0.001).

Figure 19: Association between age and dependence in ADL (Table 33)

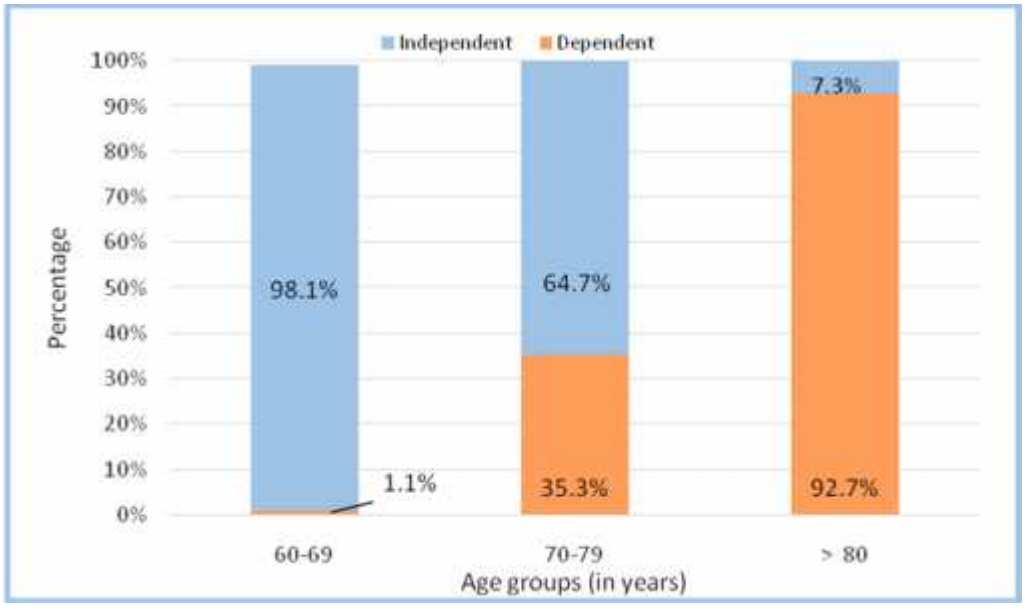


Table 34: Association between gender and depression (N=850)

Gender	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Male	132	32.3	277	67.7	**409**
Female	180	40.8	261	59.2	**441**
χ^2 =6.665 df = 1 p=0.010					

The percentage of depression was more in women (40.8%) than in men (32.3%). This difference was found to be statistically significant (p=0.010).

Figure 20: Association between gender and depression (Table 34)

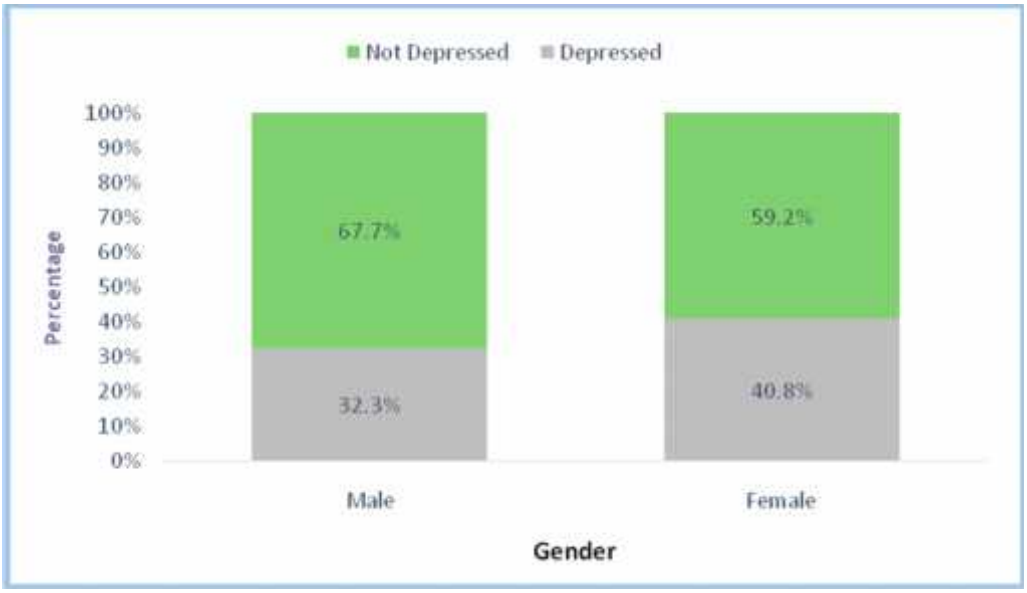


Table 35: Association between literacy status and depression (N=850)

Literacy status	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Illiterate	39	43.3	51	56.7	90
Primary	149	39.7	226	60.3	375
High school	88	33.0	179	67.0	267
PUC	17	31.5	37	68.5	54
Above PUC	19	29.7	45	70.3	64
χ^2 =6.791		**df = 4**		**p=0.147**	

The present study revealed that depression among illiterates was 43.3% and it decreased as literacy status improved. Depression among those who had studied up to PUC and above was 29.7%. This difference was not statistically significant with p=0.147.

Figure 21: Association between literacy status and depression (Table 35)

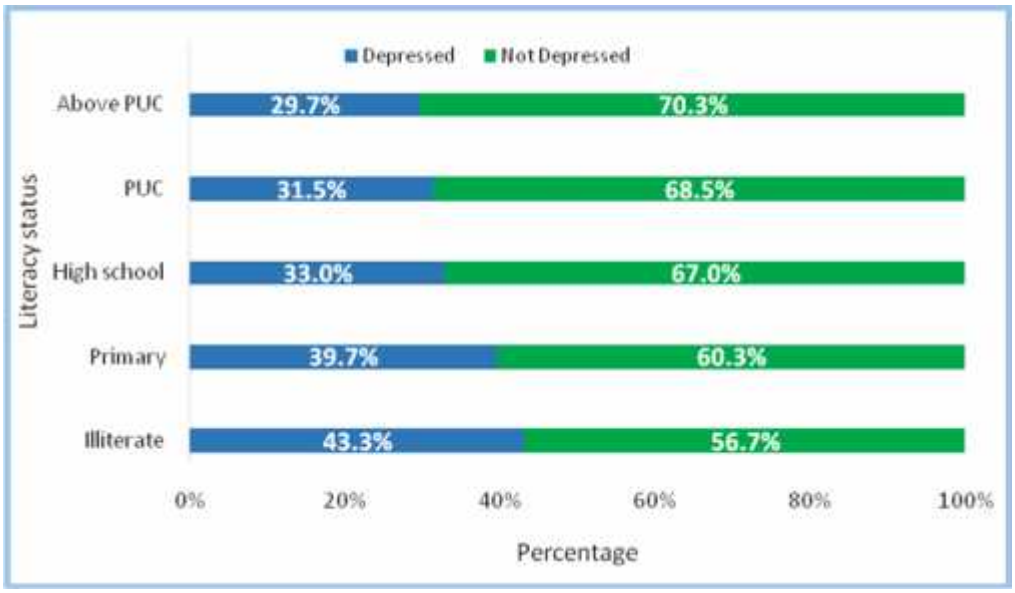


Table 36: Association between occupation and depression (N=850)

Occupation	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Retired	109	39.8	165	60.2	274
Professional	7	26.9	19	73.1	26
Semi- Professional	9	23.1	30	76.9	39
Skilled	12	15.6	65	84.4	77
Semi-skilled	11	22.9	37	77.1	48
Unskilled	29	58.0	21	42.0	50
Housewife	135	40.2	201	59.8	336
χ^2 =35.521 df = 6 p<0.001					

Majority of depression was found among housewives (40.2%) and retired persons (39.8%). The percentage of depression among professionals and semi-professionals was 26.9% and 23.1% respectively. Similarly, the percentage of depression among skilled, semi-skilled and unskilled workers was found to be 15.6%, 22.9% and 58% respectively. There was a statistical significant difference between the percentage of depression among different occupational groups ($p<0.001$).

Figure 22: Association between occupation and depression (Table 36)

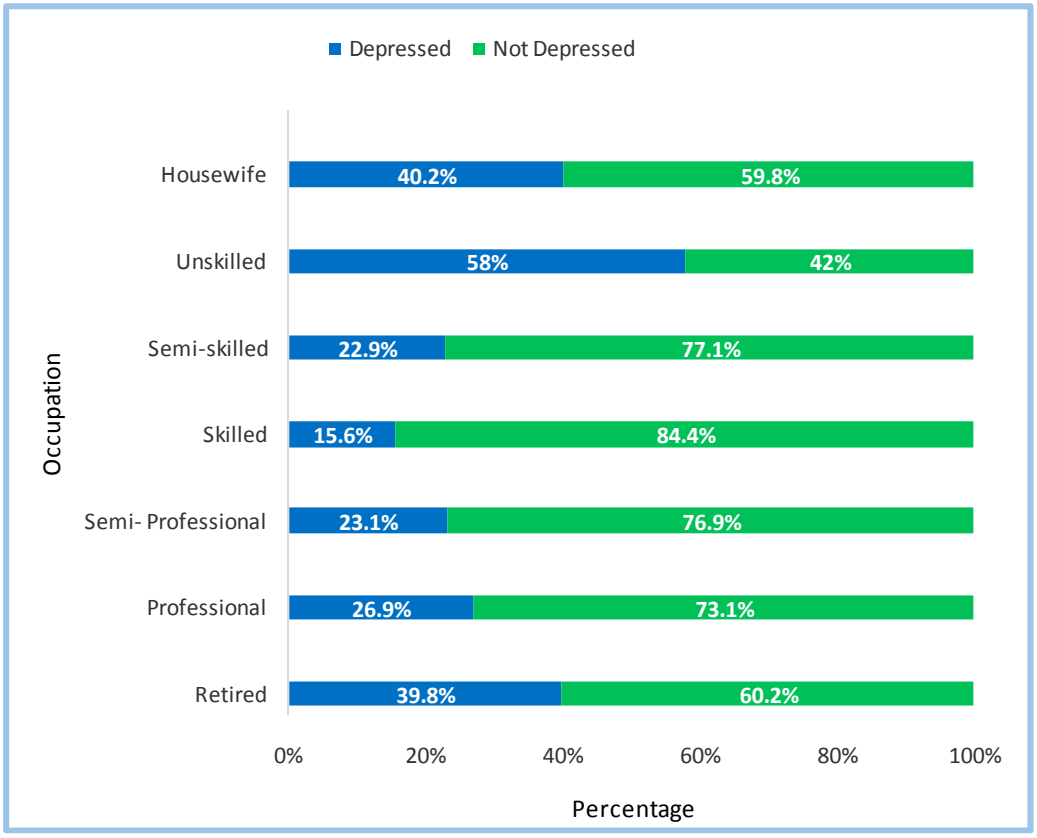


Table 37: Association between socio-economic status and depression

Socio-economic status	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Class I	10	30.3	23	69.7	33
Class II	26	16.4	133	83.6	159
Class III	145	33.3	290	66.7	435
Class IV	120	62.5	72	37.5	192
Class V	11	35.5	20	64.5	31
χ^2 = 86.069 df= 4 p<0.001					

Among the 850 study participants, major percentage of depression was found among class IV i.e., 62.5% followed by 35.5% in class V and 33.3% in class III. Depression among class I was 30.3% and in class II was 16.4%. The prevalence was found to be more in lower socioeconomic class and this difference between the percentage of depression among different socio-economic groups was statistically significant (p=<0.001).

Figure 23: Association between socio-economic status and depression (Table 37)

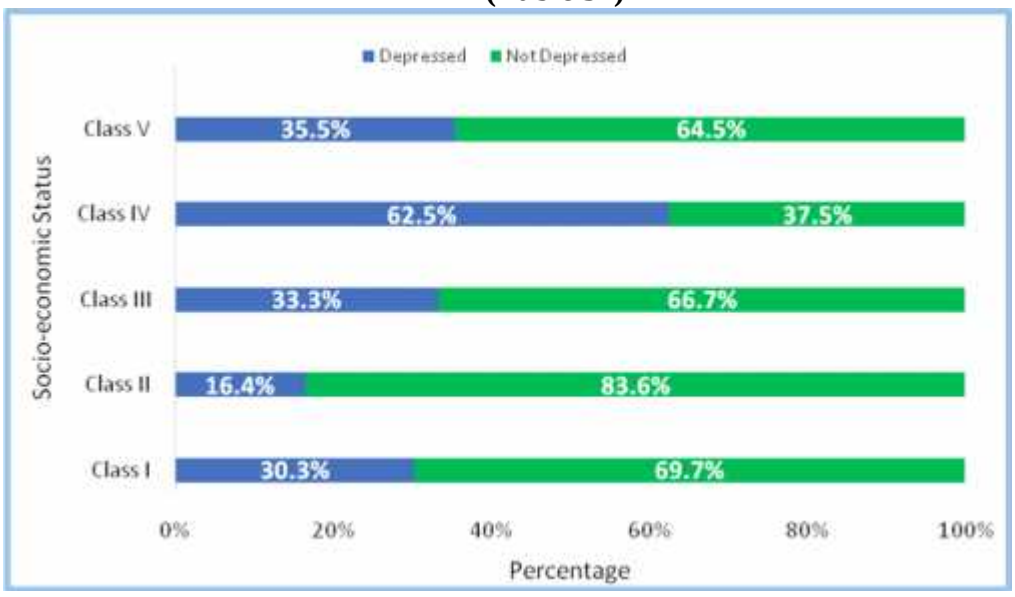
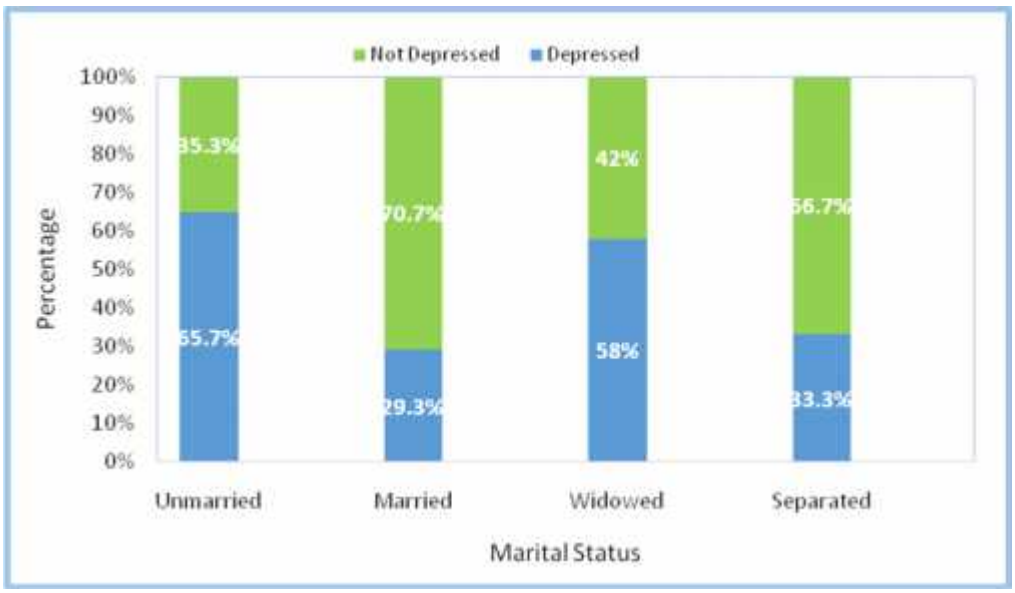


Table 38: Association between marital status and depression (N=850)

Marital status	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Unmarried	23	65.7	12	35.3	35
Married	185	29.3	447	70.7	632
Widowed	101	58.0	73	42.0	174
Separated	3	33.3	6	66.7	9
χ^2 = 61.861 df= 3 p<0.001					

In the present study, out of the 632 married elderly, 185 (29.3%) had depression and among the 174 widowed, 101 (58%) had depression. Whereas, out of 35 unmarried elderly, 23 (65.7%) had depression and among 9 separated, 3 (33.3%) had depression. The association between marital status of study participants and depression was statistically significant (p<0.001)

Figure 24: Association between marital status and depression (Table 38)



Association between type of family and depression:

The percentage of depression in the study participants belonging to joint family was 34.4%, nuclear family was 36.3%, in three generation family was 41% and in broken family was found to be 77.8%. There was no significant association between the type of family and depression (p=0.059).

Association between family size and depression:

Study participants with less than 4 family members had depression of about 33.8%, in family size of 4-8 it was 37.2%, and in those with more than 8 family members it was found to be 45%. The association between family size and depression was not statistically significant (p=0.247).

Table 39: Association between physical activity and depression (N=850)

Physical activity	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Sedentary	96	43.0	127	57.0	223
Mild	105	30.5	239	69.5	344
Moderate	81	40.9	117	59.1	198
Vigorous	30	35.3	55	64.7	85
χ^2 =11.101 df = 3 p=0.011					

Out of the 223 sedentary elderly, 96 (43%) had depression. In 344 elderly with mild physical activity, 105 (30.5%) had depression. Whereas, in 198 elderly with moderate activity, 81 (40.9%) had depression and out of 85 elderly with vigorous activity, 30 (25.3%) were found to have depression. The association was found to be statistically significant (p=0.011).

Figure 25: Association between physical activity and depression (Table 39)

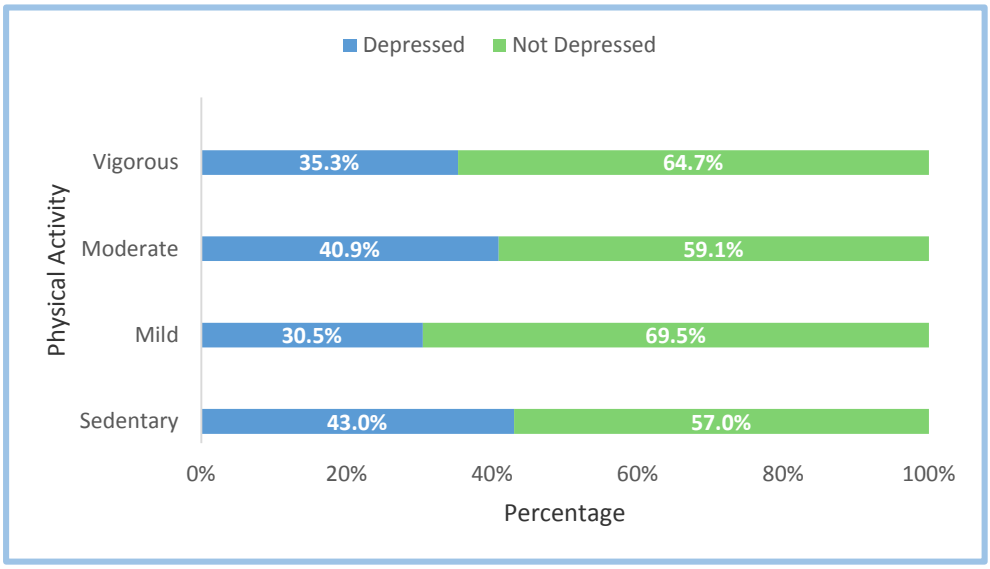


Table 40: Association between social participation and depression (N=850)

Social participation	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Actively participate	77	30.1	179	69.9	256
To some extent participate	160	36.1	283	63.9	443
Do not participate	75	49.7	76	50.3	151
χ^2 =15.828 df = 2 p<0.001					

Among 256 elderly who actively participated in social events, 77 (30.1%) had depression. In 443 of those who participated to some extent, 160 (36.1%) had depression. Out of 151 who did not participate, 75 (49.7%) were found to have depression. With reduced social participation, the prevalence of depression was found to increase and this association was statistically significant (<0.001).

Figure 26: Association between social participation and depression (Table 40)

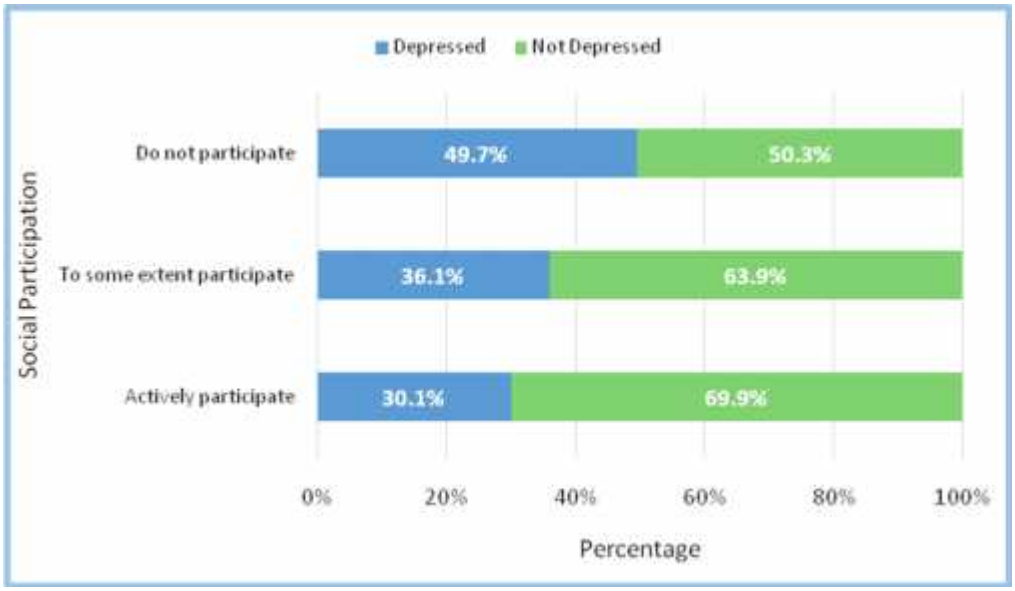


Table 41: Association between recreational activities and depression

Recreational activities	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Active	103	33.3	206	66.7	309
To some extent active	137	35.8	246	64.2	383
Inactive	72	45.6	86	54.4	158
χ^2 =7.0 df = 2 p=0.030					

Prevalence of depression increased from 33.3% among active to 45.6% among inactive participants for recreational activities and this difference was statistically significant with p=0.030.

Figure 27: Association between recreational activities & depression (Table 41)

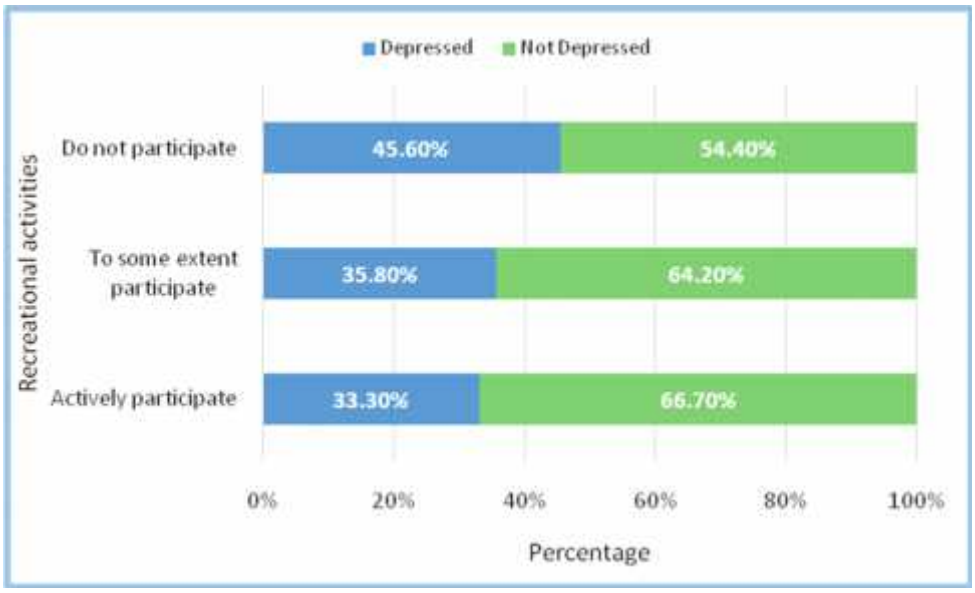


Table 42: Association between sleep pattern and depression (N=850)

Sleep pattern	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Satisfied	53	27.9	137	72.1	190
To some extent satisfied	96	31.9	205	68.1	301
Not satisfied	163	45.4	196	54.6	359
χ^2 =21.040 df = 2 p<0.001					

Prevalence of depression increased as sleep pattern got disturbed, the prevalence being 27.9% among satisfied to 31.9% to some extent and 45.4% not satisfied. This association was statistically significant with p<0.001.

Association between day time utilization and depression

The prevalence of depression among 292 elderly who were engaged in some household activities in day time was 104 (35.6%) and out of 316 elderly who were to some extent engaged, 111 (35.1%) had depression. Among 242 inactive elderly, depression was 40.1%. But the association was not statistically significant. (p=0.433)

Table 43: Association between problems in family and depression (N=850)

Problems in family	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Present	180	44.0	229	56.0	409
Absent	132	29.9	309	70.1	441
χ^2 =18.101 df = 1 p<0.001					

Out of the 409 elderly who revealed problems in their family, 180 (44%) had depression. This was significantly associated with depression (p<0.001).

Table 44: Association between locomotor disability and depression (N=850)

Locomotor disability	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Present	48	49.0	50	51.0	98
Absent	264	35.1	488	64.9	752
χ^2 =7.183 df = 1 p=0.007					

Out of the 98 elderly with locomotor disability, 48 (49%) had depression. This was significantly associated with depression (p=0.007).

Table 45: Association between stressful life events and depression (N=850)

Stressful life events	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Present	105	44.3	132	55.7	237
Absent	207	33.8	406	66.2	613
χ^2 =8.166 df = 1 p=0.004					

About 105 (44.3%) elderly out of 237 with stressful life events had depression. This was significantly associated with depression (p=0.004).

Table 46: Association between past history of depression and depression

Past history of depression	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Present	25	47.2	28	52.8	53
Absent	284	35.6	513	64.4	797
χ^2 =6.326 df = 1 p=0.012					

Out of the 53 elderly with past history of depression, 25 (47.2%) had depression. Past history of depression was significantly associated with depression (p=0.012).

Table 47: Association between family history of depression and depression among participants

Family history of depression	Depressed		Not Depressed		Total
	no.	**%**	**no.**	**%**	**no.**
Present	26	46.4	30	53.6	56
Absent	282	35.5	512	64.5	794
χ^2 =7.340 df = 1 p=0.007					

Out of the 56 elderly with family history of depression, 26 (46.4%) had depression. This association with depression was found to be statistically significant (p=0.007).

Table 48: Association between chronic medical problems and depression

Chronic medical problems*	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Present	215	40.3	318	59.7	533
Absent	97	30.6	220	69.4	317
Z=2.86		**p=0.004**			

*DM2, HTN or both

Prevalence of depression was found to be **40.3%** among those with medical problems and 31.1% among those without them. This difference was statistically significant with p=0.004.

Table 49: Association between tobacco chewing habit in elderly and depression

Tobacco chewing	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Current	100	44.4	125	55.6	225
Past	38	41.8	53	58.2	91
Non user	174	32.6	360	67.4	534
χ^2 =10.704		**df = 2**	**p=0.005**		

Depression among current tobacco chewers is more compared to past and non users. This association was statistically significant with p=0.005.

Table 50: Association between smoking habit in elderly and depression

Smoking	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Current	53	37.3	89	62.9	142
Past	25	33.3	50	66.7	75
Never	234	37.0	399	63.0	633
χ^2 =0.409 df = 2 p=0.815					

Depression among smokers is more compared to those who never smoked. But this difference was not statistically significant with p=0.815.

Table 51: Association between alcohol consumption and depression

Alcohol consumption	Depressed		Not Depressed		Total
	no.	%	no.	%	no.
Current	55	48.2	59	51.8	114
Past	15	32.6	31	67.4	46
Never	242	35.1	448	64.9	690
χ^2 =0.7659 df = 2 p=0.022					

Depression among current user of alcohol is more compared to past and non-users. This difference was statistically significant with p=0.022.

Table 52: Association between Body Mass Index and Depression (N=850)

Body Mass Index	Interpretation	Depressed		Not Depressed		Total
		no.	%	no.	%	no.
< 18.5	Underweight	5	27.8	13	72.2	18
18.5-22.9	Normal weight	115	32.1	243	67.9	358
23-24.9	Overweight	33	32.0	70	68.0	103
≥ 25	Obese	159	42.9	212	57.1	371
χ^2 =10.862		**df = 3**		**p=0.012**		

Depression among obese elderly was 42.9% compared to those with BMI<25. It was found to be 27.8% for those <18.5 and 32.1% for those between 18.5-24.9. This difference was statistically significant with p=0.012.

Figure 28: **Association between Body Mass Index and depression (Table 52)**

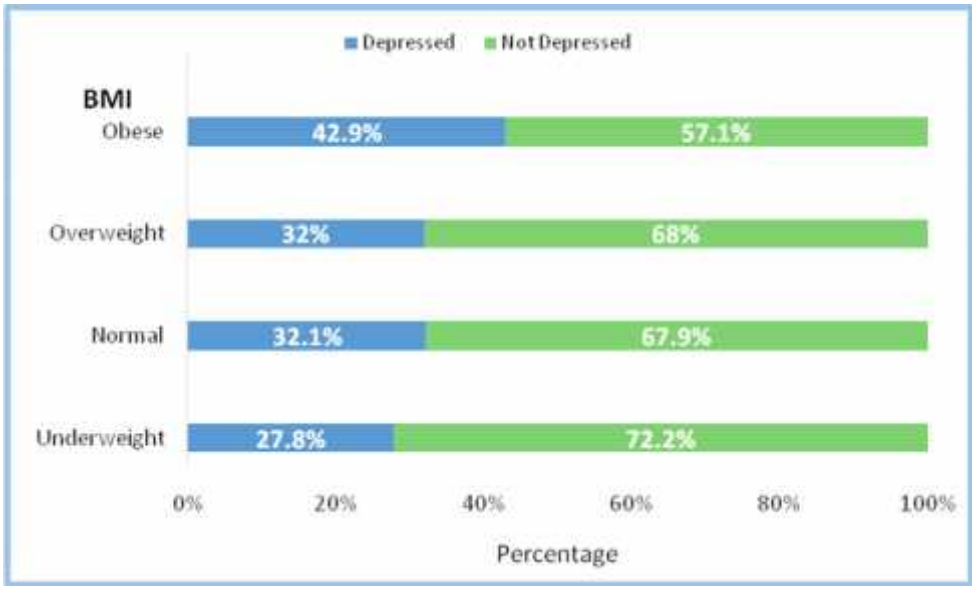


Table 53: Univariate analysis:

Particulars	Unadjusted OR[#]	95% CI[^]	p value
Age in years:			
60-69	Ref		
70-79*	4.67	3.37-6.49	**<0.001**
≥ 80*	27.77	11.62-66.66	**<0.001**
Sex*: Male/Female	0.69	0.52-0.91	**0.016**
Occupation:			
Skilled	Ref		
Retired*	3.58	1.84-6.94	**<0.001**
Professional	1.99	0.69-5.78	0.203
Semi-professionl	1.62	0.62-4.27	0.375
Semi-skilled	1.61	0.64-4.01	0.306
Unskilled*	7.46	3.24-18.5	**<0.001**
Housewife*	3.63	1.89-6.99	**<0.001**
SES:			
Class II	Ref		
Class I	2.22	0.94-5.21	0.066
Class III*	2.55	1.61-4.06	**<0.001**
Class IV*	8.55	5.1-14.28	**<0.001**
Class V*	2.81	1.21-6.58	**0.017**
Marital Status:			
Married	Ref		
Unmarried*	4.62	2.26-9.52	**<0.001**
Widowed/Divorced*	3.18	2.26-4.46	**<0.001**
Physical activity			
Mild	Ref		
Sedentary*	1.72	1.21-2.44	**0.002**
Moderate*	1.57	1.09-2.27	**0.014**
Vigorous	1.24	0.75-2.05	0.397
Social participation:			
Active	Ref		
Somewhat*	2.29	1.51-3.47	**<0.001**
No	1.31	0.94-1.83	0.105
Recreation			
Active	Ref		
Somewhat	1.11	0.81-1.52	0.503
Inactive*	1.67	1.13-2.48	**0.010**
Sleep			
Satisfied	Ref		
Somewhat	1.21	0.81-1.81	0.348
Not satisfied*	2.15	1.47-3.14	**<0.001**
Problems in family* (Yes/ No)	1.84	1.38-2.44	**<0.001**
Locomotor disability* (Yes/ No)	1.77	1.16-2.71	**0.008**
Stressful life event* (Yes/ No)	1.56	1.15-2.12	**0.004**

Particulars	Unadjusted OR[#]	95% CI[^]	p value
Past h/o depression* (Yes/ No)	2.02	1.16-3.53	**0.013**
Family h/o depression* (Yes/ No)	2.09	1.21-3.61	**0.008**
Chronic medical Problems* (Yes/ No)	1.53	1.14-2.06	**0.005**
Tobacco chewing:			
Non-user	Ref		
Current*	1.66	1.20-2.28	**0.002**
Past	1.48	0.94-2.33	0.089
Alcohol:			
No	Ref		
Current*	1.73	1.16-2.57	**0.007**
Past	0.89	0.47-1.69	0.734
BMI:			
<18.5	Ref		
18.5-22.9	1.23	0.43-3.53	0.700
23-24.9	1.22	0.40-3.71	0.720
≥ 25	1.95	0.68-5.58	0.213

*Indicates **'significant'** variables ($p<0.05$)

[#] OR- Odds ratio

[^] CI- Confidence Interval

Univariate analysis (with unadjusted Odds Ratio) showed that the risk factors such as older age [OR 27.77 (95% CI 11.62-66.66) p<0.001], female sex [OR 0.69 (95% CI 0.52-0.91) p=0.016], unskilled workers [OR 3.58 (95% CI 1.84-6.94) p<0.001], lower socio-economic status [OR 2.81 (95% CI 1.21-6.58) p=0.017], disrupted marital status [OR 3.18 (95% CI 2.26-4.46) p<0.001], sedentary lifestyle [OR 1.72 (95% CI 1.21-2.44) p=0.002], socially less active [OR 2.29 (95% CI 1.51-3.47) p<0.001], non-participation in recreational activities [OR 1.67 (95% CI 1.13-2.48) p=0.010], inadequate sleep [OR 2.15 (95%CI 1.47-3.14) p<0.001], problems in family [OR 1.84 (95% 1.38-2.44) p<0.001], locomotor disability [OR 1.77 (95% CI 1.16-2.71) p=0.008], stressful life events [OR 1.56 (95% CI 1.15-2.12) p=0.004], past history of depression

[OR 2.02 (95% CI 1.16-3.53) p=0.013], family history of depression [OR 2.09 (95% CI 1.21-3.61) p=0.008], chronic medical problems [OR 1.53 (95% CI 1.14-2.06) p=0.005], tobacco chewing [OR 1.66 (95% CI 1.20-2.28) p=0.002] and alcohol consumption [OR 1.73 (95% CI 1.16-2.57) p=0.007] were associated with depression in elderly.

Table 54: Multiple Logistic Regression Analysis:

Particulars	Adjusted OR[#]	95% CI[^]	p value
Age in years:			
60-69	Ref		
70-79*	9.90	5.78-16.95	**<0.001**
≥ 80*	142.85	38.46-500	**<0.001**
Sex*: Male/Female	0.25	0.13-0.47	**<0.001**
Occupation:			
Skilled	Ref		
Retired	1.62	0.60-4.42	0.340
Professional	2.97	0.80-10.98	0.102
Semi-professionl	2.01	0.64-6.33	0.230
Semi-skilled	1.43	0.43-4.78	0.559
Unskilled	2.77	0.81-9.52	0.104
Housewife	0.56	0.18-1.74	0.319
SES:			
Class II	Ref		
Class I	1.35	0.45-4.09	0.590
Class III	1.63	0.78-3.40	0.192
Class IV*	4.44	1.71-9.01	**0.001**
Class V*	0.23	0.06-0.90	**0.035**
Marital Status:			
Married	Ref		
Unmarried*	6.45	2.28-18.18	**<0.001**
Widowed/Divorced	1.06	0.63-1.81	0.802
Physical activity			
Mild	Ref		
Sedentary*	4.47	2.37-8.44	**<0.001**
Moderate*	3.47	1.23-9.76	**0.018**
Vigorous	1.16	0.65-2.09	0.600
Social participation:			
Active	Ref		
Somewhat*	2.30	1.15-4.61	**0.019**
No	1.16	0.73-1.63	0.530
Recreation			
Active	Ref		
Somewhat*	1.88	1.04-3.38	**0.036**
Inactive*	2.26	1.41-3.60	**0.001**
Sleep			
Satisfied	Ref		
Somewhat	1.16	0.68-1.98	0.590
Not satisfied*	2.48	1.44-4.29	**0.001**
Problems in family (Yes/ No)	1.293	0.834-2.00	0.251
Locomotor disability (Yes/ No)	0.826	0.432-1.58	0.562
Stressful life event (Yes/ No)	0.922	0.59-1.43	0.717

Particulars	Adjusted OR[#]	95% CI[^]	p value
Past h/o depression (Yes/ No)	1	0.42-2.37	0.999
Family h/o depression (Yes/ No)	0.761	0.33-1.76	0.525
Chronic medical problems (Yes/ No)	0.679	0.42-1.09	0.108
Tobacco chewing:			
Non-user	Ref		
Current	1.34	0.84-2.14	0.215
Past	1.04	0.54-2.01	0.901
Alcohol:			
No	Ref		
Current	1.42	0.71-2.84	0.317
Past	0.94	0.36-2.47	0.899
BMI:			
<18.5	Ref		
18.5-22.9	3.95	0.67-23.25	0.253
23-24.9	4.69	0.76-28.57	0.095
≥ 25*	6.71	1.14-40	**0.035**

*Indicates **'significant'** variables (p<0.05)

[#] **OR-** Odds ratio

[^] **CI-** Confidence Interval

Multiple logistic regression analysis (with adjusted Odds Ratio) showed that the risk factors such as older age [OR 142.85 (95% CI 38.46-500) p<0.001], female sex [OR 0.25 (95% CI 0.13-0.47) p<0.001], lower socio-economic status [OR 0.23 (95% CI 0.06-0.90) p=0.035], unmarried status [OR 6.45 (95% CI 2.28-18.18) p<0.001], sedentary lifestyle [OR 4.47 (95% CI 2.37-8.44) p<0.001], socially less active [OR 2.30 (95% CI 1.15-4.61) p=0.019], non-participation in recreational activities [OR 2.26 (95% CI 1.41-3.60) p=0.001], inadequate sleep [OR 2.48 (95%CI 1.44-4.29) p=0.001] and obesity [OR 6.71 (95% CI 1.14-40) p=0.035] were independently associated with depression in elderly.

DISCUSSION

The present study was conducted at Ashok Nagar, which is one of the urban field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, Belagavi from January to December 2014. This study included 850 elderly (aged 60 years and above) residing in the study area.

I) Socio-demographic profile of study participants:

Table 1 & 2: Age and sex distribution of study participants.

Among the study participants, about 66% were in the age group of 60 – 69 years, 27.6% were in 70 – 79 years and 6.5% were ≥ 80 years. The mean age of the study participants was 68.1 ± 6.37 years. Among them, 48.1% were men with mean age 67.1 ± 6.33 years and 51.9% were women with mean age 69 ± 6.29 years.

A study conducted in an urban area of Dharwad, Karnataka, had participants with mean age of 65.1 years comprising of 37.2% men and 62.8% women. The age distribution of participants were similar to our study.[17] Another study conducted in Florianopolis, Brazil showed that, participants aged 60-69 years were 51.1%, 70-79 years were 36% and ≥ 80 years were 12.9%. The study comprised of 36.1% men and 63.9% women.[32] The higher percentage of women in these studies could be due to their availability in their residence at the time of interview.

Table 3: Distribution of study participants according to religion:

In the present study, 60.1% were Hindus by religion followed by 34.6% Muslims and 5.3% were Christians. The distribution was similar to the study

conducted in Dharwad, Karnataka which comprised of 62.8% Hindus and 37.2% Muslims.[17]

Table 4: Distribution of study participants according to literacy status

In our study, 89.4% were literates. Among them, majority of the participants had studied up to primary school (44.1%), followed by 31.14% educated up to high school. About 6.4% participants studied up to Pre-University College and 7.5% were educated above PUC level. Around 10.6% participants were illiterates.

A study done in Edirne, Turkey showed that 17.9 were illiterates, 43.3% had studied till elementary school, 10.4% till middle school, 6.6% till high school and 3.1% till University.[27] In contrast to our findings, a study done in Dharwad, Karnataka showed that more number of participants were illiterates (56.9%).[17]

Table 5: Distribution of study participants according to their occupation.

In the present study, 39.5% were housewives, 32.2% were retired from service and 28.2% were working. Similarly, a study conducted in Karachi, Pakistan showed that 26.7% were working and 73.3% were not working.[24]

Table 6: Distribution of study participants according to type of family:

In our study, the majority of the elderly, 73.3% were living in nuclear families, 18.5% elderly were living in joint families, 7.2% participants belonged to three generation family and 1.1% belonged to broken family.

A study conducted in Rawalpindi, Pakistan[43] showed that 61.2% were living in nuclear families and 38.7% in joint families. Whereas, a study done in Dharwad,

Karnataka consisted of 31.2% participants from nuclear, 37.6% from joint and 31.2% from three generation family.[17]

Table 7-9 & 12: Distribution of study participants according to family size, type of house and dietary habits

In the present study, the majority of elderly, 61.3% had 4-8 members in their family, followed by 31.6% who had less than 4 members and 7.1% had more than 8 members. The study area being urban, a large majority of elderly, 89.4% lived in Pucca house 7.4% in Semi pucca house and the rest 3.2% in Kuccha house. 66.1% had their own house and 33.9% had to rent. About 63.4% elderly consumed mixed diet and remaining 36.6% consumed vegetarian diet.

Table 10: Distribution of study participants according to socioeconomic status

In the present study, as regards to socio-economic status, majority of them, 51.2% belonged to class III, followed by 22.6% to class IV, 18.7% to class II, 3.9% to class I and 3.6% belonged to class V. On contrary, in a study done in Dharwad, Karnataka, majority of the participants belonged to class IV (39.5%), followed by class III (26.2%), class II (23.9%), class I (8.3%) and class V (2.3%).[17]

Table 11: Distribution of study participants according to marital status

In our study, 74.4% of the elderly were currently married, 20.5% were widowed, 4.1% were unmarried and 1.1% were separated.

In contrast, a study done in Florianopolis, Brazil showed that 58.8% were married, 27.6% were widowed, 5.7% were single and 7.9% were divorced.[32] Results

seen among study participants of Dharwad, Karnataka study, showed that 63.8% were married and 36.2% were widowed/divorced/unmarried.[17]

Table 13: Distribution of study participants according to physical activity

In our study, majority of the participants, 40.5% performed mild physical activities, 26.2% moderate activities, 10.0% vigorous activities and 26.2% elderly were sedentary.

Results from Alameda county study, California showed that 34% of participants had low physical activity, 50.5% had medium and 15.5% had high level of physical activity according to physical activity scale.[44] In a study done in Dharwad, Karnataka showed that, 53.3% of the elderly were active and 46.7% were inactive.[17]

Table 14: Distribution of study participants according to social participation

In the present study, 52.1%, 30% and 18% of the elderly took active part, to some extent active and didn't take part in social gathering respectively. Similarly, a study done in Dharwad, Karnataka showed majority, 76.6% participated while 23.4% did not participate in social events.[17] In contrast, Florianopolis, Brazil study showed that a lesser number, 43.2% participated in social groups and 56.8% did not. [32]

Table 15: Distribution of study participants according to utilization of day time

In our study, 34.4% were actively engaged, 37.2% engaged to some extent and 28.5% did not engage in any household activities during day time. Similarly, the results from Dharwad, Karnataka study showed around 29.9% did not engage and remaining 70.1% participants were engaged during day time.[17] In contrast, a study

done in Florianopolis, Brazil showed that majority, 70.4% did not engage and 29.6% actively engaged in some activity during day time.[32]

Table 16: Distribution of study participants according to participation in recreational activities

In the present study, 36.4% actively participated, 45.1% participated to some extent and 18.5% did not participate in any recreational activities. A study done in Dharwad, Karnataka showed that larger percentage i.e., 63% participated and 37% did not participate in any recreational activities.[17]

Table 17: Distribution of study participants according to sleep pattern

In our study, majority of the participants i.e., 42.2% were not satisfied with their sleep pattern, 35.4% were satisfied to some extent and only 22.4% rated their sleep pattern satisfactory. Similar to our findings, a study done in Dharwad, Karnataka showed that 45.5% of the participants were not satisfied with their sleep and remaining 54.6% were satisfied.[17]

Table 18: Distribution of study participants according to locomotor disability

In the present study, 11.5% of the total study participants had physical disability which restricted their mobility. Similarly, a study conducted in Tamil Nadu, revealed the prevalence of walking disabilities to be 12.5%.[45] Similarly, results from Alameda county study, California showed the prevalence of physical disability in participants to be 9.8%.[44]

Table 19: Distribution of study participants according to stressful life events in last one year

In our study, 17.7% had recent history of death of family member, 5.1% had met with an accident, 3.2% reported abuse and 1.9% had neighborhood problems. Results from Alameda county study, California showed the presence of neighborhood problems to be 10.8%.[44]

Table 22: Distribution of study participants according to chronic medical problems

In our study, 28.7% had Hypertension, 24.1% had Diabetes Mellitus type 2 and 9.9% elderly had both. The findings were found to be similar when compared to a study done in Florianopolis, Brazil, which showed 22.1% participants to have Diabetes. But, the prevalence of Hypertension was found to be higher (58.8%), which may be due to the differences in lifestyle, habits and health seeking behaviour [32]

Table 23, 24 & 25: Distribution of study participants according to personal habits

In the present study, 26.5% participants were current tobacco chewers, 16.7% were current smokers and 16.7% were alcoholic.

In a study done in Florianopolis, Brazil, 8.5% were current smokers and 35.9% were alcoholic.[32] In another study done in Alameda, California 13.1% were current smokers and 73.8% of the participants were alcoholics, which is quite high, compared to our study.[44] This could be due to differences in cultural practices and financial status.

Table 26: Distribution of study participants according to problems in family

In our study, 22.1% revealed presence of health related problems, 11.2% had monetary problems and 5.4% had others. Similarly, results from Alameda county study, California showed the presence of monetary problems to be 16.3%.[44]

Table 27: Distribution of study participants according to Body Mass Index

In the present study, 43.6% were obese followed by 42.1% normal weight, 12.2% overweight and 2.1% were underweight. The mean BMI of the study participants was 24.4 $\pm$ 3.93 kg/m^2.

In a study done in Florianopolis, Brazil showed that majority were overweight (53%) followed by normal weight (38.6%) and underweight (8.4%).[32] Whereas in Alameda county study, California 1.5% were underweight, 17.1% were obese and majority were normal weight.[44]

II. Prevalence of Dependence in activities of daily living:

Table 29: Distribution of study participants according to KATZ ADL score

In the present study, the total prevalence of dependence (KATZ ADL score 0 to 5) for activities of daily living such as bathing, dressing, toileting, transferring, continence and feeding was found to be **16.6%**. Among them 1.1% elderly were completely dependent and 15.4% were partially dependent. About 83.5% of the participants were independent.

Similar to our findings, a study done in urban community of Delhi revealed that 15 % of the elderly could not carry out their activities of daily living independently.[46]

Similarly, another study done in Turkey showed that 2% of the elderly were completely dependent and 14.5% were semi-dependent for daily activities.[47] A lower percentage of elderly, 7.2% were dependent for their activities of daily living in a study done in Varanasi.[48] This might be due to the difference in health status in different areas.

III. Prevalence of Depression and associated factors:

Table 30: Distribution of study participants according to GDS score (N=850)

In our study, the overall prevalence of depression (GDS score >5) in the participants was found to be **36.7%**. This includes 30.1 % of the participants who scored 6-10 which is suggestive of depression and 6.6% scored 11 to 15 implying definite depression.

Studies done in Dharwad and Raichur districts of Karnataka revealed the depression among the elderly participants to be 29.4% and 32.4% respectively which are similar to the findings of the present study.[16, 17]

A higher prevalence of 40.6% depression among elderly was seen in a study done in Karachi and 42% in Rawalpindi, Pakistan.[24,43] Another study done in Florianopolis, Brazil revealed lower prevalence of depression i.e., 23.9% participants with score > 5 on GDS-15.[32] These differences may be due to the different socio-demographic characteristics of the population.

Table 31: Association between depression and dependence in ADL

In the present study, depression was prevalent among all the participants who were completely dependent, 77.1% of partially dependent and in 28.5% of participants who were independent for doing their activities of daily living. Depression was found to increase with increase in dependence in activities of daily living. Similar to our findings, a study done in Sweden showed that dependency in each ADL task was inversely associated with GDS-15 score, which means the lower the ADL score (dependent), the higher was the GDS score(depressed).[29]

Table 32: Association of age and depression (N=850)

In our study, the percentage of depression was highest, 89.1% in the study participants who were aged ≥ 80 years, followed by 57.9% in 70-79 years age group and 22.7% in 60-69 years. As the age increased, the prevalence of depression also increased.

Similarly, a study done in Dharwad, Karnataka showed that, 34.8% in age group 60-69 years and 59.5% in age group ≥ 70 years were found to be depressed.[17]

Another study done in Florianopolis, Brazil showed prevalence of depression in age groups ≥ 80 years, 70-79 years and 60-69 years to be 35.3%, 23.7% and 21.3% respectively. The younger age group, 60-69 years showed similar findings to our results but the prevalence of depression in older group was found to be less which might be due to increased literacy and economic status of their participants.[32]

Table 33: Association of age and dependence in ADL

In the present study, the percentage of dependence in activities of daily living was highest in the participants aged ≥ 80 years i.e., 92.7%, followed by 35.3% in the age group 70-79 years and 1.1% in 60-69 years. Similarly, a study done in South Korea showed a 2-3 times greater odds of begetting ADL disability in the 65-69 and 70-79 age groups. This suggests that with the increase in age, the trend of dependence in ADL also increased significantly.[49]

Table 34: Association between gender and depression

In our study, the percentage of depression was slightly more in women (40.8%) than in men (32.3%). A study done in Rawalpindi, Pakistan also showed the women (54.6%) to have more depression than men (29.8%). The increased risk in women could be due to increased sedentary habits and genetic propensity for depression.[43]

Table 36: Association between occupation and depression

In the present study, majority of depression was found among housewives (40.2%) and retired persons (39.8%). The percentage of depression among professionals and semi-professionals was 26.9% and 23.1% respectively. Similarly, the percentage of depression among skilled, semiskilled and unskilled workers was found to be 15.6%, 22.9% and 58% respectively.

A study done in Rawalpindi, Pakistan showed higher prevalence of 57% depression among elderly who were not working than those who were working (19.2%).[43] Similarly, another study done in Raichur, Karnataka showed the prevalence of depression to be 54.4% among non-working and 26.2% among working participants.[16] This may suggest that several factors after retirement such as financial dependence could be a risk factor for depression.

Table 37: Association between socio-economic status and depression

In our study, major percentage of depression was found among class IV i.e., 62.5% followed by 35.5% in class V and 33.3% in class III. Depression among class I was 30.3% and in class II was 16.4%. A study done in Raichur, Karnataka showed a

trend of increasing prevalence of depression from higher to lower socio-economic classes. The prevalence of depression in Class I, II, III, IV, V was 28.6%, 27.9%, 53%, 55.3% and 65.2% respectively.[16] This finding supports poor socio-economic status as a risk factor for depression.

Table 38: Association between marital status and Depression

In the present study, the prevalence of depression was maximum among unmarried (65.7%), followed by widowed (58%) and separated/divorced (33.3%). In married participants the prevalence was comparatively lower (29.3%).

A study done in Raichur, Karnataka showed prevalence of depression to be high among unmarried (80%) followed by widowed (68%) and married (33%).[16] Another study done in Karachi, Pakistan showed similarly high prevalence among widowed/divorced (51.6%) than married participants (29.7%). This higher prevalence among widowed/separated/unmarried participants may be due to the lack of emotional support from partner.[24]

Table 39: Association between physical activity and depression

In our study, the prevalence of depression among sedentary elderly was 43%. Among elderly with mild, moderate & vigorous physical activity the prevalence of depression was 30.5%, 40.9% and 35.3% respectively.

A study done in Dharwad, Karnataka showed the prevalence of depression among inactive participants to be 40.5% which was similar to our study findings. It also showed lower prevalence of 15.5% among active participants indicating physical activity to have protective effect for depression.[17]

Another study done in Alameda, California, showed that physical activity to be protective for subsequent depression. In the fully adjusted model, the relative risk was 0.83 (95 percent CI: 0.73, 0.96), meaning that each one-point increase in the physical activity scale was associated with nearly a 20 percent reduction in the likelihood of becoming depressed.[44]

Table 40-42: Association between social participation, recreation, sleep pattern with depression

In the present study, the prevalence of depression was found to be 49.7% among those with no social participation, 45.6% in those who did not participate in recreational activities and 45.4% in those who felt dissatisfied with their sleep.

A study done in Dharwad, Karnataka showed the prevalence of depression among socially inactive and those who did not participate in recreational activities, was 44.6% and 27.8% respectively. The prevalence of depression was found to be 43.1% among participants who felt dissatisfied with their sleep.[17] This shows that good social participation and adequate sleep have protective effect against depression.

Table 43 & 45: Association between stressful life events, problems in family and depression

In our study, depression was present in 44% of participants with history of problems in the family/stressful life events. A study done in Alameda, California showed that among those with presence of financial constraints and neighbourhood problems the prevalence of depression was 18% and 16.7% respectively.[44]

Table 44: Association between locomotor disability and depression

In the present study, depression was present in 49% of participants with locomotor disability. A study done in Alameda, California showed prevalence of 20.5% depression among the participants with physical disability.[44]

Table 46 & 47: Association of personal and family history with depression

In the present study, the prevalence of depression was 47.2% among those with personal history of depression and 46.4% among those who had family history of Depression. A study done by Monroe et al showed that the participants with positive family history had more lifetime episodes of depression (Mean = 5.26 $\pm$ 2.41) than those without family history of depression (Mean = 3.04 $\pm$ 2.44).[47] Another study done in Sweden reveals 42% of depression among participants with past history of depression. This suggests that personal or family history is an important risk factor for depression.[29]

Table 48: Association between chronic medical problems and depression

In our study, depression was found to be more in elderly with history of HTN than Type 2 DM (43.4% & 36.1% respectively). In elderly with history of both Type 2 DM and HTN, it was 41.7%. A study done in Florianopolis, Brazil revealed similar prevalence of 36.2% among diabetics but lesser among those with history of hypertension (28%).This infers that the presence of co-morbidities increases the risk of depression among elderly.[32]

Table 49: Association between personal habits and depression

In our study, the prevalence of depression among current tobacco chewers was 44.4% and among current smokers was 37.3%. The prevalence of depression among past tobacco chewers was 41.8% and past smokers was 33.3%. Depression was found to be significantly associated with chewing tobacco and alcohol consumption, but not with smoking.

In a study done in Alameda, California showed the prevalence of depression among current and past smokers to be 11.4% and 6.4% respectively.[44]

Table 51: Association between Body Mass Index and Depression

In the present study, the prevalence of depression was found to be highest among obese individuals (42.9%) and lowest among underweight (27.8%). The prevalence of depression was found to be similar among participants who were overweight (32%) and with normal weight (32.1%). With the increase in BMI, the prevalence of depression was found to increase. This finding is contradicted by study done in Florianopolis, Brazil which showed the prevalence of depression among normal weight, underweight and overweight to be 21.2%, 25.6% and 24.6% respectively.[32]

Table 53 & 54: Univariate and Multiple logistic regression analysis

On performing univariate analysis, the factors such as age, sex, retired working status, lower socio-economic status, widowed or divorced or unmarried status, sedentary lifestyle, non-participation in social and recreational activities, inadequate sleep, having stressful life events or problems in the family, personal or

family history of depression, chronic diseases, tobacco chewing and alcohol consumption were associated with depression in elderly.

On performing multiple logistic regression analysis and thereby removing the effect of confounders, the risk factors independently associated with depression in elderly were age, sex, lower socio-economic status, unmarried status, sedentary lifestyle, non-participation in social and recreational activities, inadequate sleep and obesity.

Living with spouse, being physically and socially active, not having tobacco or alcohol consumption habits and adequate sleep were found to be protective against depression which was similar to the findings suggested by the studies done in Pakistan, Brazil, California and Turkey. [24, 32, 44, 47]

CONCLUSION

The present community based study reported a higher prevalence of depression among elderly residing in urban area of South India. The magnitude of the problem of depression was **36.7%** in our study area which was slightly higher compared to the national study data (11-32%).[7]

Depression was found to increase with advancing age and showed higher preponderance in women. Elderly with retired status and lower socio-economic status were mostly affected. Half of the housewives were found to be suffering from depression. Elderly with sedentary lifestyle, non-participation in social or recreational activities and with inadequate sleep were found to be at risk of developing depression. Taking part in social activities was observed to have protective effect, indicating the importance of a social network in staying healthy and preventing depression.

Modifiable risk factors such as chewing tobacco and alcohol consumption were significantly associated with depression. Presence of financial, social and health problems in the family, stressful life events such as accidents, abuse and death of family member were identified as risk factors for depression. Strong association was found among elderly with a personal or family history of depression suggesting role of genetic factors.

Disrupted marital status such as widowed, separated or unmarried status were associated with depression. This suggests marriage to be a protective factor for preventing depression. Biological risk factors included hypertension, diabetes

and obesity. Elderly who were physically disabled or dependent on others for their daily activities were at higher risk for developing depression.

Our study demonstrated a significant higher prevalence of depression and identified its risk factors in urban population of South India. Steps needs to be taken at the earliest to reduce the suffering and improve the quality of life among elderly.

LIMITATIONS

The limitations of the study are:

- The data may be extrapolated to urban India but may not be applicable to rural India as lifestyle and socio-cultural factors vary widely in urban and rural areas.

- Depression may not get detected as it follows iceberg phenomenon, hence estimation of family history of depression in the present study may be lesser than actual data.

- Care giver burden among the depressed elderly could not be assessed due to lack of feasibility.

- Present study excluded elderly with severe illness, hence the prevalence of dependence for activities of daily living would be more than our study findings.

RECOMMENDATIONS

Based on the findings of our study, following recommendations are being suggested for prevention of depression among elderly:

- Periodic screening of people aged 60 years and above for depression using reliable scales, such as GDS-15, for early intervention. Preferably to be performed at first visit to outpatient department at all health centres and followed up yearly, thereafter.

- Establishment of elderly-friendly services and settings by name 'Geriatric Clinics' at the Urban and Primary Health Centres on fixed days of the week.

- Specialists in psychiatry to be appointed to train the staff at UHC, PHCs and CHCs so that the present deficiency of specialist health personnel in India can be tackled.

- Rehabilitative services for the elderly such as 'Old age homes', 'Social Clubs', recreational amenities to be provided.

- Medicines to be provided by pharmacies with 'home delivery' options to be promoted and appreciated.

- Non-Governmental Organisations to provide care to elderly in order to prevent disability due to depression and thus improving the quality of life of the elderly. Especially those who are widowed, with disability or who face abuse.

- Periodical health education programs with themes like “Healthy ageing makes the difference” should be organized in the community for the elderly and others by incorporating use of Audio-Visual aids. Movies, serials and advertisements with the central theme on depression to be promoted to increase the awareness.

- Establishment of ‘nationwide registry of older people’ where comprehensive community based data on depression can be made available to have a broader picture of the burden and helps to plan accordingly.

- Research to be promoted in the area of mental health with adequate funding from both Government and Private organization as mental illnesses go unnoticed, while the victim suffers silently.

SUMMARY

The present cross sectional study was undertaken to know the prevalence of depression and its risk factors among elderly residing in an urban area of Belagavi. The duration of the study was from 1st January to 31st December 2014.

The study population included 850 adults aged 60 years and above, residing in Ashok Nagar, which is an urban field practice area of Department of Community Medicine, J. N. Medical College, Belagavi. After obtaining informed consent, the elderly were interviewed using pre-designed and pre-tested questionnaire which included the Geriatric Depression Scale-15 and KATZ Activity of Daily Living Scale.

In our study, 65.9% were in 60 – 69 years age group, 27.6% were in 70 – 79 years age group and 6.5% were 80 years and above. The mean age ± SD of the study participants was 68.1 ± 6.37 years. Females were 51.9% and males were 48.1%. Majority, 60.1% were Hindus by religion followed by 34.6% Muslims and 5.3% were Christians reflecting the population distribution of the study area.

Most (89.4%) of them were literates, with a larger proportion being housewives (39.5%) and retired (32.2%). Majority (73.3%) were living in nuclear families with 66.1% living in own house. Most (74.4%) of the elderly were married and living with their spouse and 20.5% were widowed. About 73.8% belonged to class III and class IV socio-economic status according to Modified B. G. Prasad classification.

Around one-fourth of the elderly were sedentary who did not participate in any social or recreational activities. Similar proportion were Diabetic (24.1%) or Hypertensive (28.7%). Majority were obese (43.6%), about 45.5% had

problem of insomnia, 27.9% had stressful life events in last one year and 38.7% had some problem in their family. Regarding personal habits, 13.4% were currently chewing tobacco, 26.5% were currently smoking tobacco and 16.7% were currently alcoholic.

The overall prevalence of depression (GDS score >5) in the participants was found to be **36.7%** with higher preponderance in women (40.8%) probably attributed to the high life expectancy among women.

The prevalence of dependence (KATZ ADL score 0 to 5) for activities of daily living was found to be **16.6%**. Depression was prevalent among all the participants who were completely dependent, 77.1% of partially dependent and in 28.5% of participants who were independent for doing their activities of daily living such as bathing, dressing, toileting, transferring, continence and feeding. Presence of physical disability increased the risk of depression.

Strong association was found among elderly with a personal or family history of depression suggesting role of genetic factors ($p<0.05$). Depression was found to increase with advancing age mostly affecting elderly with retired status and lower socio-economic status. Housewives, elderly with sedentary lifestyle, non-participation in social or recreational activities and with inadequate sleep were found more depressed ($p<0.05$). Taking part in social activities was observed to have protective effect, indicating the importance of a social network in staying healthy and preventing depression.

Disrupted marital status such as widowed, separated or unmarried status were associated with depression. This also suggests living with spouse to be a protective factor for preventing depression which could be due to the availability

of emotional support. Biological risk factors associated with depression included hypertension, diabetes and obesity ($p<0.05$).

Our study demonstrated a significant higher prevalence of depression and recognised its risk factors in urban population of South India.

BIBLIOGRAPHY

1. Mahajan BK and Gupta MC. "Textbook of Preventive and Social medicine". 3rd ed. Chapter 32. Jaypee publications, New Delhi; 2003, pg: 572

2. Global issues on ageing. UN 1989. Available from URL, http://www.un.org/es/globalissues/ageing/docs/vipaa.pdf Accessed on 20/01/15.
3. Ageing and health. WHO 2012. Available from URL, http://www.who.int/ageing/publications/whd2012_global_brief/en/ Accessed on 20/01/15.
4. The World Health Report 1997: Conquering suffering, enriching humanity. pg: 14.
5. Ageing and health. WHO 2012. http://www.who.int/healthinfo/survey/ageingdefnolder/en/ Accessed on 24/12/2014.
6. United Nations (UN). "Problems of the Elderly and the Aged." World Assembly on the elderly: report of the Secretary General. New York, United Nations, 1980.
7. Ankur B. Trend of the prevalence of geriatric depression: a modern epidemic. IJCRIM, 2005;5(1):205-08.
8. Grover S, Dutt S, Avasti A. An overview of Indian research in depression 2010;52: S178-88. www.indianjpsychiatry.org Accessed on 22/08/2013.

9. International Classification of Diseases (ICD). World Health Organization. Available from URL, http://apps.who.int/classifications/icd10/browse/2016/en#/V Accessed on 12/8/2014.

10. Lopez AD, Mathews CD, Ezzati M, Jamison DT, Murray CJ. Global Burden of disease and risk factors. Washington: The World Bank; 2006.

11. Mental Health. WHO 2012. Available from URL, http://www.who.int/mental_health/management/depression/who_paper_depression_wfmh_2012.pdf Accessed on 22/08/2014.

12. Older Adults and depression. Available from URL, http://www.nimh.nih.gov/health/publications/older-adults-and-depression/index.shtml Accessed on 12/05/14.

13. The World Health Organization. Mental Health Around the World: Stop Exclusion –Dare to Care: World Health Day. Geneva: The institute; 2001.

14. Scales for depression in elderly. Medscape. Available from URL, http://www.medscape.com/viewarticle/430554_3 Accessed on 22/04/14

15. Zimmerman M. Using scales to monitor symptoms and treatment of depression (measurement based care). In UpToDate, Rose, BD (Ed), UpToDate, Waltham, MA, 2011.

16. Nair SS, Hiremath SG, Ramesh G, Pooja S, Nair SA. Depression among geriatrics: Prevalence and associated factors. IJCRR, 2013; 05(08):110

17. Pracheth R, Mayur SS, Chowti JV. Geriatric Depression Scale: A tool to assess depression in elderly. Int J Med Sci Public Health 2013;2:31-35.

18. Jain RK, Aras RY. Depression in geriatric population in urban slums of Mumbai. Indian J Public Health. 2007;51(2):112-3.
19. Jaiwala V, Bansal RK, Patel S, Tamakuwala B. A study on depression among aged in surat city. NJCM 2010;1(1):47-49.
20. Subramani P, Rajendra P, Anbhazhagan G, Vishwanathan M. Prevalence of depression in a large urban south Indian population- the Chennai urban rural epidemiology. PLoS ONE 2009;4(9):e7185.
21. Sengupta P, Benjamin AI. Prevalence of Depression and Associated Risk Factors among the Elderly in Urban and Rural Field Practice Areas of a Tertiary Care Institution in Ludhiana. Indian Journal of Public Health 2015;59(1):5-8
22. Nandi PS, Banerjee G, Mukherjee SP, Nandi S, Nandi DN. A study of psychiatric morbidity of the elderly population of a rural community in west bengal. Indian J. Psychiat, 1997;39(2):122-129.
23. Dey AB, Soneja S, Nagarkar KM, Jhingan HP. Evaluation of the health and functional status of older Indians as a prelude to the development of a health programme. Natl Med J India 2001;4:135-8.
24. Mehreen AB, Mehtab SK, Murad MK. Depression in the elderly in Karachi, Pakistan: a cross sectional study. BMC Psychiatry 2013;13:181.
25. Ahmadi SM, Mohammedi MR, Mostafavi SA, Keshavarzi S, Kooshesh SM, Joulaei H, et al. Dependence of the Geriatric Depression on Nutritional Status and Anthropometric Indices in Elderly Population. Iran J Psychiatry 2013; 8:2: 92-6.

26. Nazemi L, Skoog I, Karlsson I, Hosseini S, Hosseini M, Hosseinzadeh MJ, et al. Depression, Prevalence and Some Risk Factors in Elderly Nursing Homes in Tehran, Iran. Iranian J Publ Health 2003;42(6):559-69.
27. Unsar S, Dindar I, Kurt S. Activities of daily living, quality of life, social support and depression levels of elderly individuals in Turkish society. J Pak Med Assoc. 2015;65(6):642-6.
28. Park B, Park J, Jun JK. Cognitive Impairment, Depression, Comorbidity of the Two and Associated Factors among the Early Sixties in a Rural Korean Community. PLoS ONE 2013;8(11): e79460.
29. Bostrom G, Conradsson M, Rosendahl E, Nordstrom P, Gustafson Y, Littbrand H. Functional capacity and dependency in transfer and dressing are associated with depressive symptoms in older people. Clinical Interventions in Aging 2014;9:249–57.
30. Paudel M, Taylor BC, Israel SA, Blackwell T, Maglione JE, Stone K, et al. Sleep disturbances and risk of depression in older men. Sleep 2013;36(7):1033-40.
31. Esmayel EM, Eldarawy MM, Hassan MM, Mahmoud AA, Mohamed SY. Current Gerontology and Geriatrics Research 2013;923710:1-4.
32. Lucélia JB, Tânia RBB, André JX, Eleonora d'O. Associated factors of depressive symptoms in the elderly: Epi Floripa study. Rev Saúde Pública 2013;47(4):1-10.

33. Ankur Barua. Review Article: Trend of the prevalence of geriatric depression: a modern silent epidemic. International Journal of Collaborative Research on Internal Medicine & Public Health 2103; 5(1):178-88.

34. Martin G. Cole, Nandini Dendukuri. Risk Factors for Depression among elderly community. American Journal of Psychiatry 2003 Jun; 160(6):1147-56.

35. Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS). Recent evidence and development of a shorter version. In T.L. Brink (Ed.), Clinical Gerontology: A Guide to Assessment and Intervention (pp. 165-173). NY: The Haworth Press, Inc.;1986.

36. Katz S. Assessing self-maintenance: Activities of daily living, mobility and instrumental activities of daily living. JAGS 1983;31(12):721-26.

37. Dudala SR, Reddy KAK, Prabhu GR. Prasad's socio-economic status classification- An update for 2014. Int J Res Health Sci 2014;2(3):875-8. Available from http://www.ijrhs.com/issues.php?val= Volume2&iss=Issue3 Accessed on 19/09/2014

38. Obesity.http://www.nblbi.nih.gov/health/public/heart/obesity/lose.wt/phy. act.htm Accessed on 23/12/2014.

39. WHO STEPS Surveillance Manual. (Latest updated on 13/06/2008) Available at URL, http://www.who.int/NCD/STEPS Approach, Accessed on 14/06/2014.

40. Disabled Persons in India. Report No. 485 (58/26/1). National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, Government of India; 2003.

41. Redefining obesity and its treatment. Asia – Pacific perspective. Available from URL, http://www.wpro.who.int/internet/resources.ashx/NUT/Redefining+obesity.pdf Accessed on 16/09/2014.

42. Chobanian AV. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. Journal of the American Medical Association 2003; 289(19):2560–72.

43. Javed S, Mustafa N. Prevalence of Depression in various demographic variables among elderly. Open access scientific reports 2013;2(1):618.

44. Strawbridge WJ, Deleger S, Roberts ER, Kaplan GA. Physical Activity Reduces the Risk of Subsequent Depression for Older Adults. Am J Epidemiol 2002; 156(4):328-34

45. Audinarayana N, Sheela J. Physical disability among the elderly in tamil nadu: patterns, differentials and determinants. Health and Population-Perspectives and Issues 2002;25(1):26-37.

46. Khokhar A, Mehra M. Lifestyle and morbidity profile of geriatric population in an urban community of Delhi. Indian Journal Of Medical Sciences 2001;55(11):609-15.

47. Monroe SM, Slavich GM, Gotlib IH. Life stress and family history for depression: The moderating role of past depressive episodes. Journal of Psychiatric Research 2014;49:90-5.
48. Kishore J. Legislation for older persons. In: J. Kishore's National Health Programmes in India. 11th edition. New Delhi: Century publications; 2014. p. 841-43.
49. Kim IH. Age and gender differences in the relation of chronic diseases to activity of daily living (ADL) disability for elderly South Koreans: based on representative data. J Prev Med Public Health. 2011;44(1):32-40.

ANNEXURE I – ETHICAL CLEARANCE

K.L.E.SOCIETY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
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Ref: MDC/DOME/102 **Date: 05/12/2013**

To,

J.N.Medical College,
BELGAUM.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"ASSESSMENT OF DEPRESSION AMONG ELDERLY RESIDING IN AN URBAN AREA: A CROSS SECTIONAL STUDY"**, is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr.Hema Dhumale)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belgaum.

(Dr.Ganga Pilli)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belgaum.

ANNEXURE II

INFORMED CONSENT

"ASSESSMENT OF DEPRESSION AMONG ELDERLY RESIDING IN AN URBAN AREA: A CROSS SECTIONAL STUDY"

INSTITUTION:

INVESTIGATORS:

Purpose of the study:

Depression is characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness and poor concentration. In elderly it is often overlooked as a clinical diagnosis, since it is assumed to be a normal response to ageing. Older adults may be reluctant to seek services for depression because of mental illness stigma. Early diagnosis and treatment of depression could improve the quality of life.

Thereby you are being invited to participate in this study to find the prevalence of depression among people aged 60 years and above residing in an urban area.

Procedure: I will be asking you some questions regarding socio-demographic aspects and some questions related to opinion about your health status using Geriatric Depression Scale-15 questionnaire. The interview will not take more than 20 minutes.

Monetary benefits:

You will not be given any kind of monetary benefits for your participation in the study.

Procedure:

No risk is involved in the study as the study does not involve any intervention.

Privacy and Confidentiality:

Your identity will not be revealed as the information collected will be coded so that no one other than the investigator will know your identity.

Cost of participation:

The cost of the study will be borne by the researcher. You will not have to pay for your participation.

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 and for publications in scientific journals. However your identity will not be revealed.

Questions/ Queries:

If you have any queries regarding the study, you can contact:

Dr. _____

Dr. _____

Dr. _____

If you have any questions about rights as a research participant you can contact

Dr Ganga S. Pilli,

Chairman,

J. N. M. C Institutional Ethics Committee on human subjects' research

Phone: 0831 2741701.

Legal rights:

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

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 hereby 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 & Place:

ANNEXURE III – PROFORMA

QUESTIONNAIRE

Assessment of Depression among elderly residing in an urban area: A Cross Sectional study

Socio-Demographic data: Date:_____

1. **Name**:_____ 2) **Age**:_____years. 3) **Gender**: 1-Male, 2-Female

4. **Address**:_____ 5) **Religion**: 1. Hindu 2. Muslim 3. Christian 4. Other_____

6. **Education**:1- Illiterate/ 2- Primary/ 3- High school/ 4- PUC/ 5- Diploma/ 6-Graduate/ 7-Post graduate

7. **Occupation**:_____ 8) **A. Monthly Family Income**:_____, **B. Monthly Expenses:**_____

9. **Total no. of family members**:_____10) Monthly **Per Capita** income: Rs_____

11. **Socio economic status**: (Modified B.G. Prasad Classification 2014) Class: I/ II/ III/ IV/ V

12. **Marital status**: 1. Unmarried 2. Married 3.Widow/Widower 4. Divorcee

13. **Type of family**: 1-Joint 2- Nuclear 3-Three generation 4-Broken

14. **Type of house**: **A.** 1-Kuccha 2- Pucca 3-Semi pucca ; **B. Ownership:** 1. Rented, 2. Own

General History:

15. **Diet:** 1. Mixed, 2. Vegetarian

16. **Physical activity**: 1. Sedentary 2. Mild 3. Moderate 4. Vigorous

17. **Social Participation**: 1. Present 2. Absent 3.To some extent present

18. **Day time spending**: 1. Engaged 2. Not engaged 3.To some extent engaged

19. **Recreation**: 1. Yes 2. No 3.To some extent

20. **Sleep pattern:** 1. Satisfied 2. Not satisfied

21. A. **Locomotor disability**: 1. Present 2. Absent

B. **Stressful life events in past One year**: 0. Absent, 1. Accident 2. Death of family member 3. Abuse 4. Others_____

22. **Past h/o Depression:** 1. Present 2. Absent

23. **Chronic medical problems**: 0. None 1. DM2 2. HTN 3. Both

24. **Family history** of Depression: 1. Present 2. Absent

25. Any **problem in the family**? 0. Nil 1. Health related 2. Social 3. Economic 4. Others_____

Personal Habits:

26. Tobacco chewing: 0. Never 1. Current user 2. Past user

27. Tobacco smoking: 0. Never 1. Current user 2. Past user

28. Alcohol: 0. Never 1. Current user 2. Past user

PHYSICAL EXAMINATION

GENERAL PHYSICAL EXAMINATION:

A) **Pallor** 1. Present 2. Absent

B) **Icterus** 1. Present 2. Absent

C) **Oedema** 1. Present 2. Absent D) Any **other findings**_____

E) **Weight**_____ Kgs, **Height**_____Centimetres, **BMI (Wt/Ht^2)**_____kg/m^2

F) **Pulse Rate**(pulse Sper min)-_____ **Blood Pressure**-_____(mm of Hg)

G) **Oral pathology**: 1. Present 2. Absent

H) **Eye pathology**: 1. Present 2. Absent

I) **Ear pathology**: 1. Present 2. Absent

J) **Respiratory Rate:** _____/min

K) **Abdominal complaints:** 1. Present 2. Absent

L) **Genito-urinary complaints:** 1. Present 2. Absent

Geriatric Depression Scale (Short Form)

Patient's Name: _____ Date: _____

No.	Question	Answer	Score
1.	Are you basically satisfied with your life?	YES / ***NO***	
2.	Have you dropped many of your activities and interests?	***YES*** / NO	
3.	Do you feel that your life is empty?	***YES*** / NO	
4.	Do you often get bored?	***YES*** / NO	
5.	Are you in good spirits most of the time?	YES / ***NO***	
6.	Are you afraid that something bad is going to happen to you?	***YES*** / NO	
7.	Do you feel happy most of the time?	YES / ***NO***	
8.	Do you often feel helpless?	***YES*** / NO	
9.	Do you prefer to stay at home, rather than going out and doing new things?	***YES*** / NO	
10.	Do you feel you have more problems with memory than most people?	***YES*** / NO	
11.	Do you think it is wonderful to be alive?	YES / ***NO***	
12.	Do you feel pretty worthless the way you are now?	***YES*** / NO	
13.	Do you feel full of energy?	YES / ***NO***	
14.	Do you feel that your situation is hopeless?	***YES*** / NO	
15.	Do you think that most people are better off than you are?	***YES*** / NO	
		TOTAL	

(Sheikh & Yesavage, 1986)

Scoring:

Answers indicating depression are in bold and italicized; score one point for each one selected. A score of 0 to 5 is normal. A score greater than 5 suggests depression.

Sources:

- Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. *Clin Gerontol*. 1986 June;5(1/2):165-173.
- Yesavage JA. Geriatric Depression Scale. *Psychopharmacol Bull*. 1988;24(4):709-711.
- Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res*. 1982-83;17(1):37-49.

Katz Index of Independence in Activities of Daily Living

ACTIVITIES POINTS (1 OR 0)	**INDEPENDENCE**: (1 POINT) NO supervision, direction or personal ass**ista**nce	**DEPENDENCE**: (0 POINTS) WITH supervision, direction, personal assistance or total care
BATHING POINTS:_____	(1 POINT) Bathes self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	(0 POINTS) Needs help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing.
DRESSING POINTS:_____	(1 POINT) Gets clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	(0 POINTS) Needs help with dressing self or needs to be completely dressed.
TOILETING POINTS:_____	(1 POINT) Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	(0 POINTS) Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING POINTS:_____	(1 POINT) Moves in and out of bed or chair unassisted. Mechanical transferring aides are acceptable.	(0 POINTS) Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE POINTS:_____	(1 POINT) Exercises complete self control over urination and defecation.	(0 POINTS) Is partially or totally incontinent of bowel or bladder.
FEEDING POINTS:_____	(1 POINT) Gets food from plate into mouth without help. Preparation of food may be done by another person.	(0 POINTS) Needs partial or total help with feeding or requires parenteral feeding.

TOTAL POINTS = _____ [6 = High (independent) 0 = Low (completely dependent)]

ANNEXURE IV – KEY TO MASTER CHART

SOCIO DEMOGRAPHIC DATA

A. Age: _____years

B. Sex: 1. Male

2. Female

C. Religion: 1. Hindu

2. Muslim

3. Christian

4. Others (Sikh/Parsi)

D. Education: 1. Illiterate

2. Primary school

3. High school

4. Pre-University College

5. Diploma

6. Graduate

7. Post-graduate

E. Occupation: 0. Not Working/Retired

1. Professional

2. Semi-professional

3. Skilled worker

4. Semiskilled

5. Unskilled worker

6. Housewife

F. Total no. of family members:

1. <4
2. 4-8
3. >8

G. Socio-Economic Status: (Modified B. G. Prasad classification)

1. Class I
2. Class II
3. Class III
4. Class IV
5. Class V

H. Marital status:

1. Unmarried
2. Married
3. Widow/Widower
4. Separated

I. Type of family:

1. Joint
2. Nuclear
3. Three generation
4. Broken family

J. Type of house:

1. Kuccha
2. Pucca
3. Semi-Pucca

K. Ownership:

1. Rented
2. Own

L. Diet: 1. Mixed

2. Vegetarian

M. Physical activity: 1. Sedentary

2. Mild

3. Moderate

4. Vigorous

N. Social Participation: 1. Active

2. Inactive

3. To some extent active

O. Day time spending: 1. Engaged

2. Not engagaed

3. To some extent engaged

P. Recreation: 1. Active

2. Inactive

3. To some extent active

Q. Sleep pattern: 1. Satisfied

2. Not satisfied

3. To some extent satisfied

R. Locomotor disability: 1. Present

2. Absent

S. Stressful life events in past One year: 0. Absent

1. Accident

2. Death of family member

3. Abuse

4. Other

T. Past h/o Depression: 1. Present

2. Absent

U. Chronic medical problems: 0. None

1. Diabetes Mellitus Type 2 only

2. Hypertension only

3. Both

V. Family h/o Depression: 1. Present

2. Absent

W. Tobacco chewing 0. Never

1. Current user

2. Past user

X. Tobacco smoking: 0. Never

1. Current user

2. Past user

Y. Alcohol: 0. Never

1. Current user

2. Past user

Z. Problem in family: 0. Nil

1. Health related

2. Social

3. Economical

4. Others

Physical examination:

AA. Pallor: 1. Present

2. Absent

AB. Icterus: 1. Present

2. Absent

AC. Oedema: 1. Present

2. Absent

AD. Weight: _____Kilograms

AE. Height: _____Meters

AF. BMI: _____ Kg/m^2

AG. Oral pathology: 1. Present

2. Absent

AH. Eye pathology: 1. Present

2. Absent

AI. Ear pathology: 1. Present

2. Absent

AJ. Pulse Rate: _____ per minute

AK. Average Systolic Blood Pressure: _____mm of Hg

AL. Average Diastolic Blood Pressure: ____mm of Hg

AM. Respiratory Rate: 0. Normal

1. Tachypnea (>20/min)

2. Bradypnea (<12/min)

AN. Abdominal complaints: 1. Present

2. Absent

AO. Urinary complaints: 1. Present

2. Absent

Scores:

AP. Geriatric Depression Score (GDS-15) ____ (1-15)

AQ. KATZ Activity of daily living score _____ (0-6)