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**“MORBIDITY PROFILE AND ITS RELATIONSHIP  
WITH DISABILITY AND PSYCHOSOCIAL  
PROBLEMS AMONG ELDERLY”- A COMMUNITY  
BASED CROSS SECTIONAL STUDY**

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**Dissertation**

By

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Submitted to the  
KLE University  
Belgaum, Karnataka

In partial fulfilment  
of the requirement for the degree of

**DOCTOR OF MEDICINE (M.D)**

**IN**

**COMMUNITY MEDICINE**

Under the Guidance of

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**MAY 2010**

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I hereby declare that this dissertation entitled “**MORBIDITY PROFILE AND ITS REALTIONSHIP WITH DISABILITY AND PSYCHOSOCIAL PROBLEMS AMONG ELDERLY**” - A COMMUNITY BASED CROSS-SECTIONAL STUDY is a bona fide and genuine research work carried out by me, under the guidance of **Dr. (Mrs) VIJAYA A. NAIK MD, DPH** Professor & Head, Department of Community Medicine, J. N. Medical College, Belgaum.

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**Dr. PRAVEEN KUMAR B.A.**

## **LIST OF ABBREVIATIONS**

ADL	-	Activities of Daily Living
BMI	-	Body Mass Index
COPD	-	Chronic Obstructive Pulmonary Disease
CVA	-	Cerebrovascular Accidents
DBP	-	Diastolic Blood Pressure
DF	-	Degrees of Freedom
JNC VII	-	Joint National Committee on prevention diagnosis, detection, evaluation and treatment of high blood pressure
NSSO	-	National Sample Survey Organization
SBP	-	Systolic Blood Pressure
SES	-	Socio Economic Status
WHO	-	World Health Organization

## **ABSTRACT**

### **Background and objectives**

The world's population is ageing because of low mortality and increased life expectancy. There is very less health care available for elderly. Various studies have shown that perceived health declines with age and the effects of ill health influence many areas of daily activity. Multi-level assessment across physical, psychological, and social domains forms the basis for 'comprehensive geriatric assessment'. The objective of the study is to know the morbidity profile, relation of disability with morbidity and psychosocial problems among elderly.

### **Methodology**

The present study was conducted in an urban area of Belgaum from 1<sup>st</sup> January 2008 to 31<sup>st</sup> December 2008. 400 elderly were interviewed using pretested questionnaire. Based on the reported illness, clinical examination, medical records, and laboratory investigations diagnosis was made and coded as per ICD10. Disability was assessed using Barthel index. Relation of disability with morbidity was analysed by logistic regression analysis using SPSS software.

### **Results**

32.8% were in the age group of 60-64yrs and majority were females. 55% of the elderly belonged to lower socioeconomic class. More than one third were Illiterates. Prevalence of morbidity was 95% ( $4.1 \pm 1.72$ ) and self reported illness was 72.3%. Females had a higher fall rate and fractures. Common morbidities among elderly were Cataract (49%), Anemia (48%), Hypertension (42.3%), Arthritis (39.8%), Overweight (31.8%), Acid peptic disease (26%), Diabetes mellitus (23.5%), impaired hearing (22.5%), COPD (15.5%). Morbidity was significantly associated

with age, gender, marital status, occupation, living arrangements. Anemia and musculoskeletal problems were significantly associated with females. Prevalence of disability was 47.3%. Disability was associated with poor perceived health and higher morbidity. Chronic medical problems associated with disability were hypertension, anemia, diabetes mellitus, arthritis, cataract, COPD, deafness, valvular heart disease and overweight. 68.5% of elderly were non pensioners. More than 50% of the elderly were not happy towards life.

### **Conclusion**

Morbidity among elderly was high (95%). Common morbidities among the elderly were Cataract, Anaemia, Hypertension, Arthritis, Diabetes mellitus, impaired hearing, COPD, Stroke. Almost half the subjects were disabled. Chronic medical problems were associated with disability. Two thirds of elderly were non pensioners.

### **Keys words:**

Elderly; morbidity; disability; community; social and health problems

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## **INTRODUCTION**

One of the achievements of the 20<sup>th</sup> century was increase in life expectancy that has resulted in an increasing aging population worldwide. The incredible increase in life expectancy may be termed as one of the greatest triumphs of human civilization, but it has posed one of the toughest challenges to be met by modern society.<sup>1</sup>

The world's population is ageing because of low mortality and increased life expectancy. The demographic transition is attributed to the decreasing fertility and mortality rates due to the availability of better health care services. It has been observed that the reduction in mortality is higher as compared with fertility.<sup>2</sup>

The global population of persons aged 60 years and above was estimated at 600 million in the year 2000. In the year 2002, there were an estimated 605 million old persons in the world, of which 400 million were living in low income countries. Italy and Japan have the highest proportion of older persons. By year 2025, the number of elderly people is expected to rise more than 1.2 billion with about 840 million of them in low income countries.

In India, the number of persons aged 60 years and over was 12 million at the turn of the century. This has increased six fold to about 71 million in 2001, and is expected to be currently in the region of 80 million. The proportion of population aged 60 years and above is also rising. It was 5.63 % in 1961, 7.1% in 2001 and is expected to be 9.87% in 2021. This makes India a "graying nation". By the year 2050, India would become the most populous country with 1.7 billion people.<sup>3</sup>

Aging is a continuous process from birth to death, which encompasses physical, social, psychological, and spiritual changes.<sup>4</sup> The term "old", is always

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related to physical incapacity, biological deterioration, disabilities and psychological failures. Declining health status is a major symptom of an individual's aging process.<sup>1</sup> Old age is not a disease in itself, but the elderly are vulnerable to long term diseases of insidious onset such as cardiovascular illness, CVA, diabetes, musculoskeletal, cancers, and mental illnesses etc. They have multiple symptoms due to decline in the functioning of various body organs.<sup>5</sup>

Over the past decades, India's health program and policies have been focusing on issues related to population stabilization, mother and child health, ignoring the problems of elderly. However, current statistics for the elderly in India gives a prelude to a new set of medical, social, and economic problems that could arise if a timely initiative in this direction is not taken by the program managers and policy makers. There is a need to highlight the medical and socio-economic problems that are being faced by the elderly people in India. Strategies for bringing about an improvement in their quality of life also need to be explored.<sup>2</sup>

Health status is an important factor that has a significant impact on the quality of life of an elderly population. The major elements of health status are perceived health, especially psychosocial well-being, chronic illnesses and functional status. Various studies have shown that perceived health declines with age and the effects of ill health influence on many areas of daily activity.<sup>6</sup> Health and social services utilization is seen to be more closely related to psychological well-being or the functional status of individuals than to demographic characteristics. Many health problems are known to increase with age and this demographic trend may lead to an increase in the absolute number of various health problems in the population. In addition, the evidence shows that older people are at risk for multiple co-morbid conditions, resulting in increasing health seeking behavior of elderly. This is

especially important for the older adults, who are more likely to suffer from disease and disability, and become dependent. They also need highly sophisticated and costly health care services.<sup>7, 8</sup>

Elderly people often have multiple pathologies and reduced physiological reserve, and experience a restrictive environment. Multi-level assessment across physical, psychological, and social domains is therefore particularly necessary, and forms the basis for ‘comprehensive geriatric assessment’.<sup>9</sup> There are few studies in Northern India which identify specific diseases that cause disability and consequent distress. Some micro-level studies have been carried out in India to assess the prevalence of chronic morbidity. However, most of these studies highlighted only the pattern, and to a certain extent the differentials, by rural-urban location, age, and sex of the elderly.<sup>10, 11, 12, 13, 14</sup>

There are no studies conducted on studying the relation between morbidity and disability among the elderly in south India. This study is done with an aim to understand the specific disease processes underlying disability and psychosocial problems that may help to elucidate interventions needed to improve an older person’s general health status, through delaying the progression of debilitating diseases.

Quality of life of the elderly depends upon their psychosocial conditions. Understanding interrelationship between morbidity, disability and the psychosocial problems will help to develop the interventions which will eventually help to improve the quality of life of elderly.

**OBJECTIVES OF THE STUDY**

1. To study the prevalence of morbidities among the elderly.
2. To determine the relationship of specific morbidities with disability.
3. To know the psychosocial problems among elderly.

## **REVIEW OF LITERATURE**

### **Demographic transition in India**

Old age has always been with us and we know that everybody becomes old. With prolonged human life, reduced mortality and fertility rates, ageing has become a global phenomenon in the 21st century. Population ageing is the most significant result of the process known as demographic transition. Population ageing involves a shift from high mortality/high fertility to low mortality/low fertility and consequently an increased proportion of older people in the total population. India is undergoing such a demographic transition.

Elderly people are prone to several health problems which have physical, psychological and social components.<sup>4, 15</sup>

### **PHYSICAL DOMAIN**

#### **Ageing and functional health**

Research on ageing has traditionally been concerned with health, but recently the concept of functional capacity has also been attracting growing attention. The functional ability of elderly people is crucial to cope with the activities of daily living, which in turn reflects their quality of life.

Medical co-morbidity in the elderly is well documented. Furthermore, an increase in the number of coexistent conditions among elders is directly associated with an increase in limitations in activities of daily living. Thus, in a disabled elder with multiple chronic conditions, the inability to perform certain tasks may be related either to the broad effects of a single condition on most or all activities of daily living

or to the independent effects of several conditions, each of which affects only a few activities.<sup>15</sup>

Functional status can be defined as a person's ability to perform the activities necessary to ensure well-being. It is often conceptualized as the integration of three domains of function: biological, psychological and social. Thus, functional assessment is derived from a model which observes how the interrelationship of these domains contributes to overall behavior and function. In older persons, adaptive responses to stressors in each of these domains assume increasing importance.

### **PSYCHOSOCIAL DOMAIN**

The perception about one's health is an important factor in getting an idea about a person's actual health condition. A person may be considered as being in good health if he feels so. Moreover, it reflects the mental health of that person.<sup>16, 17</sup> International researches have consistently shown that lack of social support is associated with increased mortality and poor health. Studies on the effects of specific sources of social support in different cultures are needed. It is widely recognized that children play an important role in the wellbeing of the elderly but little is known about the specific effects of support from children on their parent's health. Many international studies showed that children's emotional and instrumental support has beneficial effects on survival and psychological wellbeing of parents particularly when the elderly experience widowhood or declining health.<sup>18</sup>

### **SOCIO-DEMOGRAPHIC TREND IN INDIA**

Of the estimated 66.4 million aged persons in the country 25% are in the urban areas. Their magnitude in terms of number and share to total population is found to rise gradually. The proportion of aged persons, which was 6.5% (43.5

million) in 1981, grew to 6.8% (61.4 million) in 1991 and 7.4% (76.6 million) in 2001. In 2004 total population tends to be higher in the rural areas than in the urban areas, the share being 7.0 and 6.6% respectively. The share of the aged females was higher than that of the aged males in the urban areas and almost the same in the rural areas.

It may be seen that the old-age dependency ratio is higher in the rural than in the urban areas. In the rural areas, every 1000 persons in the working age had to provide support physically or otherwise to 125 aged persons to maintain their daily life. The number was 103, a little less in the urban areas. Sex ratio (number of females per 1000 males) among aged persons was 985 in rural and 1046 in urban area.

As many as 65 % of the aged had to economically depend on others for their day-to-day maintenance. The situation was worse for elderly females. Among them, about 85% were economically dependent either partially or fully. In this respect, males were much better off, 46 to 49% among them did not fully depend on others for their livelihood. It is seen that of the economically dependent aged, a majority (about 76 to 78%) had to depend on their children and a sizable proportion (13 to 15%) on their spouses for their economic support. Only 3% were supported by their grandchildren and the rest (6%) had to depend on 'others', including non-relations.

94 % of the aged had at least one surviving child. The rural-urban differences appeared to be nil with respect to the proportion of the elderly who had surviving children. However, it was marginally higher for males than for females. The results show that about 57% of the aged were living with their spouses and another 32% were living without their spouses but with their children, while about 4 to 5% were living with other relations and non-relations. Nevertheless, 4 to 5% were still living alone.

The incidence of widowhood was higher among women. It is also evident from data that 40% of the elderly live below the poverty line and 90% are neither covered by any state pension nor have any family to take care of them.<sup>16</sup>

**Physical Mobility:**

About 8% of the aged persons were either confined to their home or bed. The proportion of aged persons reporting confinement to their home or bed was found to increase with the age for all categories, being as high as 27 for persons aged 80 or more. The incidence of confinement is seen to be higher among women than among men in both rural and urban areas.<sup>16</sup>

**Self Perception about Health:**

It can be seen that as high as 55 to 63% of the aged with sickness felt that they were in a good or fair condition of health. The proportion among the aged without sickness was 77 to 78%. Among the aged, the men seemed to be feeling that they had a better health condition even with sickness compared to the aged women. As against this, about 13 to 17% of the aged who were not even sick considered themselves as having a 'poor' state of health.<sup>16</sup>

**Disability trends:**

More than one-fourth of the Indian aged population is disabled and age-specific disability rates and the severity of disablement increase with age within old age bracket. In the age-groups young-old (60-64 years), middle-old (65-69 years), older-old (70-74 years) and oldest old (75 years and above), the percentages of disabled persons are 36, 42, 51 and 61 respectively. It is observed that about 46% of the elderly suffer from at least one kind of disability. However, while more elderly report disability in urban India as compared to rural India (49% and 46%,

respectively); the reverse is true in case of female elderly (44% and 45%, respectively for urban and rural areas). Disability was seen to be more evident in elderly with poor educational status.<sup>17</sup>

### **Situation in Karnataka:**

Number of aged per 1000 persons was 69 and 59 for rural and urban area respectively. Per 1000 distribution of aged persons by type of living arrangement for urban males were 8, 96, 729, 141 and 16 for Alone, with spouse only, with spouse and other members, with children, with other relations & nonrelations respectively. Similarly for urban female it was 72, 31, 209, 612, and 71 for Alone, with spouse only, with spouse and other members, with children, with other relations & nonrelations respectively.<sup>9</sup>

### **Studies on methodological issues**

A study carried out in the city of Ansan, South Korea to evaluate morbidity and co-morbidity profiles among the elderly in 2002, of the 2,767 subjects participated in the study, 78.0% reported diagnosed disease, 11.0% had been cured, and 46.8% had been diagnosed with more than two diseases. The mean number of morbidities per person was  $1.62 \pm 1.35$ , and women had a greater number of diseases per person than did men. The most common morbidities were chronic diseases such as hypertension, arthritis, and diabetes mellitus. In women, osteoporosis and arthritis were the second and third most prevalent diseases, respectively. Morbidity was significantly associated with gender, employment, household income, alcohol intake, self-assessed health status, and worries about health.<sup>6</sup>

A clinic and home based survey was carried out in Kuwait in 1998-2000 to observe the socio-demographic, health characteristics and the factors influencing their

self-dependence for the performance of activities of daily living (ADL) among elderly patients 65 years of age and above. The majority of subjects were below 85 years of age (74.3%), married (65%), having hearing defects (80%) and visual defects (91%), 17.8% were demented and 25% showed evidence of depression. These patients were mainly self-dependent for ADL (64%) and there was no significant correlation of self-dependence to the adequacy of social support, to sex or to the medical diseases the patient had. Out of 113 patients, 87 were seen in the clinic and 26 were seen at home. High statistical significance was showed when those seen in the clinic to those seen at home were compared in relation to their age, marital status, mobility, general mental state, self-dependence, general appearance and nutritional state.<sup>19</sup>

Another study done in Zimbabwe to record the prevalence of disability and the subjective morbidity showed that, out of 278 subjects, less than 4% experienced difficulty with maintenance activities of daily living, but 30% had difficulty with instrumental activities. The former were all visually impaired and both visual and mobility problems contributed to the latter. Elderly people experienced many symptoms but had inadequate access to health services and used medication infrequently. Their health and functional abilities deteriorated with age, but it was older subjects who had most difficulty getting to the clinic.<sup>20</sup>

A study done to know the effects of specific medical conditions on the functional limitations of elders in the Framingham Study identified 10 prevalent medical conditions associated with disability in elders: knee osteoarthritis, hip fracture, diabetes, stroke, heart disease, congestive heart failure, intermittent claudication, chronic obstructive pulmonary disease, depressive symptomatology, and cognitive impairment. Findings indicate that these 10 medical conditions impose functional limitations on the elderly that are specific to each disease and to each

activity. Stroke contributed to limitations in all seven activities. The proportions of disability in the elderly attributable to knee osteoarthritis, stroke, heart disease, and depressive symptomatology were greater than the proportions of disability attributable to other conditions. As mentioned in the study, one of the limitation was data were collected at the Framingham study site, therefore individuals may have been excluded because they were unable to come to the study site due to functional limitation.<sup>15</sup>

In a study conducted in Singapore between 1992-1993 to look at prevalence and factors affecting functional dependence, among 401 elderly aged 60 years and above showed, Sixty-eight subjects (17%) were dependent in at least one function of Activities of Daily Living (ADL) as measured by the Barthel's Index (BI). The most common problem identified using this index was urinary incontinence. Forty subjects (10.4%) were dependent in at least one Instrumental Activities of Daily Living (IADL) function. Female gender and age over 75 years were significant factors associated with dependence measured on Barthel's index but not on IADL. However the response rate to this study was only 21%.<sup>21</sup>

A community based study done in 1994-1995 in the city of Madrid, Spain to determine the associations between chronic diseases and disability, out of 772 people interviewed (overall response rate 77.0%), only 4.5% declared no chronic condition. Osteoarthritis/rheumatism was the most prevalent condition (56.8%). Almost 63.2% were independent, 21.3% were independent with difficulty (in at least one ADL), and 15.5% were dependent (in at least one ADL). Subjects attributed osteoarthritis (41.8%) and aging (17.1%) to disabilities. Chronic conditions strongly associated with disability were cerebrovascular disease, depression/anxiety disorders, and diabetes.<sup>22</sup>

In a nine year longitudinal study done in the city of Cleveland, Ohio to study the predictors of community and long term institutional care of elderly found that two to eight times as many impaired and disabled were cared for in community compared to institutions. Younger age, male gender, better income and living arrangements especially living with children favour continuing care in the home. Impaired or disabled living in the community was found to be 64.9%. Exact prediction of whether impairment and disability favor institutional care or community care was limited by long intervening period (9 years) between the measurements.<sup>23</sup>

A national survey conducted on disability in Brazil showed that the prevalence of markers of mild, moderate and severe disability was greater among women, and increased with age. Markers most strongly associated with increased prevalence of mobility disability were age, gender, low schooling, and low income. Study results shows findings among elderly females only, due to the limitation of data.<sup>24</sup>

Another disability survey conducted in 1997 among people of 60 years and above in Singapore showed that the prevalence of disability in all the age groups. More than half of the aged had a disability which increased with age. The lowest prevalence of disability was 54.8% among those aged 60-64 years, while the highest was 77.4% among those aged 80-84 years. Among all the men, the percentage of those having a disability was 54.7%, whereas for the women it was 70.3%.<sup>25</sup>

A community based study conducted in Spain to assess the association between emotional and instrumental support from children and living arrangements with the physical and mental health of older people showed that almost 93% of the participants had children and 45% of them co-resided with them. Low emotional support and reception of instrumental aid were significantly associated with poor self

reported health. Being a widower and sharing living arrangements with children was associated with good self reported health. Living arrangements modify some of the associations of support of children with self reported health. Depressive symptoms were associated with low emotional support, reception of instrumental help and being a widower who did not share living arrangements with children. For widowers who did not cohabit with children, reception of instrumental aid was associated with low depressive symptomatology.<sup>18</sup>

In a longitudinal study conducted in United Kingdom, annual rates of catastrophic decline in mobility reported for men and women were 4.8% and 4.6% respectively. Strong associations were found between catastrophic decline and age more than 70 years, hearing problems and health deterioration. Poor perception of health, loss of control and feeling fearful also appeared to be important. The psychological and the social engagement domains were strongly associated with catastrophic decline in mobility. There is a possibility of results being biased as the response rate to the 1 year follow up has been relatively low.<sup>26</sup>

In a Cross-sectional community based study conducted among aged in rural/urban areas of Budgam Kashmir valley in 2006, of the 692 elderly registered in the study 321 were males and 371 females. Majority of the subjects (89%) were suffering from at least one medical problem. Morbidity in rural subjects was lower than the urban subjects. Females had a higher rate of morbidity. Common presenting symptoms were pain/swelling of joints (36.5%), backache (20.2%), indigestion/heartburn (17.7%), headache (17.4%) and excessive tiredness. Medical history and clinical examination revealed that most common diseases in order of frequency were hypertension (58%), osteoporosis (50.55%), cataract (18.51%), gastritis (17.67%) and benign prostatic hyperplasia(13.14). Most of the elderly

females had osteoporosis and males benign prostatic hyperplasia. Chronic diseases like stroke, hemiplegia, cataract and other neurological disorders were responsible for IADL disability.<sup>27</sup>

In another study carried out in urban area of Rohtak to know the health problems of elderly, out of 606 persons above the age of 60 years, males and females were 322 and 284 respectively. Joint pain & cataract occupy the top position among different morbid conditions i.e. 46% and 45% respectively. Hypertension, GIT problems, Diabetes and Loneliness & depression were among the other major morbidities contributing to 22%, 14.8%, 11% and 9% respectively. However the study was more of subjective assessment.<sup>10</sup>

A study conducted in southern Delhi in 2003, of the 233 study subjects, majority were illiterate and unemployed, and 21% were economically independent. 95% of elderly were living with spouse, and/or children. 25% felt that their current health status was not healthy. Respiratory disease and visual disability were reported as commonest medical problems. It was a convenient sampling. Though the study was done to find out the morbidity, common illnesses like hypertension and musculoskeletal problems were not highlighted.<sup>11</sup>

Another study conducted in urban area of Udaipur Rajasthan showed that out of total 300 elderly 29.3% belonged to socio-economic class V, 70 % of respondents had eye problems. 48% had hypertension. Chronic Bronchitis was seen in males (6.3%) and bronchial asthma was found in 11.5% and 18.2% males and females respectively. Musculoskeletal problem was present in 11.6% and 20% males and females respectively. Nervous system disorders were found in 8.6%. 34.7% males and 60% females had cataract. Feeling of loneliness was seen comparatively more in females

than males (27.3% vs. 21.05%). Though the study stated morbidity pattern, its relation between sociodemographic and psychosocial problems has not been studied.<sup>5</sup>

A community based study conducted among aged in urban and rural area of Amritsar showed that average number of illnesses per person was 2.62. Average number of illnesses increased with advancing age. Most common diseases in order of their magnitude were arthritis followed by visual problems, carries teeth. Hypertension along with diabetes was found to be more prevalent in urban aged compared to rural. Hyperplasia of prostate or urinary incontinence was observed in 5.67% of aged males. Parkinsonism and other mental disorders were found in 5.16% of aged. As per the study 22.92% were disabled and common causes of disability were hearing problems followed by visual and neurological diseases.<sup>12</sup>

A study done in the urban geriatric population of Chandigarh to study the life style and disease burden, it was found that, male and female distribution was 42.3% and 57.7% respectively. Of these elderly, majority (66.8%) were in the age group of 65-74 years, 4.1% were smokers, 7.2% were alcoholic, more males(57.1%) than females(28.7%) were doing regular exercise. 40.4% had hypertension, 57.2% had osteoarthritis, 33.5% were overweight, 25.5% were diabetics, 67.4% had cataract and 34.2% had respiratory problems. 97% were anemic. Any association between life styles and disease status was not studied.<sup>28</sup>

In another study carried out in union territory Chandigarh to study health problems and loneliness among elderly, it was found that out of the total 361 aged persons, 311 (86.1%) persons reported one or more health-related complaints, with an average of two illnesses. The illness was higher among the females (59.5%) as compared to males (40.5%). The main health-related problems were disorders of the

circulatory system (51.2%), musculoskeletal system and connective tissue (45.7%). It was also found that loneliness was prevalent more in females (72.8%) as compared to males (65.6%). Loneliness was more prevalent among persons who lived alone (92.2%) as compared to those who lived with their spouse (58.9%) or when husband and wife lived with the family (61.4%). It was higher among the widows (85.2%) and widowers (75.8%) who lived with the family as compared to the aged who lived with the spouse (58.9%) and the aged husband and wife who lived with the family (61.4%).<sup>29</sup>

In another study carried out in urban and rural setting of union territory Chandigarh in 1998-1999, among 362 elderly registered in the study, 153 were males and 209 were females. A large number of the subjects (89%) were suffering from at least one medical problem. Morbidity among rural subjects was observed to be less when compared to urban subjects. Females had higher rate of morbidity. Common presenting symptoms were pain/ swelling of joints (36.5%), limitation of movements (20.2%), indigestion/ heartburn (17.7%), backache (17.4%) and excessive tiredness. Medical history and physical examination by the physician revealed that most common diseases in order of the magnitude were hypertension (58%), osteoarthritis (50.55%), cataract (18.51%), gastritis (17.67%), deafness (13.53%) and diabetes mellitus/ hyperglycemia (12.15%). Anemia was recorded in 68.2% of the subjects and 68% of elderly with ailments were taking treatment.<sup>30</sup>

In a study conducted to see the morbidity pattern and depression in relation to family support on 210 people above the age of 60 years in Kashmir valley of India, the morbidity pattern was 67.6% having single ailment, 30.4% people having 2 ailments and only 2.0% having more than 3 ailments. 85.7% of the geriatric population was having family support and 14.2% were without any family support.

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Out of the people having family support 20.0% were depressed as against 60.0% depressed people in the category having no family support. The study was done among the elderly outpatients attending Unani clinic and the methodological issues were not explained.<sup>31</sup>

In a study conducted among two elderly population groups from Dibrugarh Assam in 2002 to study health problems and disability shows that, the mean age for urban group was 67.1 years. Disability was found to be 20%. Hypertension 68%, musculoskeletal diseases 62.5%, COPD and other respiratory problems 30.4%, cataract 40.3%, 23.6% were undernourished, gastro-intestinal problems 13% were more commonly observed health problems. Most morbidities and disabilities were associated with identifiable risk factors, such as obesity, tobacco (smoked and non-smoked) and alcohol consumption. Educational status was also found to be an important determinant of diseases and disability of elderly population. In this study ADL-IADL disability was studied using a seven item non scoring activity list.<sup>32</sup>

In a cross sectional study carried out in the urban community of Manipur in 2003 to assess the prevalence of disability in ADL among the elderly showed that, out of 312 elderly interviewed 38 (12.2%) were found to be disabled in ADL. Elderly males with poor perceived health status and having one or more chronic diseases have significantly higher risk of being disabled in ADL but the difference was not statistically significant. Males constituted 43.3% (135) and 56.7% (177) were females. The mean age of the participants was 69.7 ( $\pm 8.1$ ) years. Those elderly who were illiterate and unemployed, by and large have higher odds of becoming disabled over those who were literate and gainfully employed.<sup>13</sup>

A study carried out in urban and rural area of northern India in 2000 showed that, of the total sample of 200 subjects, 88.9% reported illness based on their perception, and of these 43.5% were seeking treatment and actually taking medicines, and 42.5% were diagnosed as having 4–6 morbidities. The mean number of morbidities among elderly people was 6.1 (SD 2.9). A total of 87.5% had minimal to severe disabilities and 66% of elderly people were distressed physically, psychologically, or both. The most prevalent morbidity was anemia, followed by dental problems, hypertension, chronic obstructive airway disease (COAD), cataract, and osteoarthritis. Morbidities like asthma, COAD, hypertension, osteoarthritis, gastrointestinal disorders, anemia, and eye and neurological problems were significantly associated with disability and distress. Higher numbers of morbidities were associated with greater disability and distress. 103 (51.5%) subjects had fallen. Fracture was reported in 21.3%, and other injuries occurred in 79.6% of those who had fallen. Fracture was seen more in urban subjects (29.4%) compared with rural subjects (13.4%).<sup>14</sup>

In a study in Meerut in 2001 to assess the psychosocial needs of elderly and utilization of geriatric services, it was observed that, out of 354 elderly studied, 58.5% were financially dependent, 69.5% were found enjoying their leisure time at home, 55.1% were having sad attitude towards their lives, main reasons for sad attitude was loss of spouse, illness, loneliness. 46.3% were not aware of and 96% had never utilized any geriatric welfare services. However relation of psychosocial problems and utilization of geriatric services was not studied.<sup>33</sup>

A study conducted in Karnataka in 2003 showed that, among 213 elderly around 73% belonged to age group of 60-69 years. Males and females were equal in proportion. Majority of the respondents 89% were Hindus. A joint family system was

seen to be most common (56.8%) followed by nuclear family. Only 12.1% of the elderly men were widowed while 67.7% of women were widows. Nearly half of the respondents were illiterate. All the respondents had health problems, most common being hypertension, osteoarthritis, diabetes, bronchial asthma. Most of the respondents had more than one problem. Half of the respondents felt they were neglected by family members. Around 48% felt they were not happy in life and attributed it to poverty (48%) and illness (41%). 68.5% had friends and social contacts outside home. 35% of elderly felt they were not consulted by family members for making decision. Though the study highlighted the social problems of elderly, method and extent of morbidity diagnosis is not clear. Since this study was done among elderly attending outreach clinics, findings cannot be generalized to the community at large.<sup>34</sup>

Another study done at coastal Karnataka (Karkala, Manipal) in 2003 to assess the quality of life among geriatric population attending outpatient clinic, mean age of the study population was 65.8 years. The total mean score, as well as the mean score in each of the four domains; physical, psychological, social relation and environmental for both the gender, literates and illiterates were same. It was found that mean scores of the two age groups of 60-69 years and more than 70 years differed significantly in the domains of physical, psychological and social relations, and also this difference between the two groups was found to be statistically significant for the total mean score of all the domains.<sup>35</sup>



## **METHODOLOGY**

### **Study Area:**

The study was undertaken at Khasbag, the urban field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, Belgaum. The urban health centre is situated in the midst of the city about 6 km from the J. N. Medical College. It caters to a population of 13,800 and is providing curative, preventive and promotive services. The study area has two wards, number 22 and 23 as per the municipal office records.

### **Study Design:**

The present study is a cross sectional community based study undertaken to study the prevalence of morbidity among elderly persons, relation of morbidity with disability and psychosocial problems among elderly individuals.

### **Study Period:**

The study was conducted for a period of one year from January 2008 to December 2008. Before starting the study, preliminary data were collected and a pilot study was carried out in the study population using a predesigned and structured questionnaire. Appropriate changes were made based on the pilot.

### **Sample size:**

Sample size was calculated on the basis of guidelines described in “Sample determination in health studies”.<sup>36</sup>

Assuming the prevalence of morbidity among the elderly to be 50%, the sample size was calculated from the given formula -

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

Where, N = sample size,

P = prevalence of morbidity,

q = (100-p),

d = error in estimation of p (10%),

So the sample size was 400.

**Sampling procedure:**

The population of Urban Health Centre (UHC) was 13,800.

Since 7.2% of the total population constitutes elderly age group as per Sample Registration System (SRS) estimate 2003 in India,<sup>37</sup> the total number of elderly age group in UHC was estimated as 994.

After listing out all the elderly persons in the study area, by using random number table 400 elderly persons were selected for the study.

**Defining Ageing**

Even though a single “cut-off” age which would define the elderly would vary between country and region considering the biological, social and economic differences in their populations, the United Nations in 1980 defined 60 years as the age of transition of people to the elderly segment of the population.<sup>3</sup>

In the present study people aged 60 years and above have been considered as elderly.

**Inclusion Criteria:**

All persons aged 60 years and above who were residents of Khasbag were included in the study.

**Data collection tools:**

The instruments used in this study includes questionnaire, spring dial weighing machine, measuring tape, sphygmomanometer, stethoscope, torch, snellens chart, near vision chart and tuning fork. Physical instruments and techniques were initially standardized during pilot study.

**Questionnaire:**

A detailed questionnaire was prepared and was pretested and validated during the pilot study. It included the information on sociodemographic variables, psychosocial factors, physical and the laboratory examination findings. It also included a tool for assessing disability - The Barthel index. (Annexure II)

**Data collection procedure:**

The data collection procedure consisted of personal interviews, physical examination and laboratory tests. Disability was assessed using the Barthel index.

An informed written consent was obtained from all the participants before collecting the data.

**Personal interview & Physical examination:**

Subjects were interviewed by the candidate in-person after obtaining an informed consent. Thorough clinical examination from head to toe was carried out with adequate privacy in a quite comfortable room at their household. It included general physical examination, measurement of height, weight, blood pressure, other vital signs and systemic examination. After recording the data on various study variables, the subjects were treated relevantly as per the individual case needs. Morbid conditions requiring further investigation and special care were referred to the KLES

Hospital & MRC/Government district hospital depending on their affordability. The entire procedure lasted for about 45 minutes. At the end of the interview subjects were thanked for their cooperation.

**Laboratory Tests:**

Laboratory investigations were carried out for every participant in the study. It included hemoglobin estimation by Sahli's method, detection of sugar & albumin in urine samples by Benedict's and Sulphosalicylic acid method respectively. A qualified lab technician performed the above investigations according to the standard guidelines.

Based on the self reported illness, clinical findings, medical records, and the medication they had with them and by relevant laboratory investigations diagnosis was made and coded as per international classification of diseases (ICD-10).<sup>38</sup>

**Data analysis:**

The data was analyzed using mean, proportions and percentages. The Statistical analysis was done using SPSS statistical software.

- The relationship between mean morbidity and various socio-demographic variables was assessed using analysis of variance (ANOVA), t-test.
- The relationship of each medical condition with disability was tested using logistic regression analysis and chi-square test.

**Definition of study variables**

**Age** – Subjects were asked about their age and it was confirmed with appropriate documents (viz. Voter I.D card/Ration card/Senior citizen card). Age was recorded to the nearest completed year.

**Religion:**

The subject's religion was noted and was grouped as "Hindu", "Muslim", and "Others" (Sikh, Christian).

**Type of family:**

**Nuclear family** – Married couple, along with their dependent children live in the same house.

**Joint family** – Many married couples and their children who live in the same household. Males are blood relatives and females of the family are related by either marriage or blood relation.

**Three generation family** – Married couple with married children and their kids (three generations) related to each other by direct descent live together.

**Broken family** – Is one where the parents have separated, or where death has occurred of one or both the parents.<sup>37</sup>

**Socioeconomic status:**

Per-capita monthly income of the family was calculated by dividing total monthly income of the family with family size. Per capita income in Rupees per month was classified using the modified BG Prasad classification.<sup>49</sup>

<b>Social class.</b>	<b>Prasad's classification 1961</b>	<b>Modified Prasad's classification in the study period 2008 (per capita income in Rs/month)</b>
<b>I</b>	100 and above	2677 and above.
<b>II</b>	50—99	1325 to 2676
<b>III</b>	30-49	785 to 1324
<b>IV</b>	15-29	405 to 784
<b>V</b>	<15	Less than 405

Average consumer price index for the year 2008 = 548.41<sup>40</sup>

Modification was done with the aid of Multiplication Factor (M.F), which was obtained as below:

$$\text{M.F.} = \frac{\text{Average consumer price index for the study period}}{100} \times 4.93$$

$$= 548.41/100 \times 4.93 = 27.03$$

**Occupation:** Was categorized into two main groups “weaving” (handlooms or power loom) and “others” which includes shopkeepers, businessmen, agriculture, watchmen, tailors, teachers etc

**Educational status:**

The subjects were asked about their educational qualifications and were grouped into

**Illiterate:** A person who could not read and write with understanding in any language.

**Literate:** A person who could read and write with understanding in any language.

**Primary school education:** A person who had studied up to 4<sup>th</sup> standard.

**Secondary school education:** A person who had studied up to 7<sup>th</sup> standard.

**Higher Secondary school education:** A person who had studied up to 10<sup>th</sup> standard.

**College:** A person who had studied up to pre university/diploma/Tch/below degree class.

**Graduate** – A person who had a bachelor’s degree in any field

**Food habit:**

Subjects were asked about their food habits i.e. consumption of non vegetarian and / or vegetarian food in their diet. Interpretation was made as “vegetarian diet” and “mixed diet” (those who were consuming vegetarian and non vegetarian food).

**Alcohol consumption:**

For assessment purpose period of recall was considered for the “past one year”. Subjects who had never consumed alcohol were considered kept in the category of “non drinkers.” while those who had consumed any alcoholic drinks either in the past or consuming at present were categorized as “drinkers” and the total duration of consumption was noted in years.

**Tobacco use**

For assessment purpose period of recall was considered for the “past one year”. Subjects who had never smoked in any form of tobacco (beedi, cigar) and never used tobacco in any form viz gutka, pans, snuff (other than smoking) were

considered as “non smokers” and “tobacco non users” respectively. While those who had smoked either in the past or smoking at present and have used tobacco either in the past or using at present were considered as “smokers” and “tobacco users” respectively. The total duration of use was noted in years.

### **History of fall**

Subjects were asked about history of fall. For assessment purpose period of recall was kept as “past one year”. Place of fall and consequence was noted.

### **Blood pressure measurement:**

During the course of the interview, two measurements of blood pressure on each study participant were measured using mercury sphygmomanometer, first by palpatory method followed by auscultatory method as per standard guidelines. Both blood pressure measurements were obtained after the subject had rested for at least 5 min in a seated position. The first blood pressure measurement was recorded after obtaining sociodemographic information from the study subject, while the second was recorded after a brief clinical examination. All blood pressure measurements were made on the left arm of each study subject, using a cuff of appropriate size at the level of the heart. We used the average of two readings of SBP and DBP to describe the blood pressure of the participant. In cases where the two readings differed by over 10 mm of Hg, the examiner obtained a third reading, and the three measurements were averaged.<sup>41</sup>

### **Categorization of subjects by Blood pressure levels:**

The subjects were divided in to “Normotensives” or “Hypertensives” on the basis of their Blood pressure levels as per JNC 7 report.<sup>41</sup>

**Normotensives:** Systolic BP less than 140 mm Hg and Diastolic BP less than 90 mm Hg.

**Hypertensives:** Systolic BP 140 mm Hg or above and Diastolic BP 90 mm Hg or above and/or treatment with antihypertensive medication.

**Height:** The subject stood straight without footwear, with heels, buttocks and back touching the wall, eyes looking straight ahead (visual axis horizontal, when the top of external auditory meatus levels with the inferior margin of the orbit), with a set square resting on the scalp and against the wall. The coinciding reading was measured to the nearest 0.1cm using a measuring tape.

**Weight:** Body weight was measured without any foot wear and with minimal clothing to the nearest 0.1 kilogram using a standard portable weighing machine, which was standardized periodically during the study. The scale was zeroed before each session and weight was recorded in kilogram.

**Measurement of Body Mass Index (BMI):**

As per the revised guidelines for Asians (esp. South East Asians including Indians) recommended by the WHO, person with BMI values of less than 18.5 indicate “Underweight”, 18.5 to 23 indicate “Normal weight”, 23 to 27.5 indicate “Overweight” and above 27.5 indicate “Obese”.<sup>42</sup>

$$\text{BMI} = \text{weight (in kg)} / \text{height (in meter}^2\text{)}.$$

**Visual problems:** Cataract was assessed by examination of iris shadow, looking for opaque lens using torch (visible lenticular opacity) & history of cataract operation. Refractive errors were screened by using Snellen chart for far vision and Geiger chart for near vision as per the standard procedure.<sup>43</sup>

**Hearing impairment:** Hearing tests - Rinne's, Weber's and Absolute bone conduction tests were done in both ears, one after the other, with tuning fork of 512 Hz using standard methods.<sup>44</sup> Subjects were grouped as "Hearing impaired" if they had an abnormal test for any of these procedures.

**Dental Problems:** The prevalence of carries teeth was taken as the percentage of elderly population with one or more teeth decayed or filled.<sup>45</sup> Total loss of teeth was considered when all 32 teeth were absent. If 1 to 31 were absent, it was considered as partial loss of teeth.

**Anemia:** Hemoglobin level below 13 gm% in men and 12 gm% in women was considered as anemia. Most widely used criteria to define anemia in elderly was used as recommended by WHO.<sup>46,47</sup>

**Urine sugar:** Subjects positive for urine sugar were considered as probable Diabetics. They were advised to go for fasting blood sugar investigation and were followed up to confirm the diagnosis based on the report.

**Disability:** A Disability has been defined by WHO as "any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being"<sup>37</sup>

**The Barthel Index (BI)** has been recommended for the functional assessment of older people. The index is an ordinal scale comprising ten activities of daily living. The 10 subtest items include

- (1) Feeding,
- (2) Bathing,
- (3) Personal grooming,

- (4) Dressing and undressing,
- (5) Bowel and
- (6) Bladder continence.
- (7) Getting on/off the toilet,
- (8) Moving from wheelchair to bed and return,
- (9) Walking or propelling a wheelchair,
- (10) Stair climbing,

Each subtest item on the original Barthel Index is rated 0, 5 or 10 (or 15 for two of the test items). Score ranges from 0 - 100. A total score of 100 represents the highest level of independence. The scores are intended to reflect the amount of time and assistance a patient requires.<sup>48, 49</sup>

We classified subjects into three groups according to their Barthel index score: level 1 (score 100) corresponds to good functional status, level 2 (score 91- 99) to fair functional status and level 3 (score 0-90) corresponds to poor functional status. (Refer annexure)

**Assessment of psychosocial Problems:** : It includes a complex of psychosocial factors which are defined as “those factors affecting personal health, health care and community wellbeing that stem from the psychosocial make- up of individuals and the structure and functions of social groups”. They include cultural values, customs, habits, beliefs, attitudes, morals, religion, education, lifestyles, community life, health services, social and political organization.<sup>37</sup>

Subjects were asked about some of the psychosocial factors such as money management by elderly, their social contacts, attitude of subjects towards life,

expressing feelings by elderly when unhappy etc. using a predesigned and pretested questionnaire.

**Pilot study:** Pilot study was conducted on 40 subjects (i.e. 10% of total sample size) who were selected randomly with a view to ascertain the feasibility of the study. All the instruments and techniques were standardized and validated during pilot study so as to ensure high content criteria and validity.

This study was given ethics approval by the JNMC Institutional Ethics Committee on Human Subjects Research (MDC/IECHSR/2304 dated 22<sup>nd</sup> November 2007).



**Photograph 1: View of Study Area**



**Photograph 2: Interviewing elderly**



**Photograph 3: Examining health status of elderly**



**Photograph 4: Laboratory examination**

## RESULTS

The observations cited here are taken from the present study undertaken among 400 elderly individuals residing in an urban area of Belgaum.

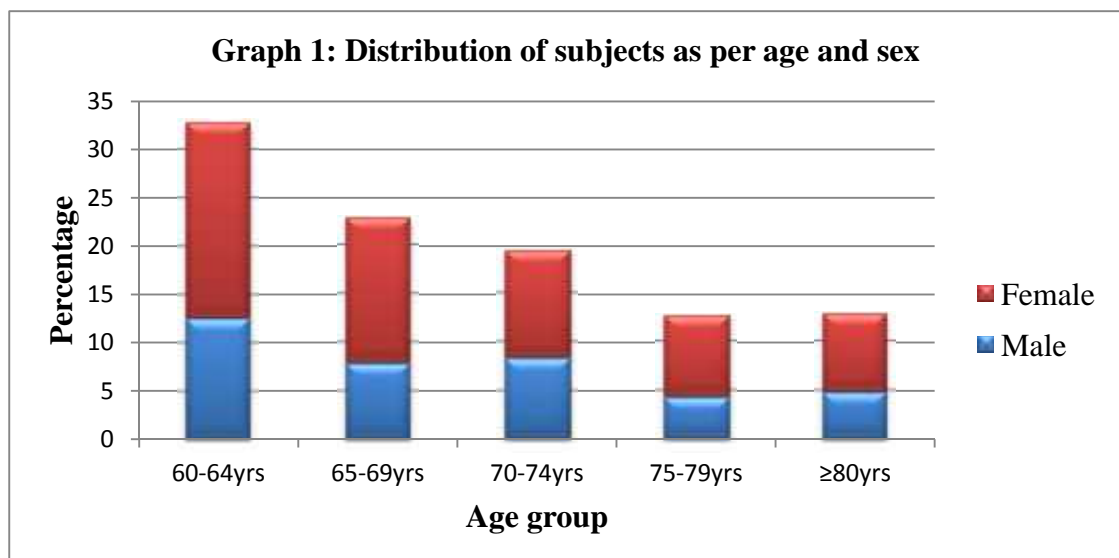
### I. Socio-demographic variables

**Table 1: Distribution of subjects as per age and sex**

Age group	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>60-64yrs</b>	50	12.5	81	20.3	131	32.8
<b>65-69yrs</b>	31	7.8	60	15	91	22.8
<b>70-74yrs</b>	33	8.3	44	11	77	19.3
<b>75-79yrs</b>	17	4.3	33	8.3	50	12.5
<b>80yrs</b>	19	4.8	32	8.0	51	12.8
<b>Total</b>	150	37.5	250	62.5	400	100

Mean age  $69.5 \pm 6.94$  (SD)

In the present study out of 400 participants, 131(32.8%) were in the age group of 60-64 years, 218 (54.6%) were in the age group of 65-79 years, whereas 51 (12.8%) were above 80 years age. Majority of the participants were females contributing to 250 (62.5%). In all the age groups females have been more than males.

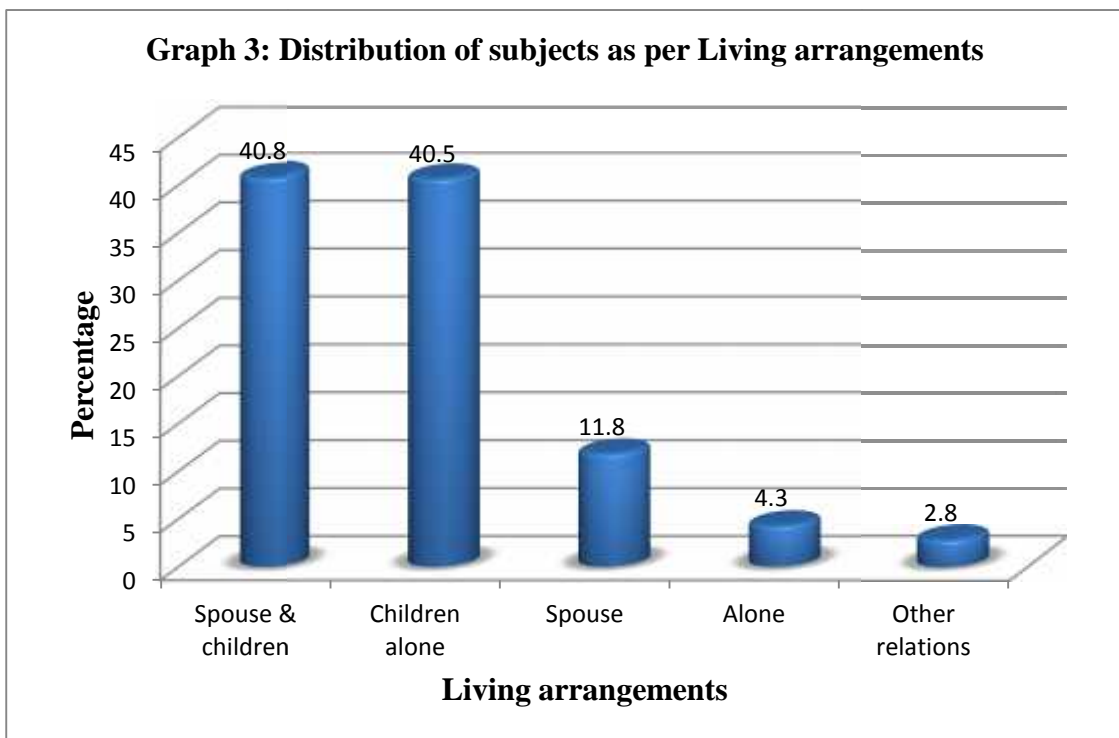
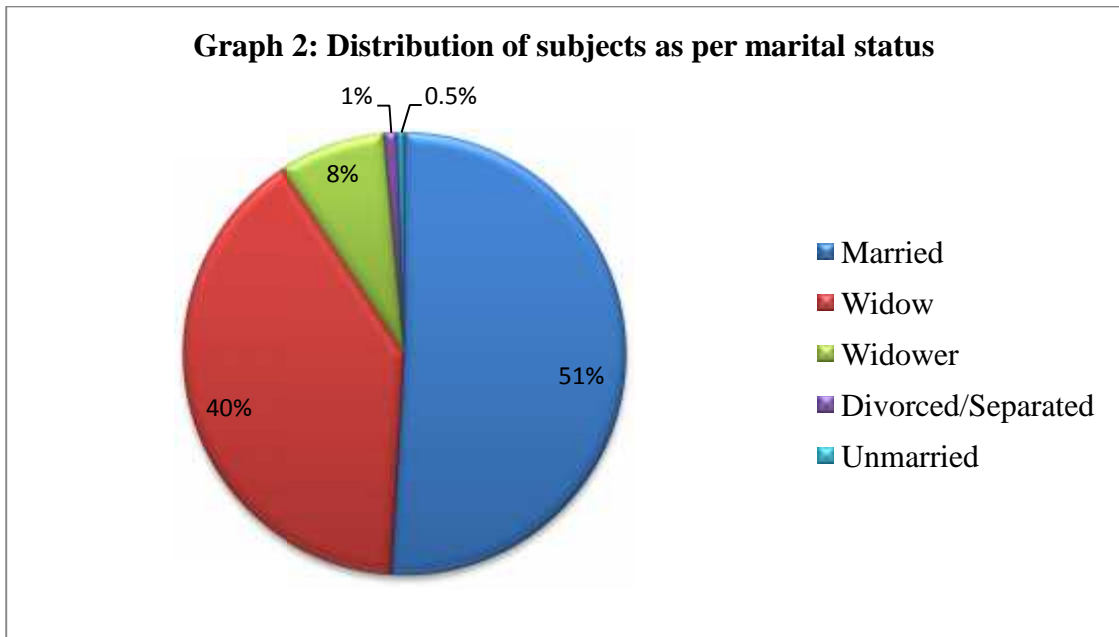


**Table 2: Distribution of subjects as per religion, family type, marital status and living arrangements**

Characteristic		Male		Female		Total (N=400)	
		No.	%	No.	%	No.	%
<b>Religion</b>	Hindu	138	34.5	234	58.5	372	93.0
	Muslim	12	3	16	4.0	28	7.0
<b>Family type</b>	Nuclear	52	13	46	11.5	98	24.5
	Joint	83	20.8	165	41.3	248	62
	Three generation	9	2.3	18	4.5	27	6.8
	Broken	6	1.5	21	5.3	27	6.8
<b>Marital status</b>	Unmarried	1	0.3	1	0.3	2	0.5
	Married	117	29.3	87	21.8	204	51
	Widower	31	7.8	0	0.0	31	7.8
	Widow	0	0.0	159	39.8	159	39.8
	Divorced/Separated	1	0.3	3	0.8	4	1
<b>Living arrangements</b>	Spouse	25	6.3	22	5.5	47	11.8
	Spouse & children	93	23.3	70	17.5	163	40.8
	Children alone	27	6.8	135	33.8	162	40.5
	Other relations	1	0.3	10	2.5	11	2.8
	Alone	4	1.0	13	3.3	17	4.3

In this study, majority of the participants were Hindus 372 (93.0%). 248 (62.0%) participants belonged to joint families followed by nuclear families 98 (24.5%) and three generation families 27 (6.8%). 204 (51.0%) individuals were in the

group of married and the widowhood was higher among females (39.8%) as compared to males (7.8%) . 47 (11.8%) subjects were living with their spouse and higher number of females 135 (33.8%) were living with their children alone as compared to males 27 (6.8%). Whereas, 17 (4.3%) of subjects were living alone.

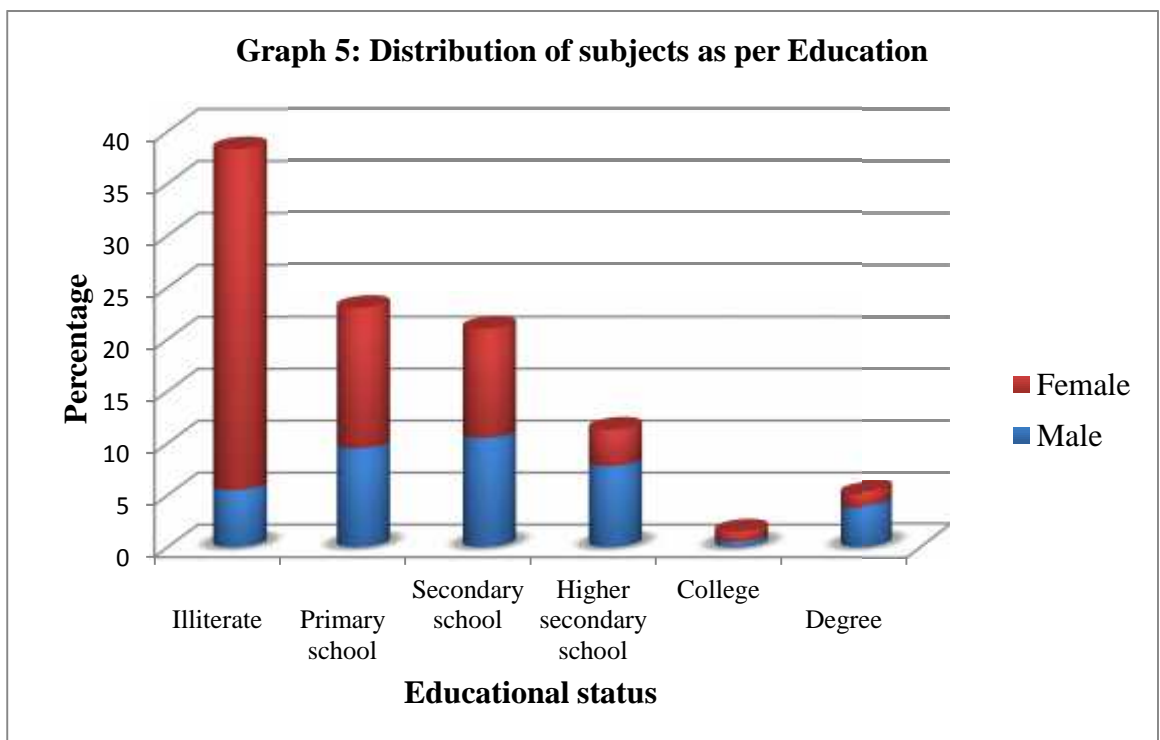
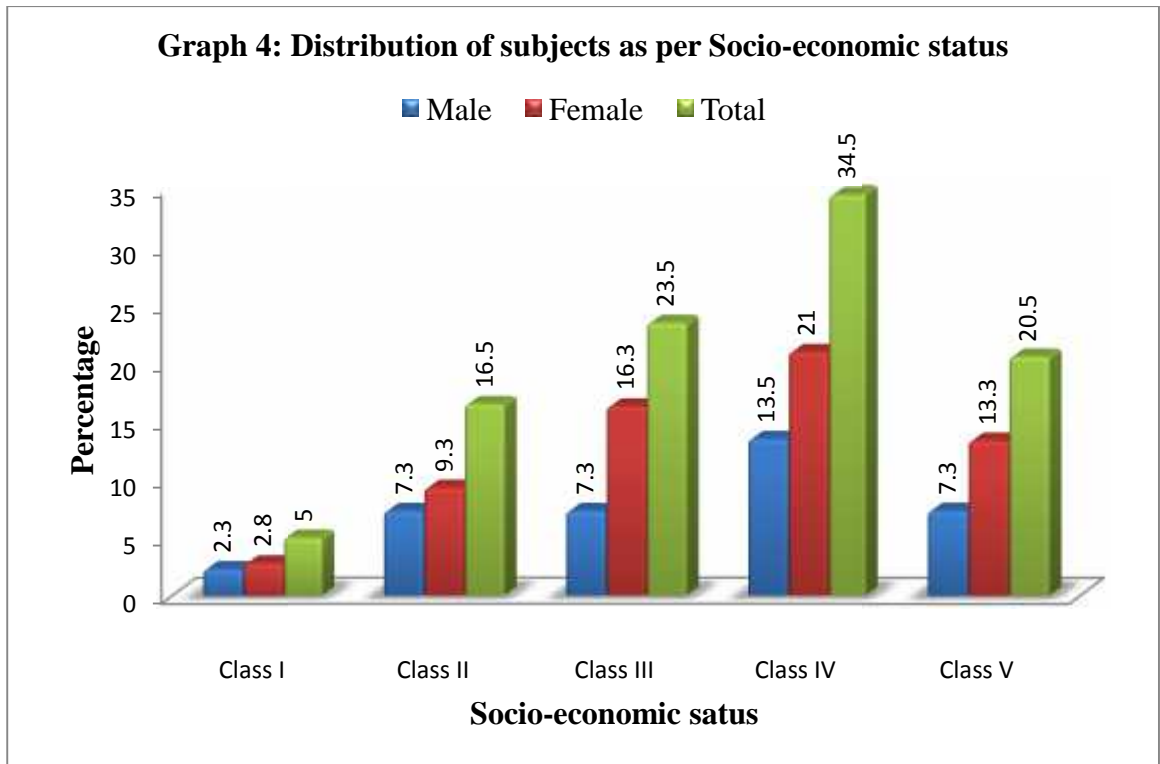


**Table 3: Distribution of subjects as per Occupation, Socio-economic status and Education.**

Characteristic		Male		Female		Total (N=400)	
		No.	%	No.	%	No.	%
<b>Occupation</b>	Weaving	28	7.0	9	2.3	37	9.3
	Others	32	8.0	16	4	48	12
	Total	60	15	25	6.3	85	21.3
<b>SES</b>	Class I	9	2.3	11	2.8	20	5
	Class II	29	7.3	37	9.3	66	16.5
	Class III	29	7.3	65	16.3	94	23.5
	Class IV	54	13.5	84	21	138	34.5
	Class V	29	7.3	53	13.3	82	20.5
<b>Education</b>	Illiterate	22	5.5	131	32.8	153	38.3
	Primary school	38	9.5	54	13.5	92	23.0
	Secondary school	42	10.5	42	10.5	84	21.0
	Higher secondary school	31	7.8	14	3.5	45	11.3
	College	2	0.5	4	1	6	1.5
	Degree	15	3.8	5	1.3	20	5.0

Out of 400 elderly, 85 (21.3%) were working at present. Among the working, there were higher numbers of males 28 (7%). As per modified BG Prasad classification larger proportion of the participants belonged to low socioeconomic group ie.138 (34.5%) and 82 (20.5%) were in class IV and class V respectively. Whereas, only 20 (5.0%) were in class I socioeconomic class. Majority of subjects were literate 247 (61.7%), among the literate 92 (23.0%) and 84 (21.0%) had studied

up to primary school and secondary school respectively. Whereas, 153 (38.3%) of elderly were illiterate. Illiteracy was higher among females (32.8%).



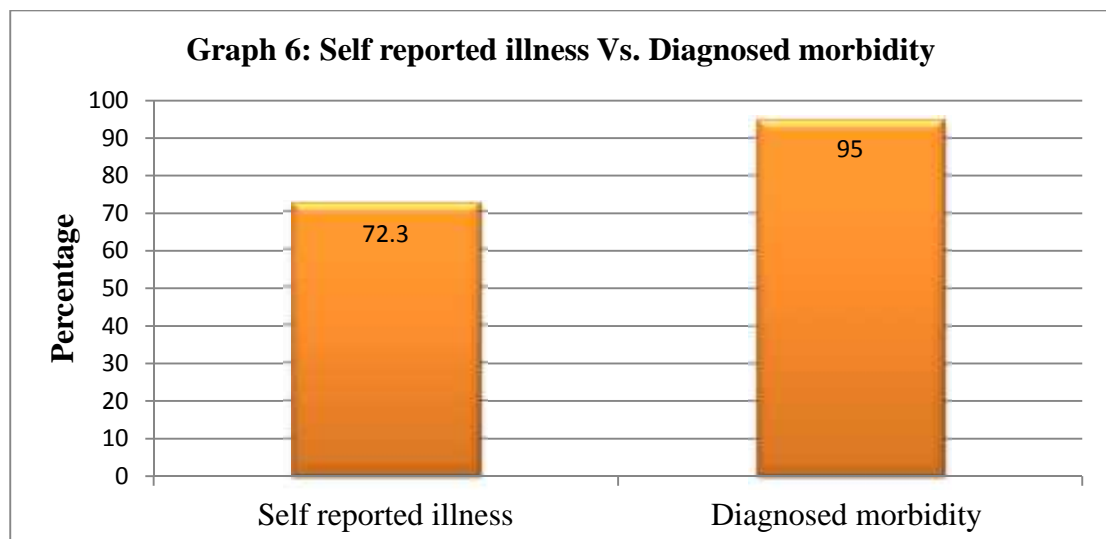
## II. Morbidity profile

**Table 4: Distribution of subjects as per self reported illness and number of morbidities**

Characteristic		Male		Female		Total (N=400)	
		No.	%	No.	%	No.	%
Self reported illness *	No illness	54	13.5	57	14.3	111	27.8
	One or the other illness	96	24	193	48.3	289	72.3
No. of morbidity **	No morbidity	7	1.8	13	3.3	20	5
	1	7	1.8	9	2.3	16	4
	2	15	3.8	17	4.3	32	8
	3	26	6.5	49	12.3	75	18.8
	4	40	10	34	8.5	74	18.5
	5	28	7.0	44	11	72	18
	6	27	6.8	84	21	111	27.8

Mean morbidity  $4.1 \pm 1.72$ , \* Perceived health, \*\* Physician diagnosed

Although 27.8% did not report any illness, 95% had one or the other morbidity on examination with a mean of 4.1 (SD 1.72) per subject. 253 (63.3%) had 2 to 5 morbidity and 111 (27.8%) had 6 or more morbidity. Self reported illness and morbidity was higher among Females.



**Table 5: Association between self reported illness and morbidity.**

Morbidity	Self reported illness				Total		Significance
	No illness		Illness				
	No.	%	No.	%	No.	%	
<b>No morbidity</b>	15	13.5	5	1.7	20	5	2 66.127 P = 0.000*
<b>Morbidity</b>	96	86.5	284	98.3	380	95	
<b>Total</b>	<b>111 (27.75%)</b>		<b>289 (72.25%)</b>		<b>400</b>	<b>100</b>	

\*Statistically significant

Out of 111 (27.75%) self reported as no illness, 96 (86.5%) were diagnosed as having one or more morbidity. Whereas among 289 (72.25%) reported as ill, only 5 (1.7%) subjects were free from morbidity and this difference was statistically significant.

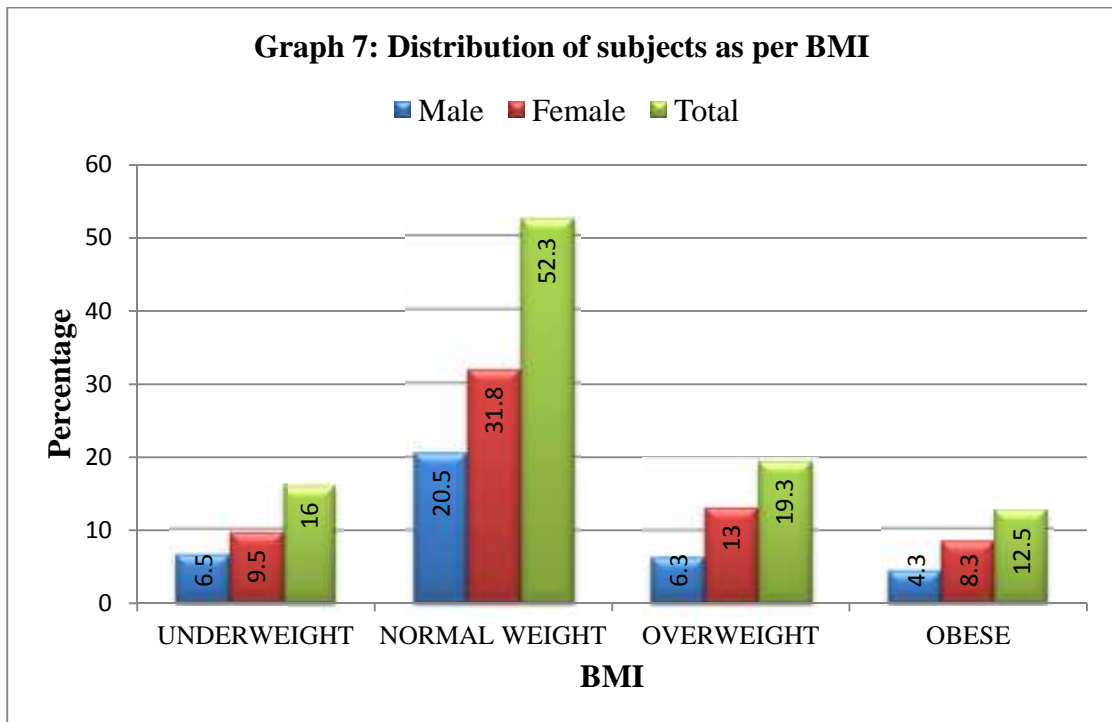
**Table 6: Distribution of subjects as per Body Mass Index (BMI)**

BMI*	Male		Female		Total (N=400)	
	No.	%	No.	%	No.	%
<b>Under weight &lt;18.5</b>	26	6.5	38	9.5	64	16
<b>Normal weight 18.5-22.9</b>	82	20.5	127	31.8	209	52.3
<b>Overweight 23-27.5</b>	25	6.3	52	13	77	19.3
<b>Obese &gt;27.5</b>	17	4.3	33	8.3	50	12.5

\* Revised WHO criteria for Southeast Asians.

In the present study 64 (16.0%) had BMI <18.5, 127 (31.8%) had BMI 23, whereas 209 (52.3%) subjects had BMI 18.5-22.9. Higher numbers of females were underweight and overweight as compared to males.

In the present study 19.8% were tobacco users, 11% were alcoholic and 9.5% were smokers.



**Table 7: Distribution of subjects as per fall and its consequence**

Fall and its consequence		Male		Female		Total (N=400)	
		No.	%	No.	%	No.	%
Fall in past 1 year	Yes	21	5.3	47	11.8	68	17
	No	129	32.3	203	50.8	332	83
Consequence of fall	Fracture	10	38.5	16	61.5	26 (38.2%)	
	Other injuries	11	26.2	31	73.8	42 (61.8%)	

Out of 400 elderly 68 (17.0%) had a fall in the past 1 year, larger proportion were females 47 (11.8%). Out of those fallen, 26 (38.2%) had fracture as a consequence. Fracture was more common among females than males (61.5% vs.38.5%).

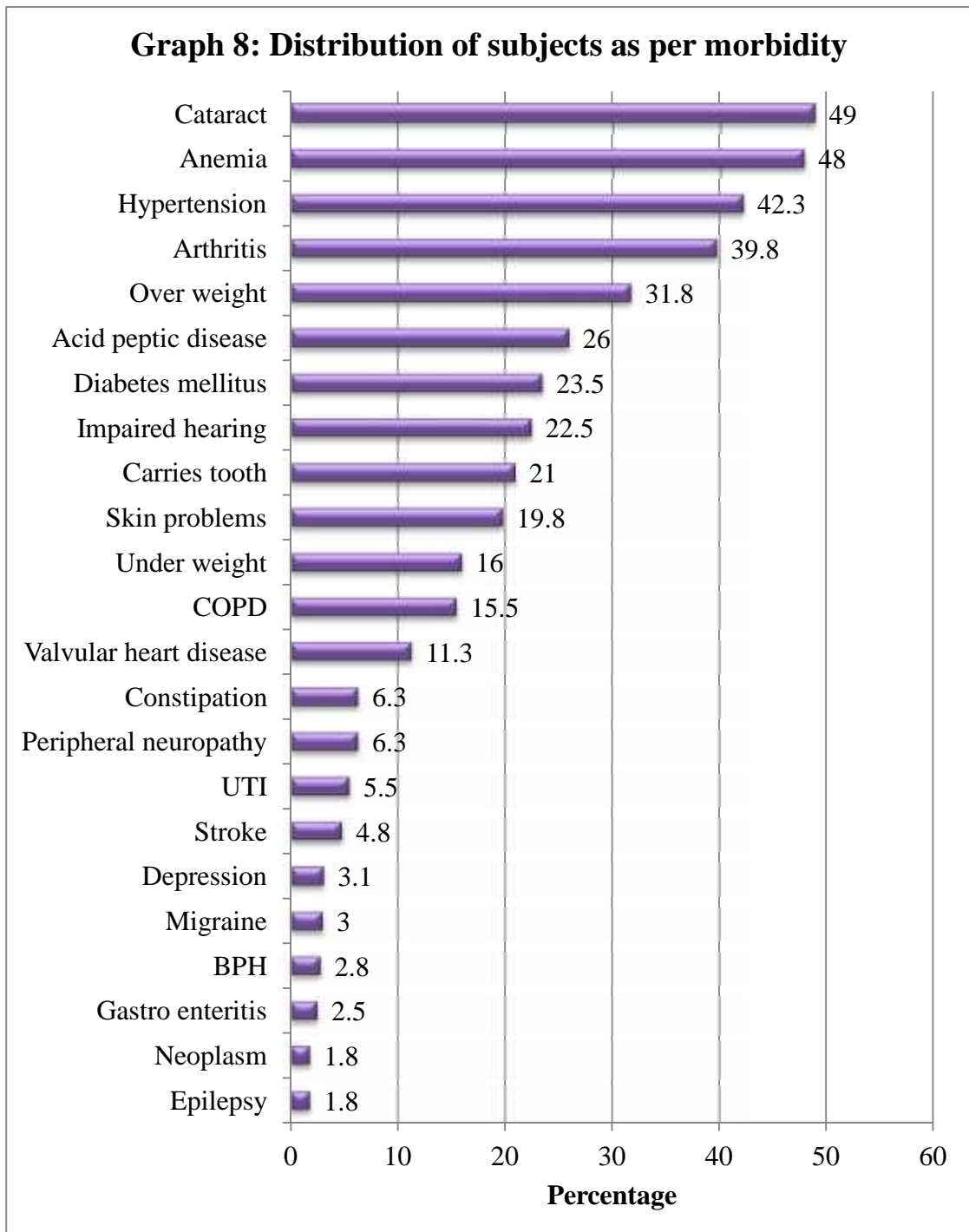
Table 8: Profile of elderly by most common morbidity and sex

Morbidities	ICD 10 CODE**	Male		Female		Total	
		No.	%	No.	%	No.	%
Cataract	H25	76	19	120	30	196	49
Anemia	D53	43	10.8	149	37.3	192	48
Hypertension	I10	56	14	113	28.3	169	42.3
Arthritis	M12, M13	41	10.3	118	29.5	159	39.8
Over weight	E66	42	10.5	85	21.3	127	31.8
Acid peptic disease	K27, K29	21	5.3	83	20.8	104	26
Diabetes mellitus	E14	41	10.3	53	13.3	094	23.5
Impaired hearing	H90, H91	30	7.5	60	15	90	22.5
Carries tooth	K02	29	7.3	55	13.7	84	21
Skin problems	L30	28	07	51	12.8	79	19.8
Under weight	E64, 62	26	6.5	38	9.5	64	16
COPD*	J44	32	8.0	30	7.5	62	15.5
Valvular heart disease	I38, I39	14	3.5	31	7.8	45	11.3
Peripheral neuropathy	G62, G63	15	3.8	10	2.5	25	6.3
Constipation	K59	08	02	17	4.3	25	6.3
UTI*	N39	02	0.5	20	5.0	22	5.5
Stroke	I64	11	2.8	08	2.0	19	4.8
Depression	F32	01	0.3	11	2.8	12	3.1
Migraine	G43	04	1.0	08	2.0	12	3.0
BPH*	N40	11	2.8	00	0.0	11	2.8
Gastro enteritis	A09	02	0.5	08	2.0	10	2.5
Epilepsy	G40	02	0.5	05	1.3	07	1.8
Neoplasm	C14, C53, C18, C39, C50	04	1.0	03	0.8	07	1.8

\*\* International statistical classification of diseases, Tenth revision.\*Ref. annexure

Among study subjects most prevalent morbidity was Cataract 196 (49%) followed by Anemia 192 (48%), Hypertension 169 (42.3%), Arthritis 159 (39.8%),

Overweight 127 (31.8%), Acid peptic disease 104 (26%), Diabetes mellitus 94 (23.5%) and Impaired hearing 90 (22.5%). Chronic obstructive airway disease and Valvular heart disease contributed to 62 (15.5%) and 45 (11.3%) of morbidity respectively. Stroke was prevalent in 19 (4.8%) of subjects. Epilepsy and Neoplasm accounted for 7 (1.8%) of morbidity each.



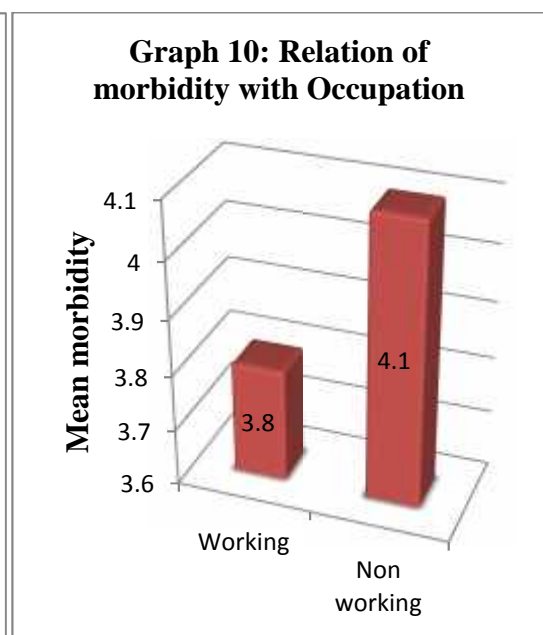
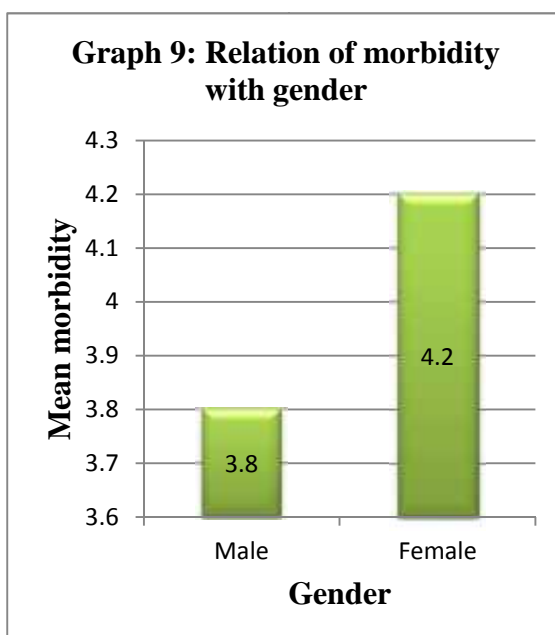
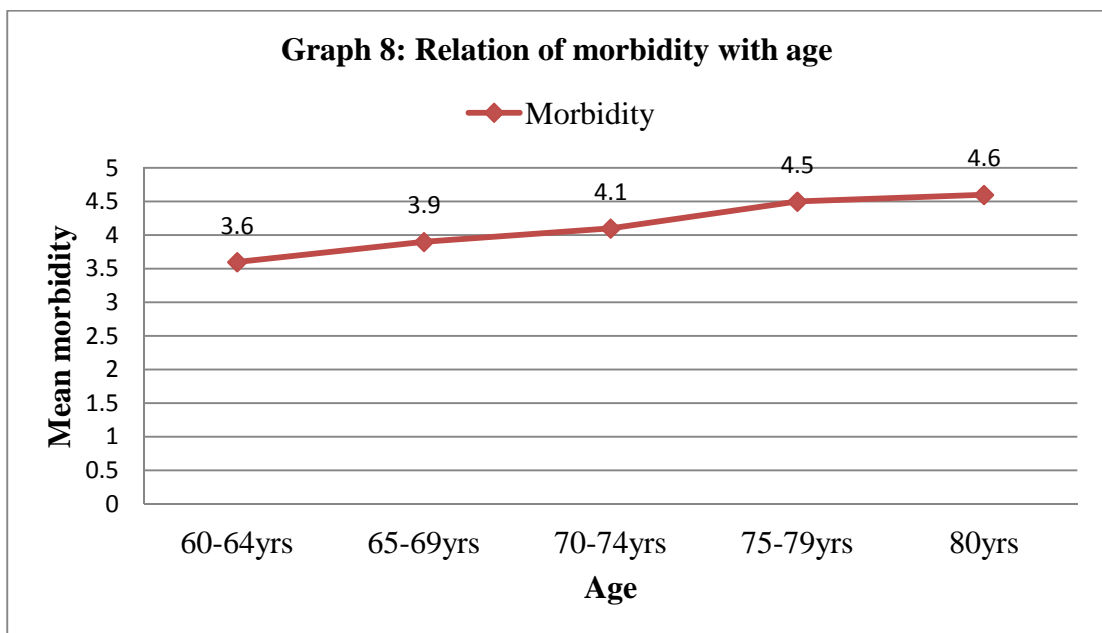
**Table 9: Profile of elderly as per system wise morbidity and sex**

Morbidity (ICD-10 CODE)	Male		Female		Total		2 test P value
	No.	%	No.	%	No.	%	
Eye problems (H00-H59)	120	30	205	51.3	325	81.3	0.620
Musculoskeletal (M00-M99) disorders	66	16.5	162	40.5	228	57	0.000*
CVS disorders (I00-I99)	72	18.0	134	33.5	206	51.5	0.278
Dental problems (K02, K05)	65	16.3	131	32.8	196	49	0.079
Anemia (D53)	43	10.8	149	37.3	192	48	0.000*
Digestive disorders (K00-K93)	34	8.5	101	25.3	135	33.8	0.000*
Over weight (E66)	42	10.5	85	21.3	127	31.8	0.212
Diabetes mellitus (E14)	41	10.3	53	13.3	94	23.5	0.161
Impaired hearing (H90, H91)	30	7.5	60	15	90	22.5	0.354
Respiratory disorders (J00-J99)	40	10	41	10.3	81	20.3	0.013*
Skin & subcutaneous tissue problems (L00-99)	28	7.0	51	12.8	79	19.8	0.673
Nervous system problems (G0-G99)	37	9.3	35	8.8	72	18.0	0.007*
Other systems problems	32	8.0	37	9.3	69	17.3	0.094
Under weight (E62, E64)	26	6.5	38	9.5	64	16	0.573
Genitor urinary problems (N00-N99)	16	4.0	31	7.8	47	11.8	0.602

\*Statistically significant

Eye problems were the most common morbidity among the study subjects accounting for 325 (81.3%) followed by Musculoskeletal morbidity constituting 228 (57.0%), Cardiovascular problems 206 (51.5%) and Dental problems 196 (49%). Musculoskeletal morbidity was significantly associated with gender. Out of 192 (48%) subjects with Anemia, 149 (37.3%) females had the illness and it was

statistically significant. Gastro intestinal illness 135 (33.8%) was significantly associated with gender. Respiratory and skin diseases were prevalent in 81 (20.3%) and 79 (19.8%) of subjects. 72 (18.0%) and 47 (11.8%) elderly had diseases of nervous system and genitourinary system. 69 (17.3%) of morbidity was attributed to other systems. Respiratory and nervous system problems were significantly associated with gender.



**Table 10: Relation of morbidity with baseline characteristics.**

<b>SOCIODEMOGRAPHIC CHARECTERISTICS</b>	<b>N</b>	<b>MORBIDITY MEAN (SD)</b>	<b>Test of significance</b>	<b>P value</b>
<b>AGE</b>				
60-64yrs	131	3.6 (1.63)	F 4.143	0.003*
65-69yrs	91	3.9 (1.67)		
70-74yrs	77	4.1 (1.82)		
75-79yrs	50	4.5 (1.88)		
80yrs	51	4.6 (1.45)		
<b>SEX</b>				
Male	150	3.8 (1.62)	t TEST	0.047*
Female	250	4.2 (1.76)		
<b>SES</b>				
Class I	20	4.9 (1.02)	F 1.830	0.122
Class II	66	4.1 (1.97)		
Class III	94	3.8 (1.76)		
Class IV	138	4.1 (1.53)		
Class V	82	3.8 (1.83)		
<b>MARITAL STATUS</b>				
Un Married	2	3.5 (0.70)	F 3.785	0.005*
Married	204	3.7 (1.70)		
Widow	159	4.4 (1.60)		
Widower	31	3.9 (1.90)		
Divorced/Separated	4	4.5 (1.90)		
<b>WORKING</b>				
Yes	85	3.8 (1.49)	t TEST	0.032*
No	315	4.1 (1.77)		
<b>LIVING ARRANGEMENTS</b>				
Spouse	47	3.7 (1.91)	F 3.882	0.004*
Spouse & Children	163	3.7 (1.64)		
Children Alone	162	4.3 (1.72)		
Other Relation	11	5.2 (0.90)		
Alone	17	4.4 (1.54)		
<b>BMI</b>				
<18.5	64	4.9 (1.41)	F 11.276	0.000*
18.5-22.9	209	3.7 (1.79)		
23-27.5	77	4.5 (1.50)		
>27.5	50	3.8 (1.55)		

\*Statistically significant

In the present study, increasing trend of morbidity with the age was seen and females had the higher number of morbidity compared to males (4.2 vs. 3.8) and these differences were statistically significant. Socioeconomic class I, II and IV had higher number of morbidity compared to class III and V. However the difference observed was not statistically significant. Morbidity was low among unmarried and married elderly compared to those in widowhood and the difference was statistically significant. Significant association of morbidity was found among sedentary subjects than the working group (4.1 vs. 3.8). Statistically significant association of higher morbidity was seen among elderly living alone or living with other relations and those having under or over weight.

### III. Disability profile

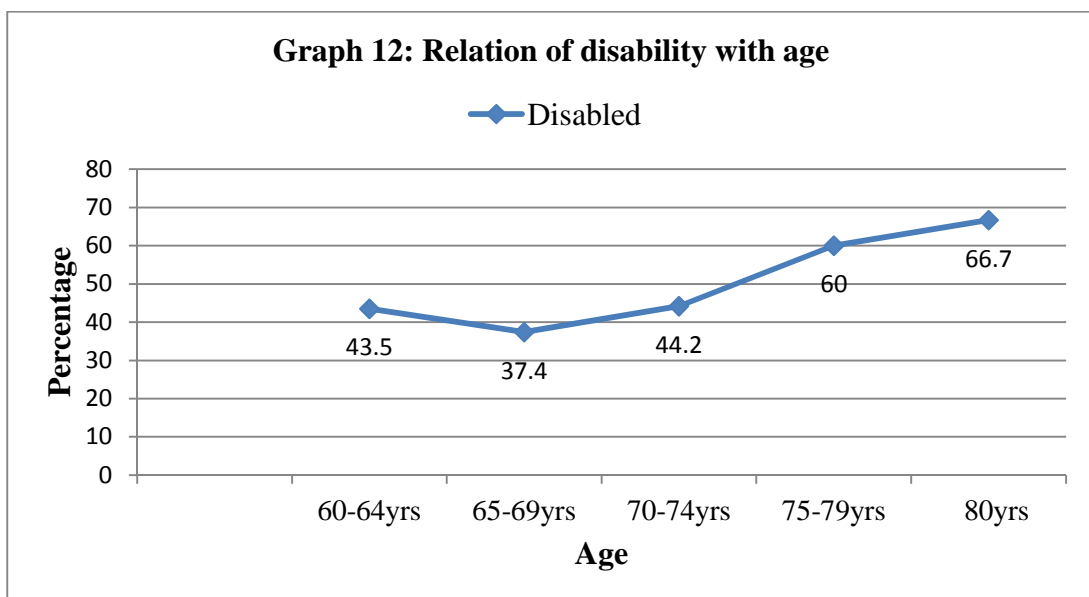
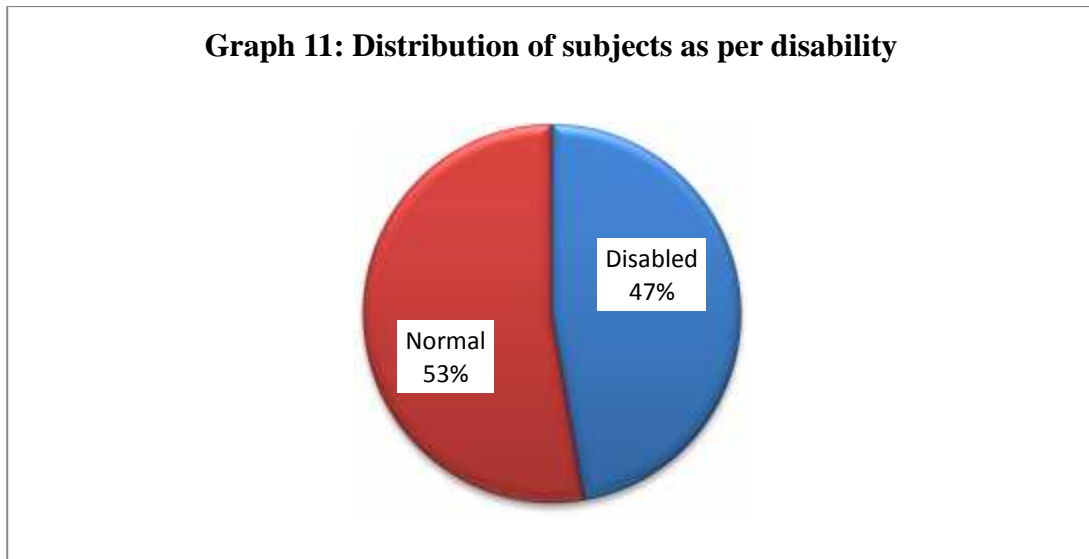
**Table 11: Distribution as per age and disability**

Age of subjects	Disabled		Normal		Total
	No.	%	No.	%	No.
<b>60-64yrs</b>	57	43.5	74	56.5	131
<b>65-69yrs</b>	34	37.4	57	62.6	91
<b>70-74yrs</b>	34	44.2	43	55.8	77
<b>75-79yrs</b>	30	60.0	20	40.0	50
<b>80yrs</b>	34	66.7	17	33.3	51
<b>Total (N=400)</b>	<b>189 (47.3%)</b>		<b>211 (52.8%)</b>		<b>400</b>

$\chi^2 = 15.575$  DF = 4 p 0.004, Logistic regression p 0.005 at 95% CI for expected B

In the present study 189 (47.3%) subjects were disabled. 57 (43.5%) of elderly were disabled in the age group of 60-64yrs followed by 34 (37.3%) in the age group of 65-69yrs, 34 (44.1%) in the age group of 70-74yrs and 30 (60%) were disabled in the age group of 75-79yrs. Whereas, 34 (66.6%) were disabled in the age group of

80yrs and above. It is observed that disability increased as the age increased. This association between disability and age was statistically significant.



**Table 12: Distribution of subjects as per gender and disability**

Sex	Disabled		Normal	
	No.	%	No.	%
Male	64	16.0	86	21.5
Female	125	31.3	125	31.3
<b>Total (N=400)</b>	<b>189</b>	<b>47.3</b>	<b>211</b>	<b>52.8</b>

$\chi^2 = 2.023$  DF = 1 p = 0.155

125 (31.3%) elderly females were disabled. Whereas, 64(16.0%) elderly males were disabled but the association between disability and gender was not statistically significant.

**Table 13: Distribution of subjects as per the Age and the Barthel index.**

Age of subjects	The Barthel index score					
	Score 100*		Score 91-99**		Score 0-90***	
	No.	%	No.	%	No.	%
<b>60-64yrs</b>	74	56.5	36	27.5	21	16.0
<b>65-69yrs</b>	57	62.6	14	15.4	20	22.0
<b>70-74yrs</b>	43	55.8	16	20.8	18	23.4
<b>75-79yrs</b>	20	40.0	9	18.0	21	42.0
<b>80yrs</b>	17	33.3	10	19.6	24	47.1
<b>Total (N = 400)</b>	<b>211 (52.8%)</b>		<b>85 (21.3%)</b>		<b>104 (26%)</b>	

$\chi^2 = 30.947$  DF = 8 P = 0.000, \*No disability, \*\*Mild disability, \*\*\*Moderate to Severe disability

In the present study, 85 (21.3%) subjects had mild disability and 104 (26%) had moderate to severe disability. Moderate to severe disability was seen in 21 (16%) of elderly in the age group of 60-64yrs compared to 24 (47.1%) in the age group of 80yrs and above. Moderate to severe disability was seen to increase with the age and the risk of disability almost doubles after 75yrs. These associations were statistically significant.

**Table 13: Relation of disability with specific morbidity and selected characteristic (Logistic regression analysis).**

Characteristics	Odds Ratio (OR)	OR for 95% CI	P value	Adjusted p value**
Self reported illness – Yes / No	18.6	2.47 - 140.4	0.005*	-
No of Morbidity – No Morbidity 1--3 4	0.25	0.17 - 0.38	0.000*	-
Fall – Yes/No	4.62	2.54 - 8.44	0.000*	-
Consequence of fall Fracture/others	0.46	0.33 - 0.66	0.000*	-
Anemia – Yes/No	2.59	1.73 - 3.88	0.000*	0.001*
Hypertension – Yes/No	1.72	1.15 - 2.57	0.008*	0.048*
Diabetes Mellitus – Yes/No	1.91	1.20 - 3.07	0.007*	0.112
Arthritis – Yes/No	1.87	1.25 - 2.81	0.002*	0.025*
Cataract – Yes/No	1.71	1.16 - 2.55	0.007*	0.225
COPD – Yes/No	2.13	1.22 - 3.71	0.008*	0.000*
Impaired Hearing – Yes/No	4.18	2.49 - 7.03	0.000*	0.000*
VHD – Yes/No	3.51	1.75 - 7.02	0.000*	0.003*
Stroke – Yes/No	10.33	2.35 - 45.33	0.002*	0.001*
APD – Yes/No	1.05	0.67 - 1.64	0.844	0.679
Overweight – Yes/No	2.11	1.37 - 3.24	0.001*	0.056
Underweight – Yes/No	1.43	0.83 - 2.44	0.195	0.004*

\*Statistically significant \*\* Significance after adjustment for other morbidities.

Disability was higher among those with self reported illness and it was statistically significant. Odds of becoming disabled increased with the mean number of morbidities and those with history of fall or fracture and the difference was statistically significant. Disability was found to be significantly associated with morbid conditions like Hypertension, Anemia, Diabetes mellitus, Arthritis, Cataract, Chronic obstructive pulmonary disease, Deafness, Valvular heart disease, and Stroke.

Disability was higher among subjects who were overweight and it was statistically significant. After adjusting for confounding variable, significant association of disability was found for Hypertension, Anemia, Arthritis, Chronic Obstructive pulmonary disease, Deafness, Valvular heart disease, underweight and Stroke.

**Table 14: Relation of disability as per system wise morbidity (Logistic regression analysis)**

Morbidity	Odds Ratio (OR)	OR for 95% CI	P value	Adjusted p value**
Eye problems– Yes/No	2.04	1.20 - 3.45	0.008*	0.997
Dental problems– Yes/No	1.72	1.16 - 2.55	0.007*	0.384
Skin diseases– Yes/No	1.18	0.72 - 1.94	0.502	0.835
Respiratory problems– Yes/No	0.33	1.19 - 3.28	0.019*	0.002*
Cardiovascular illness– Yes/No	2.32	1.55 - 3.47	0.000*	0.000*
Musculoskeletal problems-Yes/No	3.47	2.28 - 5.29	0.000*	0.000*
GIT problems– Yes/No	0.65	0.91 - 2.09	0.243	0.526
GUD– Yes/No	4.89	2.36 - 10.15	0.000*	0.001*
Nervous system problems -Yes/No	4.29	2.41 - 7.64	0.000*	0.000*
Other system problems– Yes/No	2.44	8.00 - 4.18	0.001*	0.013*

\*Statistically significant \*\* Significance after adjustment for other morbidities.

Disability was significantly associated with eye diseases, musculoskeletal problems, respiratory illness, cardiovascular diseases, genitourinary and nervous system morbidities. After adjusting for confounding variable significant association was found for musculoskeletal, respiratory, cardiovascular, genitourinary and nervous system morbidities.

Table 15: Relation of disability with selected characteristics

Characteristics		Disabled No. (%)	Normal No. (%)	Total No.	2 Test
<b>Marital status</b>	Unmarried	002 (100)	000 (0.00)	002	0.082
	Married	084 (41.2)	120 (58.8)	204	
	Widow	083 (52.2)	076 (47.8)	159	
	Widower	018 (58.1)	013 (41.9)	031	
	Div/Separated	002 (50.0)	002 (50.0)	004	
<b>Family type</b>	Nuclear	045 (46.0)	053 (54.0)	098	0.572
	Joint	119 (48.0)	129 (52.0)	248	
	Three Generation	010 (37.0)	017 (63.0)	027	
	Broken	015 (55.5)	012 (44.5)	027	
<b>Living arrangement</b>	Spouse	025 (53.2)	022 (46.8)	047	0.004*
	Spouse / Children	061 (37.4)	102 (62.6)	163	
	Children alone	087 (53.7)	075 (46.3)	162	
	Other relation	009 (81.8)	002 (18.2)	011	
	Alone	007 (41.2)	010 (58.8)	017	
<b>Education</b>	Illiterate	075 (49.0)	078 (51.0)	153	0.096
	Primary	052 (56.2)	040 (43.8)	092	
	Secondary	034 (40.5)	050 (59.5)	084	
	High Secondary	015 (33.3)	030 (66.7)	045	
	PUC	004 (66.6)	002 (33.4)	006	
	Degree	009 (45.0)	011 (55.0)	020	
<b>SES</b>	Class I	012 (60.0)	008 (40.0)	020	0.084
	Class II	037 (56.1)	029 (43.9)	066	
	Class III	045 (47.9)	049 (52.1)	094	
	Class IV	053 (38.4)	085 (61.6)	138	
	Class V	042 (41.2)	040 (58.8)	082	
<b>Occupation</b>	Not working	165 (52.4)	150 (47.6)	315	0.000*
	Working	024 (28.2)	061 (71.8)	085	
<b>BMI</b>	<18.5	035 (54.7)	029 (45.3)	064	0.000*
	18.5-22.9	078 (37.3)	131(62.7)	209	
	23	076 (59.8)	051(40.2)	127	
<b>Total (N=400)</b>		<b>189 (47.3)</b>	<b>211 (52.8)</b>	<b>400</b>	

\*P Value statistically significant

Married subjects had a lower disability (41.2%) compared to unmarried (100%) and widowhood (55.2%) but the association was not significant. Results show that, disability was high among elderly living with other relations (81.8%) than those who were living with spouse or children and the difference was statistically significant. Disability was high 165 (52.4%) in nonworking group as compared to working group 24 (28.2%) and the difference was statistically significant. Disability was higher among both the extremes of BMI (54.7% in BMI<18.5 and 59.8% in BMI 23) and the difference was statistically significant.

#### IV. Psychosocial variables

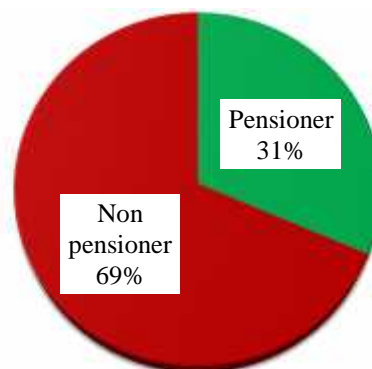
**Table 16: Distribution of subjects as per social security and sex**

Social security		Male		Female		Total		2Test
		No.	%	No.	%	No.	%	
Pensioner		51	40.5	75	59.5	126	31.5	<b>P 0.000*</b>
Non pensioner		99	36.1	175	63.9	274	68.5	
Type of pension	Old age	35	47.9	38	52.1	73	57.9	
	Widow	00	0.0	30	100	30	23.8	
	Organized sector	16	69.6	7	30.4	23	18.3	
Sufficiency of pension	Yes	22	59.5	15	40.5	37	29.4	
	No	29	32.6	60	67.4	89	70.6	
Money management	Dependent on family	67	27.7	175	72.3	242	60.5	<b>P 0.000*</b>
	Self managing	83	52.5	75	47.5	158	39.5	

N = 400 \*statistically significant.

Out of 400 elderly subjects, only 126 (31.5%) were getting pension as a social security. Among these pensioners 73 (57.9%) elderly were getting old age pension, 30 (23.8%) female subjects were getting widow pension, and 23 (18.3%) of elderly were getting pension from the organized sectors. These differences observed were found to be statistically significant. Out of 126 (31.5%) subjects getting pension, majority 89 (70.6%) of subjects said that their pension is not sufficient for daily activities. 242 (60.5%) subjects were economically dependent on their families. Whereas, only 158 (39.5%) were economically independent and this difference observed was statistically significant.

**Graph 13: Distribution of subjects as per Pension**



**Graph 14: Distribution of subjects as per Pension type**

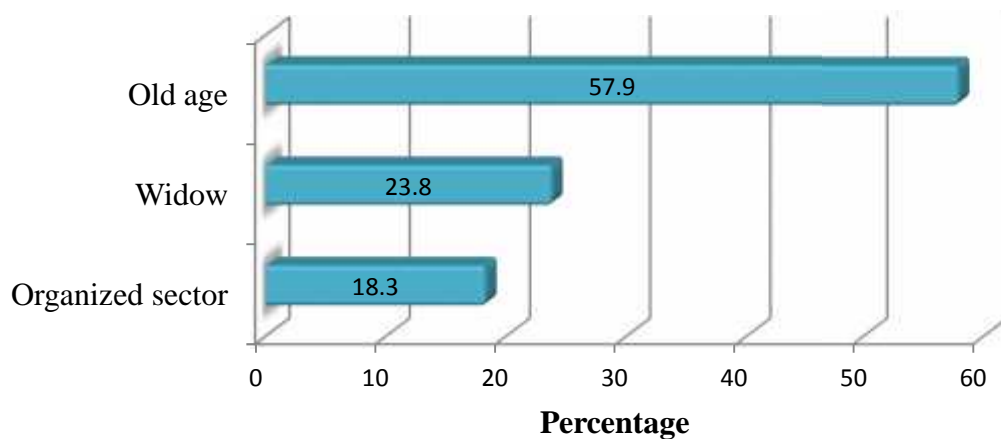


Table 17.1: Distribution of subjects as per psychosocial variables

Psychosocial variables		Male		Female		Total		2 Test
		No.	%	No.	%	No.	%	
Care during illness by family members	Well	124	31	178	44.5	302	75.5	0.023*
	Indifferent	14	3.5	47	11.8	61	15.3	
	Bad	12	3.0	25	6.3	37	9.3	
Care taker during illness	Spouse	74	18.5	22	5.5	96	24.0	0.000*
	Family members	55	13.8	174	43.5	229	57.3	
	None	21	5.3	54	13.5	75	18.8	
How do you carry out ADL (If disabled)	Spouse	22	5.5	10	2.5	32	8.0	0.000*
	Family members	19	4.8	63	15.8	82	20.5	
	Self managing	27	6.8	54	13.5	81	20.3	
Expressing feelings when unhappy	Spouse	67	16.8	36	9.0	103	25.8	0.000*
	Children	24	6.0	85	21.3	109	27.3	
	Friends	20	5.0	28	7.0	48	12	
	All/Any one	05	1.3	09	2.3	14	3.5	
	None	34	8.5	92	23	126	31.5	
Consultation by family members during decision making	Always	97	24.3	118	29.5	215	53.8	.009*
	Sometimes	30	7.5	74	18.5	104	26	
	Never	19	4.8	49	12.3	68	17	
Advice honored by family members	Yes	122	31	168	42	290	73	0.008*
	No	25	6.3	76	19	101	25.3	

N = 400, \*P Value - Statistically significant

In the present study, 302 (75.5%) elderly were well taken care by their family members during illness compared to 37 (9.3%) who were badly treated by their family

members during illness and the difference was statistically significant. 96 (24.0%) of the respondents said spouse as a care taker during illness, 229 (57.3%) elderly were taken care by other family members (children and grandchildren). Whereas, in 37 (9.3%) elderly there were no care taker at all. Statistically this difference was significant. Among disabled, 81 (20.3%) were self dependent in their basic activities of daily living. Whereas, 114 (79.7%) were dependent on either spouse or other family members for the same activities. This difference was found to be statistically significant. 126 (31.5%) elderly were not expressing their feelings to anybody when they are unhappy while 274 (68.5%) were expressing their feelings to either spouse or children/friends and statistically this difference was significant. 104 (26%) of subjects were not consulted by their family members during decision making where as 215 (53.8%) of elderly were consulted by their family members and the difference was statistically significant.

Table 17.2: Distribution of subjects as per psychosocial variables

Psychosocial variables		Male		Female		Total		2 Test
		No.	%	No.	%	No.	%	
Company	Available	112	28	175	43.8	287	71.8	0.316
	Lonely	38	9.5	75	18.8	113	28.3	
Social contacts	Outside home	105	26.3	124	31	229	57.3	0.000*
	No contacts	45	11.3	126	31.5	171	42.8	
Happy attitude towards life	Most of the time	86	21.5	104	26	190	47.5	0.002*
	Some time	34	8.5	98	24.5	132	33	
	Not at all	30	7.5	48	12	78	19.5	
Reasons for sad attitude**	Illness	39	9.75	99	24.8	138	34.5	0.010*
	Loneliness	22	5.5	68	17	90	22.5	
	Poverty	24	06	43	10.8	67	16.8	
	Loss of spouse /Loved one	11	2.8	56	14	67	16.8	
Spending leisure time	Outside home	63	15.8	41	10.3	104	26	0.000*
	At home	87	21.8	209	52.3	296	74	
Activity in leisure time**	Gossiping	44	11	88	22	132	33	0.065
	Looking after children	38	9.5	103	25.8	141	35.3	
	Radio / TV	66	16.5	120	30	186	46.5	
	Religious activity	41	10.3	94	23.5	135	33.8	

N = 400, \*P Value - statistically significant \*\*Multiple responses

113 (28.3%) elderly were feeling lonely as compared to 287 (71.8%) elderly who had one or the other company. However this difference was not statistically significant. 229 (57.3%) had social contacts as compared to 171 (42.8%) who did not have any social contact and the difference was statistically significant. 78 (19.5%) elderly were having sad attitude towards life as compared to 322 (80.5%) elderly who were happy toward life and the difference was statistically significant. 138 (34.5%) subjects attributed illness to the sad attitude towards life followed by loneliness 90 (22.5%), poverty and loss of spouse/loved ones 67 (16.8%) and this difference was statistically significant. 104 (26%) elderly were spending their leisure time outside the home as compared to 296 (74%) who remained at home during leisure time and the difference was statistically significant. Gossiping 132 (33%), looking after children 141 (35.3%), watching TV or listening to radio 186 (46.5%), and attending religious activity 135 (33.8%) were some of the common activities carried out by the elderly during their leisure time and difference observed was not statistically significant.

## DISCUSSION

### I. Socio-demographic characteristics of study population (Table 1 - 3)

In the present study out of 400 study participants, we noted that the majority of the participants (32.8%) were in the age group of 60-64yrs; only 12.8% were above 80 yrs. Most of the study participants were young old. In a study conducted in Rohtak, 54% were in the age group of 60-65yrs and only 10% were above 75yrs.<sup>10</sup> Another study done in Amritsar, majority (56%) were in the age group of 60-65yrs.<sup>12</sup> Among elderly subjects of Dibrugarh, 41% were in the age group of 60-64yrs, only 15% were above 75yrs.<sup>32</sup> A study conducted in Chandigarh showed a similar trend with 61% elderly in the age group of 61-72yrs.<sup>14</sup> Among elderly people of Budgam in Kashmir, 66.6% were in age group of 65-74yrs.<sup>27</sup> Similar trend was seen in a study among elderly of developing nation (Brazil).<sup>24</sup> A study carried out in developed country (South Korea) showed similar distribution.<sup>6</sup> Whereas, in a study done in Manipur majority of elderly (45%) were above 80yrs.<sup>13</sup>

In our study majority of the participants were females (62.5%). As per NSSO 60<sup>th</sup> round in India, the number of aged females was higher than that of the aged males in the urban area.<sup>16</sup> Female predominance was shown by many studies across India.<sup>2, 27</sup> Similar findings were seen in studies among elderly population of developed nations (Spain, Kuwait).<sup>19, 22</sup> Where as in a study carried out in Assam and Amritsar majority were males contributing to 61.8% and 61% respectively.<sup>32, 12</sup> Adverse sex ratio in these places might have contributed to male predominance.

In the present study majority of the participants were Hindus 93.0%. More than 60% belonged to joint families, followed by nuclear families (24.5%). Whereas, in a North Indian study majority belonged to three generation family 78%, followed

by nuclear family 16% and joint family 5%.<sup>10</sup>In a Kuwaiti study 77.1% subjects belonged to nuclear family.<sup>19</sup>Rapid urbanization and socio-cultural practices might have lead to disintegration of joint families in these settings.

In our study 51% of subjects were married, prevalence of widowhood was higher among females (39.8%) compared to 7.8% of widowed males. The similar data was brought out by National sample survey in India.<sup>16</sup> A study carried out in union territory of Chandigarh, it was observed that 59% of subjects were married, 39.3% were widows/widowers.<sup>29</sup>In a South Korean study 68.4% were in the married group.<sup>6</sup> Similar marital status were seen among elderly of developed country (Spain).<sup>18, 22</sup> In our study 1% were divorced or separated, whereas it was high among Kuwaiti elderly (32%).<sup>19</sup>

In this study 11.8% subjects were living with their spouse, 40.5% were living with their children alone, whereas 17 (4.3%) of subjects were living alone. It was observed that more women were living with children than men. As per NSSO 60<sup>th</sup> round about 57 % of the aged were living with their spouses and another 32 % were living with their children, while about 4 to 5 % were living with other relations and 4% were living alone. Data for Karnataka state showed that majority were living either with their children/spouse or children alone.<sup>16</sup>Among elderly people of union territory of Chandigarh 3.7% were living alone, 49.8% were living with spouse and children.<sup>29</sup>Community dwelling older people in Spain showed similar living arrangement.<sup>18</sup>Whereas 54% of elderly were living alone in Sweden.<sup>8</sup>

Out of 400 elderly, 21.3% were working at present. As per NSSO 52<sup>nd</sup> round, nearly 40 per cent of the elderly in India were working to earn their livelihood.<sup>16</sup> In the present study 55% were from lower socioeconomic strata (Class IV & V). This

reflects the poor socioeconomic status and dependence by aged. As per the national sample survey 40% of elderly were below poverty line which is higher compared to our study.<sup>16</sup> The reason could be that our results are from current prevailing socioeconomic status of urban area as per modified BG Prasad classification. Nevertheless, true economic status is difficult to elicit in India. In a study conducted in Rohtak, majority of elderly (46%) were in lower socioeconomic class.<sup>10</sup>

As per our observations almost 61% were literates. Women had lower education than men. In a study done in union territory of Chandigarh 64.5% were literates.<sup>29</sup> Similar findings were seen among urban population of Assam<sup>32</sup> and older people of Spain.<sup>18</sup>

## **II. Morbidity pattern of study population (Table 4 - 10)**

There is an implicit assumption that disease and deterioration of health are inevitably associated with chronological ageing. However, physical decline in health among old age is not always identical in all those in a particular age group.<sup>14</sup> Some elderly people are sick while others maintain good health status even into advanced age. Hence, it is important to know from the elderly person how they evaluate their health since health comprises subjective and objective components.

In the present study 72.3% reported one or the other illness based on their perception and higher number of females 48.3% reported illness based on their perception. In a study in union territory of Chandigarh, 86.1% reported one or more health-related complaints, with an average of two illnesses. Illnesses were higher among females (59.5%).<sup>29</sup> A study conducted in northern India showed 91% self reported illness which was higher among females.<sup>14</sup> A geriatric cohort in a South Korea reported 78% self reported illness and females reported more illness.<sup>6</sup> Among

older people in Spain, 69% self reported their health as poor, and women's health status was significantly worse than men.<sup>18</sup>

In our study, 95% subjects were having one or more morbidity ( $4.1 \pm 1.72$ ) and 81.8% had more than 3 morbidities. Women had more morbidity than men. Similar results were shown by Chandigarh study; where in a high prevalence of 99 % morbidity ( $6.1 \pm 2.9$ ) was reported.<sup>14</sup> Among elderly of Budgam Kashmir, 88.9% (mean 1.79) had at least one morbidity.<sup>27</sup> Results of few studies among elderly of developed nations were comparable to our findings.<sup>6, 19, 22</sup>

Modernization and Lifestyles might have lead to the increased health problems of elderly in these regions. Higher health problems among females can be explained by the gender related hormonal changes and hard life faced by women who never retire from household work unless totally disabled. The difference in the proportion of self-reported illness and morbidity in various studies could be due to factors such as gender, culture, educational level, availability and utilization of health services in different regions

In the present study 52.3% of subjects were having normal BMI (18.5-22.9), whereas almost half of the subjects were either overweight or underweight. It was also observed that over weight/obesity was higher among females than males. A study done in Chandigarh to study the obesity among elderly showed similar findings.<sup>50</sup>

In our study 17% had a fall in the past 1 year. Among those who had fall, almost one third had fracture as a consequence. Fracture among females was reported more commonly than in males. These results are comparable to a study done in Chandigarh except that the fall frequency was higher (51.5%) in that study.<sup>14</sup> Higher

fall rates and fractures among elderly especially in females could be because of osteoporosis.

If the increase in life expectancy has a downside, it is the exposure of risk to age-related chronic disorders.<sup>32</sup> As expected the study shows that irrespective of gender aging is associated with higher burden of chronic and non-communicable diseases and poorer physical functioning which adversely affect the wellbeing of older people.

Among study subjects most prevalent morbidity was Cataract 196 (49%) followed by Anemia 192 (48%), Hypertension 169 (42.3%), Arthritis 159 (39.8%), Overweight 127 (31.8%), Acid peptic disease 104 (26%), Diabetes mellitus 94 (23.5%) and impaired hearing 90 (22.5%). Almost similar results were shown by Chandigarh study except that anemia and dental problems (53%) were the most common morbidity in that study.<sup>14</sup> Among elderly people of Rohtak, the most common morbidities were arthritis 46%, cataract 45% and anemia 43%.<sup>10</sup> More or less the similar trends of morbidities were shown by many studies across India.<sup>5,12,27,28,29 25</sup> Our results are comparable to morbidity profile of a study done in developed nation (Spain), in which arthritis was the most prevalent morbidity (56.8%).<sup>22</sup> In another study done among elderly of developed region (South Korea) showed similar results.<sup>6</sup> Modernization and lifestyle behaviors can be implicated to higher burden of chronic disease across the world.

Survey carried out by NSSO and some other population-based studies from different parts of the country also reported higher burden of chronic health conditions in elderly population.<sup>11, 16, 30, 31</sup>

In a study conducted among two elderly population groups in Assam, among the urban population hypertension, musculoskeletal diseases, COPD and other respiratory problems, cataract, underweight, gastro-intestinal problems were the commonly observed health problems which were higher than our study.<sup>32</sup>

Elderly women are more vulnerable to anemia and under nutrition, which could be due to their greater socio-economic marginalization. Similarly females are more likely to have musculoskeletal problems than males, which perhaps reflect harder life faced by females who never retire from household work unless totally disabled. These findings are significant in our study.

In comparison, the morbidity profile of the elderly in this study with other studies shows that the variation in non-reporting of illness might increase with age and it also varies greatly with the type of morbidity and prevailing socio-demographic differences.

In the present study increasing trend of morbidity with the age was seen. As the age advances the odds of various diseases and ADL disability also increases. There is significant relationship between age and different geriatric morbidities. Our findings are similar to Assam study.<sup>32</sup>

Females had the higher no of morbidities compared to males (4.2 vs. 3.8) which is comparable to Chandigarh study (6.4 vs. 5.9)<sup>14</sup> and a similar association was seen in Assam study.<sup>32</sup>

Statistically significant association of higher morbidity was seen among widowhoods/divorced which is consistent with Chandigarh study.<sup>14</sup>

In our study Socioeconomic class I, II and IV had higher number of morbidity. Morbidity was high among elderly living alone or living with other relations

compared to those who were living with their spouse and/or children. Elderly with normal weight were having less morbidity compared to variations in both the extremes of Body Mass Index. A similar association was seen in Assam study.<sup>32</sup> A study done among elderly cohort of a developed country (South Korea), morbidity was significantly associated with female sex, unemployment and lower income. Similar results are seen in our study except for the income.<sup>6</sup>

### **III. Disability pattern of study subjects (Table 11 - 15)**

In the present study prevalence of disability was 47.3%. The present findings show that functional dependence of geriatric individuals becomes a serious concern as the age advances.

As per WHO, 20% of people aged 70 years or older, and 50% of people aged 85 and older report difficulty with physical activities of daily living (PADL). The prevalence of various disabilities gradually increases with advancing age, starts to accelerate after the age of 70 years.<sup>51</sup> As per NSSO 58<sup>th</sup> round, more than one-fourth of the Indian aged population was disabled and age-specific disability rates and the severity of disablement increase with age within the old age bracket ranging from 36% for young old to 61% for oldest old. However, 49% of the elderly have suffered from at least one kind of disability in urban area.<sup>17</sup> Our results are contributory to this national survey.

Increase of ADL disability with age was also shown in a study conducted in Kashmir, Zimbabwe and Brazil.<sup>27, 20, 24</sup> Among Spanish elderly 55.9% had functional limitation.<sup>18</sup> In the city of Madrid 36.8% of elderly were functionally dependent.<sup>22</sup> 36% were dependent in ADL among Kuwaiti elderly.<sup>19</sup> Among Singaporean elderly

disability prevalence was 62.8%, females had a higher values 77% and disability increased significantly after 79yrs.<sup>25</sup>

In the present study 21.3% subjects were having mild disability which is similar to Chandigarh study (22%) but 65.5% of subjects were moderate to severely disabled in the Chandigarh study with a overall prevalence of 87.5% which is higher than our study (47.3%).<sup>14</sup> A study done among elderly in Manipur showed 12.2% disability in ADL which is less than the present study. The reason could be that Manipur study used 6 item basic personal tasks for assessing ADL disability, whereas we used a 10 item scoring task. The higher number of items used surely increases the percentage of people with disability in one or more ADLs.<sup>22</sup>

Among non-institutionalized older people in Spain, 39% had level 1, 41% had level 2 and 20% had level 3 disability in functional status as per Barthel index.<sup>22</sup> Where as among Singaporean elderly 17% had difficulty in at least one ADL.<sup>21</sup> Among Swedish elderly 35% were moderately disabled, 36% had severe disability whereas only 29% were normal. However this study was done among oldest old (80yrs and above).<sup>8</sup>

More over difference in the prevalence of disability among these studies may be due to difference in method of assessing disability and also disability varies from region to region and influenced by differences in socio-demographic and cultural factors.

In our study, 31.3% elderly females were disabled whereas 16.0% elderly males were disabled. Disability was not significantly associated with gender. Similar association was seen in Manipur study<sup>13</sup> and Kuwaiti study.<sup>19</sup> In studies among older

people of a developing country and some developed countries reported higher disability among females.<sup>24, 18, 21</sup>

In the present study, disability was found to be significantly associated with morbid conditions like hypertension, anemia, diabetes mellitus, arthritis, cataract, chronic obstructive pulmonary disease, deafness, valvular heart disease, and stroke. These associations are highly supported by Chandigarh study.<sup>14</sup> In a study done to know the effects of specific medical conditions on the functional limitations of elders in the Framingham Study identified 10 prevalent medical conditions which are comparable to our study.<sup>15</sup> In a logistic regression analysis to know the chronic condition affecting functional status among elderly of Madrid city, disability was strongly associated with cerebrovascular diseases, diabetes mellitus, osteoarthritis, visual impairment and high blood pressure which are consistent to our results.<sup>22</sup>

A study done to know the disability and handicap among Singapore elderly, disability was associated with disorders of the eye, musculoskeletal disorders, circulatory diseases, respiratory diseases, disorders of the ear, diabetes, stroke, cancer, and other systems which are comparable to our study.<sup>25</sup>

Results show that, elderly with poor perceived health status and having one or more chronic diseases have significantly higher odds of being disabled in ADL which was similar to results of Manipur study.<sup>13</sup> Strong association of self reported ill health with functional limitation was also found among non institutionalized older people of Spain.<sup>22</sup> The prevalence of disability was significantly associated with living arrangements and occupation. Similar results are shown by Manipur study.<sup>13</sup> In our study disability was higher among illiterates, which was comparable to that of Manipur study but lacked statistical significance in our study.

In our study disability was not associated with education and income, whereas a study conducted among elderly Brazilians disability was associated with low educational status and income among females.<sup>24</sup>

In the present study disability was high among widowhood and divorced. These results are similar to a Kuwaiti study which has a high divorce rate.<sup>19</sup> BMI less 18.5 and more than 23 was also found to be a significant predictor of disability among geriatric individuals. Our results are contributory to results of Assam study.<sup>32</sup> Significant association of nutritional status was also seen among Kuwaiti elderly.<sup>19</sup>

#### **IV. Psychosocial profile of study population (Table 16 - 17)**

In our study only 31.5% were getting pension as a social security. Among these pensioners, 57.9 % elderly were getting old age pension. Poor social security for elderly was supportive to national sample survey data where in up to 90% were not covered by any pension scheme.<sup>16</sup>

60.5% subjects were economically dependent on their families and the situation is worse for the female, which was consistent with NSSO 60<sup>th</sup> round in India which showed 65% economic dependence.<sup>16</sup> Similar observations are seen among studies across India.<sup>33,34</sup>

In our study almost two thirds had family support. A study done in Kashmir valley majority had family support (86%).<sup>31</sup> Among elderly population of Udupi taluk, Karnataka, it was seen that around 48% felt that they were not happy in life, felt they were burden to family and attributed it to poverty and illness, this attitude was more among females.<sup>34</sup> These findings are comparable to our study. In our study around one third of elderly were not consulted by family members in decision making and

more than half of the subjects had social contact outside home. Similar results are seen in Udupi study.<sup>34</sup>

In the present study, 28.3% were feeling lonely and females had higher score. In a study done among urban elderly of Udaipur, 23.3% were feeling lonely, 17.3% felt they were neglected/ignored.<sup>5</sup> Among elderly of union territory of Chandigarh, It was observed that females had significantly higher mean score on loneliness than males ( $P < 0.05$ ) and this was also higher among the 75+ years age group than among the 65+ years age group.<sup>29</sup> These results are comparable to our study.

In another study done among elderly of Meerut, 32.2% of elderly were lonely and 24.8% did not have social contact. 55.1% had a sad attitude towards life and attributed sadness to loss of spouse (49.2%), illness (44.1%), loneliness (36.9%) and poverty (32.8%). 33.9% of elderly were ignored by their family. Most of the subjects (69.5%) were having no leisure time activity outside home.<sup>33</sup> Our results were comparable with this study except that higher number of subjects did not had social contact (43%) and attributed sadness most commonly to illness (34.5%) and loneliness (22.5%).

## **CONCLUSION**

This cross sectional study revealed that prevalence of morbidity among elderly was high (95%). There was a significant association between self reported illness and diagnosed morbidity. Common morbidities among the elderly were Cataract, Dental problems, Anemia, Hypertension, Arthritis, Overweight, Acid peptic disease, Diabetes mellitus, impaired hearing, COPD, Stroke. Most of them are lifestyle related diseases. Morbidity was higher among females and non-working group, and was significantly associated with increasing age, marital status and living arrangements. Anemia, musculoskeletal, respiratory and gastro intestinal illness were significantly high in females.

Almost half of the subjects were disabled (47.3%). Elderly with poor perceived health status and having one or more chronic diseases have significantly higher odds of being disabled. Chronic medical problems which were associated with disability were hypertension, anemia, diabetes mellitus, arthritis, cataract, chronic obstructive pulmonary disease, deafness, valvular heart disease and overweight. Significant association of disability was seen with non working group, living arrangements, and body mass index of less than 18.5 and more than 23.

Two thirds of elderly were non pensioners and majority of the subjects (60%) were economically dependent. Most of elderly were well taken care by the family members during illness and dependent on family for carrying out ADL. Although most elderly had social contacts, more than half were not happy towards life and attributed unhappiness to illness, loneliness and poverty.

## **SUMMARY**

The present study was a cross sectional community based study undertaken to know the prevalence of morbidity and relation of morbidity with disability and psychosocial problems among elderly individuals.

The duration of the study was for one year from 1<sup>st</sup> January 2008 to 31<sup>st</sup> December 2008. 400 persons aged 60 years and above who were residents of Khasbag, an urban field practice area of Department of Community Medicine, J. N. Medical College, Belgaum were included in the study by random sampling.

Majority of participants (32.8%) were in the age group of 60-64yrs and were females (62.5%). More than 90% were Hindus and nearly two thirds (62%) of the participants belonged to joint families followed by nuclear families (24.5%). Half of the subjects (51.0%) were married. Nearly 40% elderly lived with their spouse and children. More than half (55%) of the elderly belonged to lower socioeconomic class. More than one third 38.3% were Illiterate which was higher among females.

Prevalence of morbidity among elderly was 95% ( $4.1 \pm 1.72$ ) and self reported illness was 72.3%. There was a significant association between self reported illness and diagnosed morbidity. Nearly one third 31.85% of subjects were Overweight/Obese (BMI  $\geq 23$ ). Females had a higher fall rate and fractures. The common morbidities were Cataract (49%), Anemia (48%), Hypertension (42.3%), Arthritis (39.8%), Overweight (31.8%), Acid peptic disease (26%), Diabetes mellitus (23.5%), impaired hearing (22.5%), Chronic obstructive airway disease (15.5%) and Valvular heart disease (11.3%). Stroke was prevalent in (4.8%) of subjects. Most of them are modifiable lifestyle related diseases. Eye problems 325 (81.3%),

Musculoskeletal morbidity 228 (57.0%), Cardiovascular problems 206 (51.5%) and Dental problems 196 (49%) were the most common morbidities as per system.

Morbidity was significantly associated with increasing age, females, widowhood, non working group, elderly living with other relations and body mass index of < 18.5 and ≥ 23. Socio-economic status was not found to be associated with disability. Anemia, musculoskeletal problems, respiratory, gastro intestinal and nervous system problems were significantly higher among females.

The prevalence of disability was 47.3%. 21.3% subjects were having mild disability and 26% had moderate to severe disability. Elderly with poor perceived health status and having one or more chronic diseases have significantly higher odds of being disabled.

Chronic medical problems associated with disability were hypertension, anemia, diabetes mellitus, arthritis, cataract, chronic obstructive pulmonary disease, deafness, valvular heart disease, and overweight. Visual, cardiovascular, musculoskeletal and respiratory problems are most commonly related with disability. Disability was also associated with living arrangements, occupation and body mass index. Gender, marital status, education and Socio-economic status was not associated with disability.

More than two thirds (68.5%) of elderly were non pensioners and economically dependent on the family. Among these pensioners, 57.9% elderly were getting old age pension, 23.8% female subjects were getting widow pension, and 18.3% of elderly were getting pension from the organized sectors. Nearly 80% disabled elderly were dependent on either spouse or other family members for carrying out basic activities of daily living. Most of the elderly 75% were well taken

care by the children. Although most elderly had social contacts, majority (52.5%) of elderly were not happy towards life and attributed unhappiness to illness, loneliness and poverty. More than one third of the elderly were spending their leisure time in watching TV, listening to radio, taking care of children and attending religious activities. All these differences were statistically significant.

## **LIMITATIONS**

- This study did not incorporate measures of environmental characteristics which can directly or indirectly affect both functional status and psychosocial well-being.<sup>32</sup>
- Psychosocial problems have been more subjective. Perhaps the objective assessment by the use of scoring system would have given a more realistic picture.

## **RECOMMENDATIONS**

- This study identifies need for nationwide efforts to develop various intervention programs for decreasing age associated morbidity, co morbidity and disability.
- Nutrition supplementation for elderly especially for women should be given special emphasis. National programme for early diagnosis, prevention and treatment of osteoporosis among elderly (especially among females) should be launched.
- Periodic health checkups, regular screening and health awareness programmes should be organized in the community to detect the elderly suffering from various morbidities.
- Since majority of elderly were non pensioners, steps to ensure pension especially among lower economic segment needs be emphasized by the government.
- Longitudinal research on the role of living arrangements and support from children on older people's health should be carried out.
- Programmes for Primordial prevention to be launched both by government and non governmental agencies to prevent onset of chronic disabling diseases and to improve the quality of life of elderly.
- Welfare programmes need to be planned and implemented for the elderly woman specifically to address their needs. Strategies should also be developed to create general awareness on the specific problems of the elderly especially the women.

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**ANNEXURE-I: INFORMED CONSENT FORM**

**“MORBIDITY PROFILE AND ITS RELATIONSHIP WITH DISABILITY AND PSYCHOSOCIAL PROBLEMS AMONG ELDERLY”- A COMMUNITY BASED CROSS SECTIONAL STUDY**

**Principal Investigator: DR. Praveen Kumar B.A**

**Guide: Dr. (Mrs) Vijaya A. Naik. MD, DPH**

**VOLUNTARY PARTICIPATION / WITHDRAWAL**

You are being invited to participate in this study to find out the prevalence of morbidity and its relationship with disability and psychosocial problems among the elderly people of Khasbag, Belgaum. Participation in this study is completely voluntary.

In this study you will have to answer a few prepared questions about your general health and sociodemographic details. The questions are about medical complaints you may have such as visual problems, joint pain, cough, cold, fever etc. and are also about routine activities of your daily living and certain psychosocial aspects of health. You will also undergo a brief physical examination. The entire procedure may take about 45 minutes.

**RISKS AND BENEFITS**

If you agree to participate you will be asked the questions, but you are free to leave at any time.

The investigator does not promise or guarantee that you will receive any direct benefit by being in the study. The study is intended to the whole community because it will enable us to know the prevailing geriatric health problems and medical

conditions causing disability. This study hopes to help in the future for the development of the geriatric health services.

The tools employed for conducting the tests are safe and as such are not likely to cause any harm to the persons.

### **CONFIDENTIALITY**

Your identity will not be revealed. All information collected will be coded so that no one will know your identity.

Participation in this study is voluntary. If you do not wish to participate in this study, you will not lose benefits to which you are entitled. You are free to withdraw your consent and to discontinue participation in this study at any time.

Any significant new findings discovered during the course of this study, which may influence your decision to participate in the study, will be made known to you.

### **COSTS**

The cost of the study will be borne by the researcher. There will be no additional cost to you for participating in this study.

### **COMPENSATION**

There will be no payment to you for participating in this study.

If, as a result of your participation, if you experience injury from known or unknown risk of the research procedures as described, immediate care and treatment, including hospitalization if necessary, will be available. However there will be no monetary compensation in the event of injury resulting from the research and in the event of such injury, treatment is provided.

If you have any questions about this study, questions about a research related injury, or experience any problems during the study, you can contact Dr. PRAVEEN KUMAR B.A at 9964318732 or DR (Mrs.). VIJAYA A NAIK at 0831-24091548 and, if you have any questions about your rights as a study participant, you may contact Dr V.D. PATIL, Chairman, JNMC Institutional ethics committee on human subjects research at 0831 2741701.

By signing this consent form, you are not waiving any of your legal rights. You are making a voluntary decision whether or not to participate in this study. Your signature below indicates that you have decided to participate, that you have read (or been read) the information provided above, that you were given the opportunity to ask questions and that they have been answered to your satisfaction, and that you have received a copy of this signed consent form.

**CONSENT OF THE SUBJECT TO PARTICIPATE IN THE STUDY**

I voluntarily agree to take part in this study by signing below. I may withdraw at any time. I am not giving up any of my legal rights by signing this form. My signature below indicates that I have read, or it has been read to me this entire consent form, and have had all my questions answered.

_____	_____	_____
Signature of the participant	Date	Place
_____	_____	_____
Signature of Investigator	Date	Place
_____	_____	_____
Signature of Witness	Date	Place

**ANNEXURE-II: PROFORMA**

**“MORBIDITY PROFILE AND ITS RELATIONSHIP WITH DISABILITY AND PSYCHOSOCIAL PROBLEMS AMONG ELDERLY”- A COMMUNITY BASED CROSS SECTIONAL STUDY.**

**PART – 1: GENERAL INFORMATION**

1. Name : \_\_\_\_\_
2. Age : \_\_\_\_\_ Yrs
3. Sex : M/F
4. Religion : \_\_\_\_\_ 5. Address: \_\_\_\_\_

**A. FAMILY COMPOSITION**

6. Type of family: Nuclear / Joint / Three generation / Broken
7. No. of members in the family: \_\_\_\_\_
8. Martial status: Unmarried / Married / Widow / Widower / Separated / divorced

**B. SOCIO-ECONOMIC STATUS**

9. Income
- Total income of the family in Rs/month \_\_\_\_\_
- Per capita income in Rs/month \_\_\_\_\_
10. Occupation
- a) Presently working: yes / No
- If yes type of work and income in Rs per month \_\_\_\_\_
- b) Previously working: yes / No
- If yes type of work and income in Rs per month \_\_\_\_\_
- c) Pensioner (Old age pension/Widow pension/Organized sector) Or Non-pensioner
11. Education: Illiterate / Primary / Secondary / Higher Secondary / PUC / Degree

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**C. LIVING ARRANGEMENTS**

12. Living with: Spouse / Spouse and children / Children alone / other

Relatives/Alone

**PART – 2: PHYSICAL EXAMINATION**

**D. SICKNESS AT THE TIME OF SURVEY (SELF REPORTED)**

SN	Complaint or disease	Duration	Source of health facility	Type of treatment
1				
2				
3				

**E. PERSONAL HISTORY:**

13. Diet: Mixed / Vegetarian

14. Appetite: Normal / Reduced

15. Sleep: Normal / disturbed

16. Habits / addiction

i. Alcohol consumption                      Yes / No    If yes, Duration \_\_\_\_\_

ii. Smoking                                      Yes / No    If yes, Duration \_\_\_\_\_

iii. Tobacco chewing                      Yes / No    If yes, Duration \_\_\_\_\_

iv. Any other (Specify)

**F. FAMILY HISTORY:**

**G. PAST HISTORY:**

17. Did you fall in the past 1 year? If yes, place of fall and its consequences?

**H. GENERAL PHYSICAL EXAMINATION**

18. Built \_\_\_\_\_

19. Nutrition \_\_\_\_\_

- 20. Nails / Conjunctiva \_\_\_\_\_
- 21. Pallor \_\_\_\_\_
- 22. Cyanosis \_\_\_\_\_
- 23. Clubbing \_\_\_\_\_
- 24. Lymphadenopathy \_\_\_\_\_
- 25. Oedema \_\_\_\_\_
- 26. Skin \_\_\_\_\_
- 27. Hairs \_\_\_\_\_
- 28. Spine \_\_\_\_\_
- 29. Joints \_\_\_\_\_
- 30. Jugular venous pulse; peripheral pulsations \_\_\_\_\_
- 31. Temperature \_\_\_\_\_
- 32. Weight \_\_\_\_\_ Kgs
- 33. Pulse rate \_\_\_\_\_/min
- 34. Respiratory rate \_\_\_\_\_/min
- 35. Blood pressure \_\_\_\_\_ mmHg
- 36. Ear R \_\_\_\_\_ L \_\_\_\_\_
- 37. Oral cavity \_\_\_\_\_
- 38. Eye R \_\_\_\_\_ L \_\_\_\_\_

**I. SYSTEMIC EXAMINATION**

- 39. Gastro intestinal system
- 40. Respiratory system
- 41. Cardio-vascular system
- 42. Musculo-skeletal system
- 43. Genito-urinary system
- 44. Central nervous system

**J. INVESTIGATIONS**

- 45. Hb% (Sahli's hemoglobinometer method) \_\_\_\_\_ gm%
- 46. Urine examination: Sugar \_\_\_\_\_  
Albumin \_\_\_\_\_

**K. DIAGNOSIS**

**PART – 3: PSYCHOSOCIAL FACTORS**

1. Are you a pensioner? Yes / No
  - a) If yes, is your pension sufficient for you? Yes / No
  - b) If No, how are you managing? \_\_\_\_\_
  - c) If not pensioner, do you get money from your people for your personal use?  
Yes / No
2. How are you treated by your family members during illness?  
Very well / well / Indifferent / Bad / Very bad
3. If you are staying alone during illness, who takes care of you?
4. If you are physically disabled, how do you carry out your daily activities?  
With the help of: Spouse / Children / Grand Children / Other members of family or relatives / Neighbours / None
5. When you feel unhappy or when you are in difficulty with whom do you talk about them? Family members / Relatives and friends / Both / None
6. Do your family members consult you while taking important decisions at home?  
Always / Often / Sometimes / Never / Living alone
7. Is your advice honored or ignored by your family? \_\_\_\_\_
8. Do you have any company?  
Available / Lonely
9. Do you have social contacts?  
Out side home / No contacts
10. Are you happy at this age?  
Most of time / Sometimes / Not at all
11. If not happy, what are the reasons for sad attitude?  
Poverty / Illness / Loneliness / Loss of spouse or loved ones
12. How do you spend your leisure time?  
Out side home / At home
13. What do you do in your leisure time?  
Gossiping / Looking after children / Listening to radio and watching TV /  
Attending religious activity / Any other(Specify) \_\_\_\_\_

**PART 4: THE BARTHEL INDEX**

Patient name	Rater name	Date
<b>Activity</b>		<b>Score</b>
<b>Feeding</b>		_____
0=unable 5=needs cutting, spreading butter, etc., or requires modified diet 10 = Independent		
<b>Bathing</b>		_____
0=dependent 5=independent (or in shower)		
<b>Grooming</b>		_____
0=needs help with personal care 5=independent face/hair/teeth/shaving (implements provided)		
<b>Dressing</b>		_____
0=dependent 5=needs help but can do about half unaided 10=independent (including buttons, zips, laces, etc)		
<b>Bowels</b>		_____
0=incontinent (or needs to be given enemas) 5=occasional accident 10=continent		
<b>Bladder</b>		_____
0=incontinent, or catheterized and unable to manage alone 5=occasional accident 10=continent		
<b>Toilet use</b>		_____
0=dependent 5=needs some help, but can do something alone 10=independent (on and off, dressing, wiping)		
<b>Transfer (bed to chair and back)</b>		_____
0=unable, no sitting balance 5=major help (one or two people, physical), can sit 10=minor help (verbal or physical) 15=independent		
<b>Mobility (on level surfaces)</b>		_____
0=immobile 5=wheelchair independent, including corners, >50 yards 10=walks with help of one person (verbal or physical) >50 yards 15=independent (but may use any aid, eg., stick) > 50 yards		
<b>Stairs</b>		_____
0=unable 5=needs help (verbal, physical carrying aid) 10=independent		
<b>Grading:</b> Level 1 (Score 100), level 2 (Score 91-99) level 3 (Score 0-90)		<b>Total (0-100)</b>

## **KEY TO MASTER CHART**

**1. Serial Number**

**2. Age:** 60-64 = 1, 65-69= 2, 70-74=3, 75-79=4, 80 & above=5

**3. Sex:** Male = 1, Female = 2

**4. Religion:** Hindu=1, Muslim=2

**5. Family type:** Nuclear= 1, Joint=2, Three generation=3, Broken =4

**6. Marital status:** Unmarried=1, Married=2, Widow=3, Widower=4,  
Separated/Divorced=5

**7. Socioeconomic status (SES):** Class I=1, Class II=2, Class III=3, Class IV=4, Class  
V=5

**8. Present working:** Yes=1, No=2

**8.1. Type of work:** Weaving=1, Others =2

**9. Past working:** Yes=1, No=2

**9.1 Type of work:** Weaving=1, Others =2

**10. Social security:** Pensioner=1, Non Pensioner=2

**11. Pensioner:** Old age =1, Widow =2, Organized =3

**12. Education:** Illiterate=1, Primary=2, Secondary =3, Higher secondary=4  
PUC=5, Degree=6

**13. Living arrangements:** Spouse =1, Spouse & children=2, Children alone=3,  
Other relatives=4, Alone =5

**14. Self reported illness:** No illness=0, One or the other illness=1

**15. Source of health facility:** Private=1, Government=2, Both =3, None =4

**16. Type of treatment:** Allopathy=1, Ayurveda =2, Homeopathy =3, Home  
remedy=4, Allopathy + Ayurveda =5, Allopathy + Home remedy=7, All =6

**17. Diet:** Mixed =1, Vegetarian =2

- 18. Appetite:** Normal =1, Reduced =2
- 19. Sleep:** Normal =1, Disturbed =2
- 20. Alcohol consumption:** Yes =1, No =2
- 21. Duration in years**
- 22. Smoking:** Yes =1, No =2
- 23. Duration in years**
- 24. Tobacco consumption:** Yes=1, No =2
- 25. Duration in years**
- 26. Family history:** Hypertension=1, Diabetes mellitus=2, Both =3, other diseases=4
- 27. Past history:** Hypertension=1, Diabetes mellitus=2, Both =3, other diseases=4,  
H/o Surgery=5
- 28. Fall in past one year:** Yes =1, No =2
- 29. Place of fall:** Home = 1, Outside home=2, Not applicable (NA) =0
- 30. Fall consequence:** Fracture =1, Others =2
- 31. BMI:** <18.5 = 1, 18.5 – 22.9=2, 23-27.5=3, >27.5=4
- 32. Hb%:** Hb% < 13gm% (men) or <12gm% (women) = Anemic= 1  
Hb% >13gm% (men) or >12gm% (women) = Not Anemic= 2
- 33. Urine sugar:** Nil = 1, 0.5%=2, 1%=3, 1.5%=4
- 34. Number of morbidities:** No morbidity = 0, 1 morbidity= 1, 2 morbidities=2, 3 morbidities=3, 4 morbidities=4, 5 morbidities=5, 6 or more morbidities=6
- 35. Eye problems:** Cataract = 1, Refractive error (RE) =2, Pseudophakia=3,  
Pterigium=4, Conjunctivitis=5, Cataract + RE = 6, Corneal opacity=7,  
Cataract + RE + Corneal opacity=8, Squint/strabismus=9
- 35.1 Ear Problems:** Impaired hearing = 1, No hearing impairment=0
- 
-

**35.2 Dental Problems:** Carries = 1, Partial loss of denture=2, Complete loss of dentures=3, Artificial dentures= 4, Carries + partial loss of dentures=5, Others (Gingivitis, Fluorosis) =6

**35.3 Skin problems:** Allergy =1, Vitiligo = 2, Pyoderma =3, Lichen simplex chronicus=4, Tinea = 5, Herpes infection =6, Hirsutism =7

**35.4 Respiratory system:** Chronic obstructive pulmonary disease (COPD) =1  
Lower respiratory tract infection (LRTI) =2, Upper respiratory tract infection (URTI) =3, COPD+URTI=4

**35.5 Cardiovascular system:** Hypertension (HTN) =1, Diabetes mellitus (DM) =2, HTN+DM=3, Coronary heart disease (CHD) =4, Valvular heart disease (VHD) =5, HTN+VHD=6, Hemorrhoids=7, HTN+DM+ Hemorrhoids=8

**35.6 Musculoskeletal system:** Arthritis =1, Spondylitis=2, Fracture = 3, Arthritis+fracture=4, Khyposis=5, All =6, Arthritis+khyposis=7

**35.7 Gastrointestinal system:** Acid peptic disease (APD) =1, Gastroenteritis (GE) =2, Irritable bowel syndrome (IBS) =3, APD+IBS=4, Constipation =5, APD+Constipation=6, Liver disease=7

**35.8 Genitourinary system:** Renal stones=1, Urinary tract infection (UTI) =2  
Benign prostatic hyperplasia (BPH) =3, Uterovaginal (UV) Prolapse=4  
Urinary incontinence+UTI=5, UV Prolapse+Urinary incontinence+UTI=6

**35.9 Central nervous system:** Hemipareis=1, Parkinsonism=2, Dementia, Peripheral neuritis=4, Epilepsy =5, Migraine =6

**35.9.1 Other systems:** B-Complex deficiency=1, Fissure foot=2, Depression=3, Leukoplakia=4, B-Complex deficiency+ Leukoplakia=5, Multiple lipoma+sabacious cyst=6, B-Complex deficiency+ Fissure foot=7,

Schizophrenia+depression+psychosis=8, Inguinal hernia=9, Cancer=10, Alopecia=11,

Connective tissue disorder=12, Neurofibromatosis=13

**36. Sufficiency of pension:** Yes =1, No =2, NA=0

**37. Managing money:** Get money from your people=1, Self working=2

**38. Treated by family members during illness:** Well =1, Indifferent =2, Bad =3

**39. Care taker during illness:** Spouse =1, Other family members=2, None =3

**40. If physically disabled how do you carryout ADL:** Spouse =1, Other family members=2, Self managing=3, NA=0

**41. Expressing of feelings when unhappy:** Spouse =1, Children =2, Friends =3, All/any one=4, None =5

**42. Consultation by family members during decision taking:** Always=1, Sometimes=2, Never =3, NA=0

**43. Advice honored by family members:** Yes =1, No =2, NA=0

**44. Company:** Available = 1, Lonely =2

**45. Social contacts:** Outside home=1, No contacts=2

**46. Happy at this age:** Most of the time=1, Some time=2, Not at all=3

**47. Reasons for sad attitude:** Poverty =1, Illness =2, Loneliness =3, Loss of spouse/loved ones= 4, All =5, Illness+Loneliness=6, Poverty+Illness=7, Loss of spouse/loved ones+ Illness+Loneliness=8

**48. Spending leisure time activity:** Outside home=1, At home=2

**49. Activity in leisure time:** Gossiping=1, Looking after children=2, Listening to radio & TV=3, Attending religious activity=4, Looking after children+Listening to radio & TV=5, others=6, Others+ Looking after children+Listening to radio & TV=7, All of the above=8, Gossiping +Attending religious activity=9

**50. The Barthel index:** Level 1=1, Level 2=2, Level 3=3





52	1	1	2	1	2	2	2	0	1	1	2	0	3	1	0	1	5	1	1	1	2	0	2	0	2	0	1	0	2	0	0	4	2	4	4	2	0	0	0	0	3	0	2	0	0	0	0	1	1	1	0	2	1	1	1	1	1	0	2	4	1		
53	3	1	1	2	2	3	2	0	1	1	2	0	6	2	0	1	1	1	1	1	2	0	2	0	2	0	1	3	2	0	0	3	2	2	6	1	1	2	0	0	3	1	0	3	0	6	0	1	1	1	3	1	1	1	1	1	0	2	8	2			
54	2	2	1	2	2	2	2	0	1	1	2	0	3	2	1	3	6	1	1	2	2	0	2	0	2	0	3	1	1	1	2	4	1	1	6	1	0	4	0	0	1	1	0	2	4	0	0	1	1	2	2	1	1	1	1	2	2	2	3	3			
55	2	1	1	1	2	4	1	1	1	1	2	0	4	1	1	3	1	1	1	2	1	30	1	40	2	0	0	0	2	0	0	2	2	1	6	1	0	3	0	1	1	7	0	3	6	0	0	2	1	1	3	1	1	1	1	1	3	2	1	6	3		
56	1	2	1	2	2	2	2	0	2	0	2	0	3	3	1	1	6	1	1	2	2	0	2	0	2	0	4	1	2	0	0	4	1	2	6	2	0	1	3	0	4	1	1	0	0	0	0	1	1	2	0	2	1	0	2	8	1						
57	2	2	1	1	2	4	2	0	1	1	1	1	1	1	1	1	5	1	1	1	2	0	2	0	2	0	0	0	2	0	0	1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	2	2	1	1	0	5	1	1	1	2	1	0	2	3	1		
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