BURDEN OF SELF REPORTED MORBIDITY AND ITS CORRELATES AMONG PEOPLE ABOVE THE AGE OF FORTY FIVE YEARS : A COMMUNITY BASES SURVEY IN RURAL KERALA

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May 2001.

DECLARATION

I hereby Certify that the work embodied in this dissertation entitled "Burden of Self Reported Morbidity and its Correlates among People above the age of Forty Five Years –A Community based Survey in Rural Kerala" is the result of original research and has not been submitted for any degree in any other University or Institution.

Deepa Mathew

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May 2001

Certificate

Certified that the dissertation entitled **"Burden of Self Reported Morbidity and its Correlates among People above the Age of Forty Five Years –A Community based Survey in Rural Kerala"** is a record of bonafide original research work undertaken by Ms. Deepa Mathew, in partial fulfillment of the requirement for the award of the MPH degree, under our guidance and supervision.

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ABBREVEATIONS

NSSO	National Sample Survey Organization
WHO	World Health Organization
NNMB	National Nutrition Monitoring Bureau
NCAER	National Council of Advanced Economic Research
UNDP	United Nations Development Programme
ICMR	Indian Council of Medical Research
KSSP	Kerala Sastra Sahitya Parishad
SPSS	Statistical Package for Social Science
BMI	Body Mass Index
SES	Socio Economic Status
UTI	Urinary Tract Infection
LPG	Liquefied Petroleum Gas

ABSTRACT

Background of the study: The epidemiological and demographic transition that Kerala has undergone has resulted in a population distribution that is rapidly aging. This brings in the question the need to consider the health of this group and this is an area that is under researched. The morbidity levels of people beyond the reproductive ages are of particular concern, especially those above forty-five and they form the focus of this study. The study was to look into the prevalence of acute and chronic morbidity separately, the overall nutritional status of this age group, the health seeking behavior of the group and the health and social consequences of illness.

Methodology: A cross sectional study-using cluster sampling technique, taking 'six clusters of ten' from each of the ten wards of the study village in Idukki district of Kerala was conducted. The sample comprised of 630 individuals, 358 females and 272 males. A house-to-house survey was conducted using a structured questionnaire, and collected quantitative as well as qualitative data. Data was collected on the various factors that affect the health status of the subject. Point prevalence was assessed for acute morbidity and a reference period of one year was used for chronic illnesses.

Results: Over 93% of the sample population was suffering from some sort of morbidity. Of these, prevalence of acute morbidity was 26.5%, that of chronic (currently experiencing symptoms) was 39.7% and of chronic (no symptoms on the day of survey) was 27.3%. Only 7% did not suffer from any illness. The overall prevalence of chronic morbidity was 66.8%. Of the factors related to morbidity, we could find a statistically significant association between SES and acute morbidity ($\chi^2 p < 0.001$) and SES and chronic morbidity ($\chi^2 p=0.004$). Type of cooking fuel had a significant association with acute morbidity ($\chi^2 p=0.013$). Coming to lifestyle practices, smoking was significantly associated with chronic morbidity ($\chi^2 p=0.004$). Menopause was found to be significantly associated with chronic morbidity ($\chi^2 p =0.010$). Majority (56%) of the subjects felt that their ill health was a natural consequence of ageing. The Body Mass Index (BMI) was used as an indicator of nutritional status and it was associated with age ($\chi^2 p= 0.029$), sex ($\chi^2 p < 0.001$), occupational status ($\chi^2 p < 0.001$), SES ($\chi^2 p < 0.001$) and menopause ($\chi^2 p = 0.007$). A vast majority (93.3%) sought medical advice from a qualified health care professional. Only 2% of the subject took preventive advice and among these, the proportion of females was less than half of that of males. However, of the women who were suffering from gynaecological morbidity, only less than 20% took medical treatment. Modern medicine was the system of choice for the majority (83.2%). More than 62% of the people felt that their present ill health has curtailed their original level of functional capacity and thus affected their capacity to earn for a living and over 76% felt that it affected their participation in social life.

Discussion: That the high level of morbidity in the target population is adversely affecting their functional capacity and thus their productivity is the most important finding. As a result the quality of life of these people has come down markedly. The void that is present in our health programmes becomes more evident here as we hardly find anyone seeking or receiving any sort of preventive care or advice for their health needs. A narrow approach just to address their immediate curative health care needs will not suffice here, but we need to think in terms of a wholesome package of social, economic and rehabilitative services for this section of the society whose proportion in the community can only go up in the coming years. We may also need special programmes to address the gynaecological problems of the subjects as we have long nurtured the belief that the women past their reproductive age do not need such programmes. The need of the hour may be a more detailed study to ascertain in clinical terms, the actual level of morbidity in the community as we are talking only about the reported level of morbidity in our study.

Chapter I
INTRODUCTION

1.1 Background Information

The aging of the world's population will profoundly influence the health trends over the next 25 years. In the industrialized countries of the world, the population aged 15-44years is predicted to decline, and the populations aged 45-64years and 65years and older to increase by about 26% and 71%respectively. In contrast, in the developing world, the growth rate in the adult population will be dramatic. By 2020 the number of adults aged 45-59 years will increase by 140 %[1].

1.2 Review of Literature

1.2.1 Epidemiological transition in developing countries: The health patterns in the developing world during the next three decades will also be profoundly influenced by the decline in fertility and mortality as the countries pass through the demographic transition, with increasing life expectancy and increasing proportion of older people in the population. This demographic transition sets the stage for epidemiological change.

There is a transformation in the age structure of mortality associated with the demographic transition. As life expectancy increase and fertility decline, the percentage of people in the older age groups will naturally be higher and so, there will definitely be a change in the age structure of mortality. This leads to a transition in the cause structure that has been termed the **'epidemiological transition'** by Omran in (1971)[2]. Omran identifies three phases in this transition: the age of pestilence and famine, the age of receding epidemics and the age of degenerative and man -made diseases.

The following data clearly illustrates the epidemiological transition that is underway in many parts of the world. In the developing countries, diseases of the Cardiovascular and Cerebrovascular systems form the leading cause of death at ages 45 and over, increasing to an estimated 48% of deaths at ages 45-64 and 62% at ages 65 and over. Gynecological neoplasm's account for more deaths, second only to those due to CVS disorders, for ages

45 and above[4]. In developing countries, the proportion of infectious diseases are decreasing and diseases of the circulatory system have become the leading cause of death, none-the-less even at ages 45 to 64 years ,more than a quarter of deaths in developing countries are due to infectious diseases[5] .

The morbidity pattern also shows a similar trend of a change in disease patterns from infectious to degenerative diseases. The World Development Report (1993) shows the distribution of the 10 diseases with the highest disease burden in adult and elderly populations in 'demographically developing' countries. This is a term coined by the authors of the World Development Report, 1993 for the purpose of demographic and epidemiological analysis. This term comprises of all the countries, which can broadly be categorized as low and middle-income economies, and it includes all the regions of the globe except the Former Socialist Economies and the Established Market Economies[4].

Table1.0 **Distribution of disease burden in the adult and elderly populations in the demographically developing economies showing the ten main causes, 1990**(WDR 1993)

	Age 45-59 years (Mature adults)		Age 60+ years old (Elderly)	
	Women	Men	Women	Men
1	Cerebrovascular diseases	Tuberculosis	Cerebrovascular diseases	Cerebrovascular diseases
2	Tuberculosis	Ischemic heart diseases	Ischemic heart diseases	Ischemic heart diseases
3	Ischemic heart diseases	Cerebrovascular diseases	Chronic obstructive airway disease	Chronic obstructive airway disease
4	Peri/endo/myocarditis	Cirrhosis	Dementia	Dementia
5	Periodontal disease	Alcohol-related	Respiratory infections	Tuberculosis
6	Cataracts	Peri/ endo / myocarditis	Peri/endo/myocarditis	Respiratory infections
7	Chronic obstructive airway disease	Chronic obstructive airway disease	Diabetes mellitus	Peri / endo / myocarditis
8	Diabètes mellitus	Benign prostatic hypertrophy	Tuberculosis	Cancer of the stomach
9	Osteoarthritis	Periodontal disease	Falls	Cancer lung / trachea / bronchus
10	Cancer of the cervix	Cancer of liver	Cataracts	Cirrhosis

The health of adults over the age of fifty is often considered only of concern to industrialized societies. However, the majority of the world's 467 million women aged

fifty and older live in developing countries. By the year 2020 one in five women in developing countries will be fifty or older.[6] Until now, much of the focus of women's health issues has been on the reproductive years, or those years immediately preceding the onset of reproductive life. But in terms of quantifiable disease burden, such a focus, however, means that the health needs of older women, i.e., women in the post reproductive ages in low-income countries have been relatively neglected[4, 6]. A number of studies have noted that the midlife (approximately age 50 years) is associated with a significant rise in chronic disease among women[6, 7]. There is also speculation that physiological changes associated with the menopause, interacting with or accelerating events of normal aging, promote the increased incidence of osteoporosis, heart disease, diabetes mellitus, hypertension, breast cancer, oesteoarthritis and autoimmune diseases[8]. Menopause leads to alterations in the skeletal, cardiovascular, nervous, skin, genitourinary, and GI systems and can affect women's capacity to perform everyday activities. There is a scanty data available concerning the functional capacity limitation in women of this age group. Studies need to be designed to separate the effects of aging from those of menopause[7]. It is difficult to distinguish the effects of aging from those of menopause, but cross sectional studies involving large numbers of women aged 45 to 55 will help us to distinguish the difference in symptom frequency by menopausal status from the aging process[9]. If this large age window is used it is possible to cover subjects who are in their pre-, peri-, and post menopausal period and the difference in the frequency and severity of symptoms can give us a clear picture of the complex process of menopause and related morbidity.

Although women in general live longer than men, studies have shown that women have more problems with physical functioning and general health than do men[10]. Women's health problems begin earlier in life and persist longer into old age, with the result that women suffer more from both acute and chronic non-fatal diseases. Major health problems among women older than 45 include gynecological diseases such as cervical cancers,

diabetes mellitus, under-nutrition osteoporosis, cardiovascular diseases and psychological problems. Ischemic heart disease and Cerebro-vascular disease are the leading cause of death among adults aged 45 and older in developing countries and represent a higher proportion of the disease burden among women than men in this age group[4]. The vast majority of problems affecting women after the age of 45 are chronic. Injuries and infections also contribute to women's disability in their later years, as do malnutrition, anemia and loss of visual acuity. If there is paucity of data on the health status of older women, information about older men is remarkable by its absence.

1.2.2 Epidemiological transition and population aging: India

India is also undergoing a demographic transition with a declining trend in fertility and mortality rates. This reduction in mortality due to infectious diseases and improvement in life expectancy have resulted in an increase in the proportion of older adults and the elderly in the population[11]. As per the 2001 Census, India had a total population of 1.027 billion and the percentage of 60+ was 7%[12]. It is projected that more than one quarter of the population will be in the older adult years that is from 45 to 59 years, (17.3% of males and 16.8% of females) or elderly (10.6% of males and 11.5% of the females) by 2021[11]. But there is scanty data available on the health of the aged and older adult population in India.

Coming to age specific moralities of the population, over the years there is a declining trend in mortality rates of the population above the age of 45[13].

Table. 2.0 **Age specific mortality for India and Kerala**

Age group	India (1997)			Kerala (1997)		
	Total	Male	Female	Total	Male	Female
45 - 49	7.5	9.0	5.8	5.0	7.2	2.7
50 - 54	12.2	14.2	10.2	7.0	10.2	3.4
55 - 59	16.9	19.7	14.1	10.3	15.9	5.2
60 - 64	27.1	32.3	22.1	17.4	26.1	9.4
65 - 69	40.2	46.3	34.4	30.6	43.1	20.0
70 +	83.5	89.7	77.6	80.4	97.7	67.2

Source: SRS, 1997[14]

For the Indian subcontinent, epidemiological information on annual incidence or prevalence rates and morbidity trends in defined populations are not available[15]. The best way to get morbidity data is through population-based surveys, which look at the determinants as a part of it. This morbidity data is an important complement to mortality data[16]. Most of these studies have generally been based on the perceived morbidity. But self-perception is distinct from self-reporting. Person can report illness after someone else has observed it even if he is unable to perceive it. Self perceived measures of morbidity can be grouped into three categories: symptoms, functional disability and handicaps, and the utilization of health services [17]. All these have an effect on the health status of the individual.

In India, while acute illness and communicable diseases constitute a bulk of all reported morbidity, chronic and degenerative health problems are also on the increase especially among the middle-aged and older people. A study carried out in India by the National Council of advanced economic Research (NCAER) to estimate the health care utilization and expenditure on a sample covering the complete country have observed a prevalence rate of illness in urban and rural areas to be 214.6and 219.7 per1000 persons respectively[10]. The same paper gave figures of 104.95 per 1000 for rural areas and 100.35 per 1000 for urban areas for chronic morbidity in the age group 15 to 59 years. In the sixty plus age group, it was 203.4 per 1000 for rural and 217.8 per 1000 for urban areas.

The limited information available on morbidity in the 45^{+} age group is given below. The National Sample survey Organization (NSSO) of India found that the rural and the urban elderly are experiencing nearly the same rate of chronic morbidity at 54%[18]. The NSSO data for the year 1981 reported that 11% of the rural elderly and 9 % of the urban elderly suffered from one or more disabilities[19].

A study in rural southern India found that, the prevalence of hypertension increases with age, body weight, heart rate, and socioeconomic status. This study also found that

hypertension is one of the most important causes of mortality and morbidity in the elderly[20]. A small-scale study in rural Karnataka also reported that the major chronic diseases among the elderly were respiratory disease, locomotor illness, and blood pressure[21]. Visual and Locomotor disabilities were the most common disabilities among the elderly. An ICMR study among the aged population found that hearing impairment was the most common morbidity followed by visual impairment[22]. Such hearing impairments were higher among the aged population when compared to the general population[13]. Another study in Tamilnadu identified Visual disability as another important problem followed by illness affecting locomotion, CNS and CVS among elderly in this region[19]. Nutritional problems were also found to be common [23] apart from bronchitis and dental problems and skin diseases[24].

Gender is also an important variable that influences the quality of life at all ages, more so in old age. A detailed examination of cause of death statistics by two distinct age groups, viz., late adults (45-54) and the elderly (55yrs) by gender showed some similarities and dissimilarities. For instance the risk of dying from diseases of circulatory system, fever and digestive disorders is similar for both age groups across both genders. However tuberculosis, accidents and injuries are more prominent in the late adult age group than among elderly males and females. The risk of dying from respiratory and circulatory disorders is higher among males than among females. However death due to senility was reported more among females than among males. Deaths due to cancer showed a distinct age pattern among females but not among males: late adult females are more likely to die from cancer than elderly females. However the risk is similar across the two age groups among males[19].

The continued increases in life expectancy mean that questions about quality of life are becoming more important[25]. Because the women live longer than men, the common belief is that they are healthier. In reality the women are more likely to experience sickness and

chronic poor health than men are[26]. As for morbidity, Sundar (1995) points that the morbidity prevalence rates for females was 2 % higher than that for males in rural India. In 1993, the differential rose to 10 % for urban India. Gender differentials in these categories were not noticed in the national survey of 1993 except in the case of headache / backache / body ache, where it was 120% higher among females when compared to males in rural areas and 74 % higher in urban areas[10]. NCAER 1995 data shows that among the chronic illness weakness, dizziness and anemia are the major cause of morbidity for women compared to men in the rural areas. In men, the major causes for morbidity are Hypertension, Heart ailments, Paralysis and Breathing problems like Asthma[27].

Very little is known about the gynecological illness of post –reproductive age group females in India. According to one study, many consider menopause a biological marker of aging[28]. Two hospital-based studies of post- menopausal and elderly women attending gynecological out patient departments have reported carcinoma of cervix and genital prolapse as the most common morbidity conditions[29, 30]. However not much is known about how much morbidity impacts on women's ability to fulfill their various roles, economic, domestic, marital and sexual – or their mental health and well being[31].

1.2.3 Epidemiological Transition in Kerala

Kerala, the southern most state of India, has achieved a very low fertility rate (below replacement level) and is far ahead of other states of India in the demographic transition stage. The life expectancy in Kerala in 1990 was 68 years whereas all India life expectancy was 55 years. The elderly represent an increasingly significant segment (8.8%) of Kerala's population[32]. Along with the demographic transition, Kerala is also undergoing an epidemiological transition. Kerala is experiencing simultaneous decline of infectious disease and rise in chronic disease like dementia[33] and Coronary heart disease[34] even in the presence of a good health care delivery system[35].

The reported morbidity rates in Kerala are several times higher compared to those in the other states of India[36, 37,38]. The high morbidity rate found in Kerala can be explained in different ways,

- The high levels of reported morbidity are the result of statistical issues.
- Morbidity is largely dependent on perception, and chronic morbidity is especially difficult to define: difference in reported rates implicate differences in perception of morbidity.
- Large difference in reported morbidity cannot be fully explained by differences in perception or reporting: they suggest real differences in illness burdens in the population[35].

The morbidity pattern in Kerala may be due to the higher life expectancy in Kerala and emergence of diabetes mellitus, hypertension and degenerative diseases[37, 38].

An all India survey reports that the prevalence rate of chronic disease in the general population was 23.5% and 17.1% Kerala's rural and urban areas respectively in 1990[39]. Subsequently a cross sectional KSSP study in the whole of Kerala showed 12.2 % for acute illness and 11.5% for chronic disease (KSSP, 1996). Another study carried out by Leela Gulati in a non-coastal as well as coastal PHC provides an estimate closer to that of the KSSP finding. It is 10.8% to 11 % for acute diseases and 11.7% to 15.3for chronic diseases[40].

The rural population have higher prevalence rate of morbidity compared to the urban population[22]and the aged population is more in rural areas than in urban areas with the except for West Bengal[41]. Therefore studying the prevalence of morbidity in the rural area, gains importance.

1.2.4 Determinants

Factors such as gender, economic status, marital status, living standards, and availability of social support influence health during old age.

Age and Sex: Total morbidity increases with age and at any given age morbidity is greater for women than men. A study done in Jaipur, among the elderly (60 +), found an increase in prevalence of chronic bronchitis, anemia, constipation, cataract, periodontal diseases, oesteoarthritis, hypertension and corneal opacity, with age and it was higher in men as compared to women though not statistically significant. But the same study also found a higher prevalence in anemia among women than men[42]. A study done by AK Singh et al, 1991, in Varanasi, India, among the rural elderly, found that there was a strong association between age and incidence of 'multiple pathologies' (presence of more than one disease at the same time) and also it showed a linear increase with age[43]. .

Socio-economic status: One of the most established findings in social Epidemiology is the inverse relationship between socioeconomic status and health[23, 44]. People from lower SES do not live as long and that they suffer disproportionately from major diseases such as Cardio vascular diseases, Diabetes, Cancer and Hypertension, as well as from a variety of other illnesses. Individuals in higher SES have a longer life expectancy, less mortality and a better health and nutritional status than those in lower. While the economic situation of the elderly has been undergoing change during the past few years. There are hardly any studies conducted in this vital area concerning elderly in India[23].

Occupation: The duel burden of the marital and work roles were predictive of subsequent morbidity and mortality especially for women[45].

Marital status: It is difficult to determine the effect on health of marital status, as health itself may be a selective factor in marriage and divorce. Studies have shown that mortality is lower for married men and women and higher for the divorced than for the single and the widowed[46]. Data on this point for developing countries are lacking. A study in Nashik a district in Maharashtra brought out greater morbidity amongst married women compared to unmarried women, separated or widowed women reported higher morbidity. These findings reflect the multiple burden on women[47].

Education: Study done by Adrienna et al (1998), in western European countries, have reported a higher level of morbidity and mortality for people with a lower educational level, occupational level or income level[48]. Psychological factors and behavioral factors, knowledge of health and medical knowledge associated with education will also influence self-reporting of morbidity[49].

Body mass index: Studies have looked into association between low body mass index and higher morbidity. Smaller adults have higher age specific mortality rates[50]. But a study done in urban Bangladesh found an association between increased morbidity and low body mass index[51]. Body mass index (>25) is believed to be associated with higher risk of many diseases, including coronary heart diseases[52]. Obesity, particularly in its most severe form, is an important risk factor for premature mortality. The specific role of obesity as causative factor in many chronic disease is under active investigation.

Effect of physical activity: Regular physical activity promotes improved health. There is growing evidence that regular physical activity whether occupational, recreational, or part of daily chores, is associated with decreased risks of coronary heart disease[53]. In the developing countries, most people have adequate physical activity in the routine aspects of their work, home life and mode of transportation to confer a health benefit[54]. IOWA women study found that post- menopausal women who participated in regular physical activity had a lower risk of dying from cardiovascular disease compared with the physically inactive group[55]. A study done by Sachdev in 120 elderly widows it was observed that there were differences in reporting disability by SES for climbing stairs, walking 2 Kilometers and lifting 2 Kilogram weight to 1.5 feet height. The performance of the economically poor was better than their rich counterparts in the age group between 70-79 for climbing, walking and lifting[56].

Life style factors: Chronic alcohol exposure can cause liver cirrhosis, various psychiatric symptoms, dementia, stomach ulcers, pancreatitis, diabetes, fetal alcohol syndrome, and cancers of the gastrointestinal tract[57]. The risk of illness and injury increases with the amount of daily consumption of alcohol [58].

The overall effect tobacco smoking has on health is substantial. Smokeless tobacco, in the form of snuff, and chewing tobacco, causes oral cancer. A case control study done by Natani (1988) in Bombay found that alcoholic beverages and tobacco chewing habit were causally related to cancer of esophagus[59]. Cigarette smoking is one of the most important causes of premature mortality at middle and older ages, mainly from cardiovascular, cancer, and chronic respiratory diseases[60] and majority of deaths will be from India and China[61].

Study done by Laurence in 1974 among elders (above 65years) in Massachusetts community, found that slowed down physical activities (for elderly women) and a history of cigarette smoking (for elderly men) achieved associations with subsequent physical limitations. However no firm association between current lifestyle practices and onset of disability could be demonstrated. Healthful practices included never smoking, regular physical activity, moderate alcohol consumption, average weight status, and sleeping seven to eight hours a night[62].

1.3 Relevance of the study

Accurate morbidity data, based on population samples is available from only a handful of developed countries. Even Comparison is difficult due to methodological standardization[63]. An understanding of illness experience and beliefs and its correlates in 45+ age group may help us to find out the health needs and also to design programs which are more likely to be used and to be effective in controlling and limiting morbidity among older adults and older people. This study will provide preliminary data on the appropriate or need for service in this increasingly important age group.

1.4 Objectives of the study

General Objectives:

1.To estimate the levels of morbidity among men and women above the age of 45 Years.

2.To identify the factors underlying morbidity in the age group.

3.To study the health seeking pattern in the age group.

4.To discuss the implications of the burden of disease in the 45+ age group for health policies and programmes.

Specific objectives:

1.To find out the self- reported morbidity pattern in men and women in the age group of 45-60years.

2.To estimate the self reported morbidity in the elderly.

3. To examine the biological, socioeconomic cultural factors influencing morbidity.

4.To understand the people's perceptions about causes of morbidity experienced by them.

5.To describe the pattern and factors affecting health seeking behavior in this age group.

6.To explore gender and social differences in the levels and pattern of morbidity in terms of perception and health seeking behavior.

For purposes of this study we will look at the point prevalence of both acute and acute manifestation of chronic illness as well as prevalence of chronic illnesses. Acute illness is defined as any illness present on the day of the survey and does not come under the definition of chronic morbidity as defined below. Chronic disease is defined as any illness for which the duration is more than a year and is not yet completely cured. For the purpose of this analysis morbidity will be determined using self-reports. No attempts will be made to clinically validate reports by participants.

Chapter II
METHODOLOGY

This chapter deals with the methodology adopted for the study. Here we look into the description of variables, study design, study location, sample size estimation, data collection tools, pre-testing of the questionnaire and plan for data processing and analysis.

2.1 Outcome variables of the study

1.The prevalence of acute and chronic morbidity among people above the age of 45 yrs.

2.Health seeking behavior of the selected population on a qualitative basis.

3.Nutritional status of the sample population based on body mass index.

4. Health and social consequences due to chronic illness.

2.2 Predictor variables

1.**Age:** Information on age of the sample population was collected in completed years as on 1st of December 2000.

2.**Sex:** We collected data from males and females.

3.**Socio-economic Status:** The SES classification was done based on subjective as well as objective criteria for assessment. Information on housing condition, Ownership of the house, Monthly expenditure, and assets were also collected for that purpose.

4. **Educational status of the population:** The educational level was categorized into groups based on the years of schooling. This includes, no schooling, primary, secondary, Higher, Graduate and above.

5. **Marital status:** For marital status, currently married, divorced, widowed, separated, and never married were the categories used.

6. **Occupational status of the population:** Data was collected on the nature and type of work, past work and years of work. In addition the reasons for quitting the work among people who have worked in the past was also obtained.

7. **Life style practices like smoking, tobacco chewing and alcohol use:** This was assessed by asking questions on frequency, duration of smoking, tobacco chewing and alcohol.

8.**The physical activity pattern:** The Physical activity pattern of the sample population was assessed based on the checklist in to three categories, namely Vigorous, Moderate and Light.

9. **Body mass index (BMI):** Height and weight of the sample population was measured to calculate BMI and then BMI was categorized in to three groups: lower, middle and high.

10. **For women, menopausal status**: Menstrual and reproductive history, including age at menarche and menopause, use of contraceptives, and surgical interventions related to reproductive health was also collected.

2.3 Methods and Materials

Study location: The study was conducted in Kerala state of India. This is the southern most state in the country covering an area of around 1.2% of India and sustains 3% of India's population. The population according to 2001 census was 31.8 million[12]. This state has three main geographic features, coastal, midland plain and hilly regions. Muttom Panchayat of Thodupuzha Development Block was the study area. It is in Idukki, a backward and hilly district of Kerala state. It has a population of 1.08 million (3.7% of the state). Muttom Panchayat is one of the six panchayats in the Thodupuzha Community Development Block and the panchayat is divided in to 10 wards, each with a population of about 1000 to 1500. Idukki District consists of four Taluks namely, Devikulam, Udumbanchola, Thodupuzha and Peermade Taluk. Muttom falls within the Thodupuzha Taluks of Idukki district. As forest and water bodies cover nearly 70 % of the area, habitable areas amount to a very small proportion of the total area. However, the total population of the district is low compared to the other districts of Kerala and hence the overall density of population is very low (215 per Km^2) compared to the rest of the Kerala as per the Census of India, 1991.

Muttom panchayat was chosen because the investigator is a resident of Idukki district and it was convenient for the investigator to go for fieldwork

Subjects: The study population consisted of people above the age of 45years.

Sample Size: It was calculated to be 600 persons, allowing for design correction*.

Sampling Method: Multi- stage, cluster-sampling method was used to collect the required sample. There were 10 wards in Muttom panchayat. With the above calculation, we took "6 clusters of 10" from each of these wards and the sample size came as 600. As it is a hilly area, geographical peculiarities of region were also considered while selecting the sample from the population. While doing the survey, a few more people who conformed to our subject description had to be included, in addition to calculated sample size. Thus total number of subjects thus included in the study was 630.

Study design: It was a cross sectional study.

Data collection methodology: Both quantitative and qualitative methods were used for data collection. Quantitative data was collected with the help of a structured, pretested questionnaire applied during the time of house-to-house survey. The clusters were identified based on directions given from the panchayat office. From the voter's list published in 2000, a list of households with people above 45years was prepared to get a profile of the sample population. As it is a hilly area with lower density of population finding out the subjects above 45 years especially males were difficult. As men are usually the earning members in the household, most of them were busy and were not

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* *Sample size was calculated using the formula* $N=(Z^2PQ/\ ^2)^*d$.
Here, n=sample size, Z=Confidence limit factor. This is taken as 1.96 for 95% confidence interval.
P=Prevalence of morbidity both acute and chronic (assumed to be 15%, based on interviews with key informants)
Q=Precision factor (difference between the assumed prevalence and lowest expected prevalence). Here the lowest expected prevalence was taken as 12%.
So =0.15-0.13=0.03
d=design effect. Here it was taken1.1
The calculated sample size was $n = (1.96)^2 * 0.85 / (0.03)^2\ 1.1 = 600$. *The formula* $Z^2PQ/\ ^2$ *is used for random sampling. As we used cluster-sampling method, in order to reduce the design effect 10% (d) of the calculated sample was added to the sample size.*

available in the house during the daytime. In each ward clusters were identified and six clusters of ten each from each ward were surveyed. After self-introduction, the investigator explained the purpose of the visit and sought their willingness for this study, explaining the need for giving accurate information for all the questions. Subjects were interviewed and this continued till the required number of people from each cluster was met. If there were more than the required number in the last visited household, they were also included in the sample as it was not acceptable culturally to refuse that person an opportunity to participate in the study.

2.4.1 Field Work Experience

Majority of the sample population was able to report their age. In case if they had any doubt, it could be crosschecked with the 2000 voters list then and there. Methods like counting the number of years after retirement, confirming it from the ration cards (Booklet issued from the government for the Public distribution system) were also used to overcome difficulties in getting vital information on date of birth etc. But we did face difficulties while collecting information on age with respect to menarche and menopause in women. But other life cycle landmarks regarding age at marriage and age of their children and year of quitting work were useful to determine this. Most considered menarche and menopause as important events in women's life, and people generally tend to remember these events well and correlate it with important national or local events. Some of the subjects were married at 10 or 12 years of age, before even attaining menarche and so, to remember these dates, they could very well relate to other events in their own personal life, like marriage.

2.5 Research Tools

Questionnaire: A structured questionnaire was prepared and pre-tested in the 1st week of December to check the clarity and practicality of the questions used. The questions were mainly concerning to the variables under study. This included sections on informants' demographic characteristics, predictor variables such as socioeconomic and educational status, occupational status, living standards, dietary habits, lifestyle practices like smoking, alcohol use and tobacco use to. Also information regarding the self reported morbidity (both acute and chronic) and acute manifestation of the chronic illness were collected in order to estimate the gravity of the situation. Data were also collected to assess the functional capacity limitation and disability status. We used a scale, which was a modification of scale devised by Didi M W Kreigsmann et al to assess the functional capacity Limitation[64]. And to women questions pertaining to their reproductive health and menopause were also included. One questionnaire took nearly 25 to 35mts to complete, including measurement of weight and height. The length of time utilized to fill up the questionnaire also depends on their present health status, sex and age. Elderly people required more time and in the case of women, collecting information about reproductive health also needed more time. Confidentiality was ensured to each subject.

The investigator assessed the socioeconomic status subjectively by observing the type of house, assets like vehicles, gadgets, furniture and spaciousness and cleanliness of surroundings, total family income and calculating the per capita expenditure. The sample population was classified in to three groups based on this information.

Information on current and past smoking habits, use of smokeless tobacco, alcohol use and dietary pattern were collected. Based on a checklist prepared earlier, on the physical activity level of each work category, the sample population was classified into groups.

Weighing scale: The body weight of the selected individuals was taken using a standardized weighing scale.

Plumb Line: Height of the sample population was measured by an improvised method. This was done using a graduated plumb line. The graduations were made earlier using a measuring tape. Height was measured by making the person to stand against a wall with hip and heel straight and head erect.

Self reported disease conditions classification: Acute illness, the morbidity conditions reported at the day of survey were collected, i.e., point prevalence in order to get accurate information. For chronic conditions the illness suffered for one or more years were collected. The Lay reporting of health information by WHO (1978) were also used to identify undiagnosed cases[65].

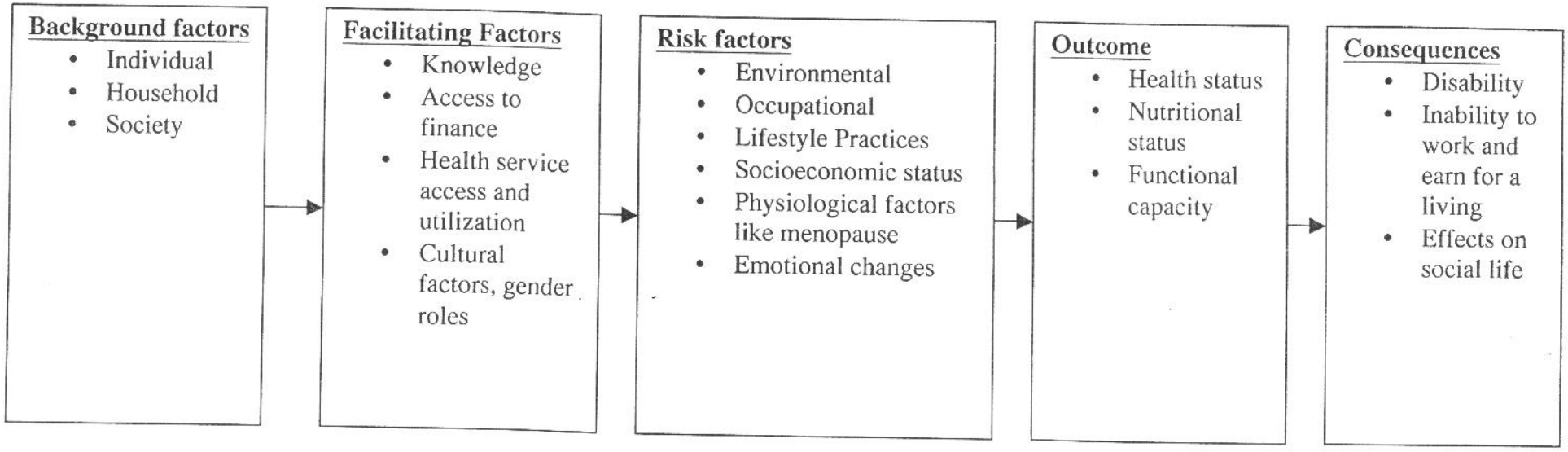
2.6 Conceptual framework

To facilitate easy explanation of the association between the factors and the outcome, we developed a conceptual framework. It is a linear model in which the factors play their roles in tandem with each other to bring about an outcome that may or may not be beneficial to the subject. We have grouped the factors in three distinct groups with reference to their effect on the outcome. The three groups are the Background factors, the Facilitating factors and the Risk factors.

The Background factors: They include personal features, household features and social characteristics. Under personal features come factors like age, sex, education, marital status, occupation and income. Household characteristics include features like total number of household members, economic status, housing conditions etc. Social characteristics include cultural norms and values prevailing in the society, which may have an impact on the individual's health and health seeking behavior.

Facilitating factors: This includes knowledge on hygienic practices, and healthy living access to finance, decision-making, health service access and utilization etc. There are a host of cultural factors that may have an association with good health or lack of it. They include Gender roles, religious beliefs and practices on health and health seeking and dietary factors based on culture and religion.

Table: 3 **Conceptual Framework for determinants of morbidity and its consequences**



Risk factors: Under this category comes a group of factors that have been proven to be a hazardous to good health. These include environmental factors like climatic changes, geographical peculiarities, pollution etc., Occupational factors like a stressful work conditions, Occupational hazards etc., and Life style practices like use of tobacco and alcohol lack of physical exercise and unhealthy dietary habits. Hormonal changes during menopause have been proven beyond doubt to be associated with a clutch of illnesses including cardiovascular and musculo-skeletal disorders and thus form an important physiological risk factor. Emotional changes are also known to affect health status of the individuals and they have even important effect on healing. As mentioned earlier these factors either individually or in tandem can affect the level of good health enjoyed by the subject, which is the outcome. These also exert their effect on other outcomes like the nutritional status and functional capacity.

The outcomes, in turn, lead to a set of conditions that are the consequences, which may include disability, inability to work and earn for a living and can also affect their social life.

2.7 Duration of the study and reference period

The duration of the study was from 18th of December1999 to 21st February2000. The reference period for acute morbidity was the day of interview and for chronic morbidity it was the one-year preceding the day of interview.

2.8 Data Storage and Analysis

Data entry was done with to help of structured codebook in the Microsoft excel version 4. After the data entry, cleaning of the data was done for any error. Descriptive analyses of all study variables were carried out using statistical packages SPSS programme (SPSS 6.1 Version for windows). Bivariate analysis was done for testing association wherever necessary.

2.9 Strengths of the study

- It is a community-based study of morbidity that distinguish between acute and chronic conditions as opposed to hospital based studies.
- The inter-observer variation for the study was non-existence as only one investigator collected all the data.

2.10 Limitations of the study

- Since most part of the study was done during working days a representative number of males could not be met.
- No clinical examination was undertaken to confirm the morbidity. The relationship between self reported symptoms and clinically verifiable conditions in this study are uncertain.
- The neglect of local perceptions and interpretation of symptoms and signs, such as whether mild conditions are viewed as morbidity or natural events, may lead to inaccurate comparison within this population.

Chapter III
RESULTS

This chapter deals with the description of the analysis and interpretation of data collected from the study population. The results of the analysis have been organized into four sections namely, dimensions of morbidity, determinants of morbidity, determinants of nutritional status, health seeking behavior and health consequences of morbidity, keeping with the objectives of the study.

Section –1 Socio Demographic Profile

Table: 3.1 Distribution of sample population by demographic characteristics and sex

Characteristics (Variables)	Males n=272(43.2)	Females n=358(56.8)	Total n=630(100)
3.1.1 Age group			
<60years	136(50)	200(55.9)	336(53.3)
>60years	136(50)	158(44.1)	294(46.7)
3.1.2 Marital Status			
Currently married	249(91.5)	251(70.1)	500(79.4)
Widowed	8(3)	19(5.3)	27(4.3)
Others	15(5.5)	88(24.6)	103(16.3)
3.1.3Type of family			
Nuclear	116(42.7)	139(38.8)	255(40.5)
Extended	156(57.3)	219(61.2)	375(59.5)
3.1.4 Religion			
Hindu	56(20.6)	88(24.6)	144(22.9)
Muslim	21(7.7)	29(8.1)	50(7.9)
Christian	195(71.1)	241(67.3)	436(69.2)
3.1.5 Education			
No schooling	25(9.2)	58(16.2)	83(13.2)
Primary	110(40.4)	117(32.7)	227(36)
Secondary	103(37.9)	141(39.4)	224(38.7)
Higher & above	34(12.5)	42(11.7)	76(12.1)
3.1.6 Occupation			
Laborers	40(14.7)	27(7.6)	67(10.6)
Self Employed	27(9.9)	3(.8)	30(4.8)
Salaried	8(2.9)	3(.8)	11(1.7)
Housewives	0	290(81)	290(46)
Unemployed	72(26.5)	31(8.7)	103(16.4)
Living of assets	125(46)	4(1.1)	129(20.5)
3.1.7 Socio-economic Status			
Lower	16(5.9)	17(4.7)	33(5.2)
Middle	199(73.1)	249(69.6)	448(71.1)
Upper	57(21)	92(25.7)	149(23.7)

All the values given in brackets are in percentages

The sample population consisted of 630 individuals above the age of 45 years from the selected rural area. The study sample had a sex ratio of 1:1.3 per100 males. Age of the sample population ranged from 45 to 109 years with an average age of 61.05 years. Based

on that the sample population was categorized into two groups those who had completed 60 and those above.

3.1.1 Age and sex wise distribution of the sample population: Age and sex wise distribution of the sample population was as follows. Slightly above the half of the sample was below the age of 60 years (53.3%). Forty-three percent of the total sample population was males and the rest were females.

3.1.2 Marital status the sample population: Marital status of the sample population was categorized into married, widowed and others. (Others include, separated, divorced and never married). Around 79.4% of the sample population was married and staying together, and 16.3% of them were widowed. Majority (91.5%) of the males came under the currently married category while this was the same among females but the percentage was considerably lower at 70.1. This difference could be due to two reasons, one being that the women live longer but the other reason is a bit more complex and other that widow marriages and divorcee marriages are still not very common.

3.1.3 Type of family of the sample population: Nearly 40% of the sample population was living in a nuclear family. The rest were living in non-nuclear, either joint or extended families.

3.1.4 Religion wise distribution of the sample population: Majority of the sample group (69.2%) were Christians. Hindus constituted 22.9% and Muslims 7.9 %.

3.1.5 Education status of the sample population: According to level of education the sample population was categorized into four groups; those of no schooling, primary (up to fourth class), secondary (up to tenth class) and Higher secondary and above (above tenth class). In the sample population majority had primary or secondary education, but 13.2% of the population was illiterate (9.2% for males and 16.2% for females).

3.1.6 Occupation status of the sample population: The sample population was engaged in a variety of occupation. Information was collected about their past and present

occupation. Majority of them were not working, and some of them were living off assets. Seventy-eight persons were working at the time of the study (Laborers+ salaried).

3.1.7 Socio-economic status (SES) of the sample population: The researcher assessed the socioeconomic status of the subjects on the basis of a set of pre-defined criteria, which includes the type of house, cleanliness and spaciousness of the surroundings, assets like vehicles, household gadgets, furniture etc, and the per capita expenditure of the household. Using this, the researcher assigned each subject to one of three SES categories, upper middle and lower. (For e.g., a typical subject belonging to the upper SES would live in a pucca house of over three or more bedrooms, with kitchen and one or more toilets, independent water source and electricity. They would have possession of household gadgets like refrigerator; colour TV, telephone and a four-wheeler). Among the study group, nearly 71.1 % of the sample population came under the middle socioeconomic group, 33 subjects (5.2%) in the lower socioeconomic strata, and 149 (23.7%) subjects belonged to upper socioeconomic category. Most of them lived in own houses.

3.2 Past work and reasons for quitting

Out of 630 individuals 28.8% had worked in the past. The 159 (28.8%) subjects who worked in the past has stopped working due to different reasons. Among that 73.6% of them stopped working due to some sort of illness or due to weakness as part of aging. A higher proportion of females (57.1%) than males (42.7%) stopped working because of illness or weakness as part of aging.

Table: 3.2 Distribution of persons by past work status and reasons for quitting by sex

People who had worked in the past			
(N=552)	**Males (n=159)**	**Females (n=393)**	**Total**
Yes	46.5	38.2	28.8
No	53.5	61.8	71.2
Reasons for quitting the work			
(N=159)	**Males (n=117)**	**Females (n=42)**	**Total**
Illness	42.7	57.1	73.6
Others	57.3	42.9	26.4

All the values given above are in percentages and will add up to hundred vertically

3.3 Housing conditions

Table: 3.3 Distribution of sample population by housing conditions

Variable (n=630)	Number	Percentage
Type of house		
Pucca	148	23.5
Semi-pucca	456	72.4
Kutcha	26	4.1
Separate room for cooking		
Yes	611	97
No	19	3
Source of lighting		
Kerosene or oil or gas	45	7.1
Electricity	585	92.9
Fuel for cooking		
Wood (Exclusively or Predominantly)	387	61.4
LPG (Exclusively or predominantly)	243	38.6
Source of drinking water		
Well or pipe or hand pump (own)	387	61.4
Well or pipe or hand public	243	38.6
Source of water for washing, bathing		
Within the house	264	41.9
Elsewhere	366	58.1
Toilet Facility		
Flush toilet	577	91.6
Shared pit toilet	2	.3
No Facility	51	8.1

Percentages will add up to hundred vertically.

Majority of the sample population (72.4%) were living in a semi pucca houses and only 4.1% were living in kutcha houses. Ninety seven percent of the subjects had a separate kitchen in their house. Majority (92.9%) of the people had electricity connection. Sixty-one percent of the subjects were using wood as the major fuel for cooking ('Wood-Exclusively or Predominantly' includes those people who use, either wood alone or wood & biogas or Wood and electricity as the fuel). LPG (Exclusively or predominantly) means those people who use LPG alone or (LPG and Wood) or (LPG, Wood and Electricity). Sixty one percent of them were having their own well, pipe or hand pump. The remaining 39% were taking water either from public water supply source or utilizing facilities owned by others. Forty-two percent of the subjects where having water for washing and bathing within the compound and 58.1% of them have to go out for washing and bathing. Ninety-

two percent of the subjects were having their own flush toilet. However, 8% of them had no facility at all.

3.4 Dietary Habits of the sample population

Table: 3. 4 Distribution of Sample population by dietary habits.

Boils Water for drinking (n=630)	**Number**	**Percentage**
Yes	339	53.8
No	291	46.2
Diet		
Vegetarian	17	2.7
Non- vegetarian	613	97.3

Percentages will add up to hundred vertically.

Out of the 630 subjects, nearly 53.8% of the subjects boil water before drinking. Majority of them (97.3%) of them were Non-vegetarians.

3.5 Body Mass Index (BMI)

Table: 3.5 Distribution of sample population according to the body mass index and sex

BMI N = 621*	**< 60 years**		**> 60 years**	
	Males (n=136)	**Females (n=199)**	**Males (n=133)**	**Females (n=153)**
<20 kg/m2 (Lower)	42.6	23.1	48.9	34.6
20-25 kg/m2 (Moderate)	44.2	53.8	42.9	43.1
>25kg/m2 (High)	13.2	23.1	8.2	22.3

All the values given above are in percentages and will add up to hundred vertically

** BMI could not be computed for 9 subjects, as basic measurements could not be taken for them. Three of these 9 were bedridden and the rest 6 did not permit measurement.*

The weight and height of the individuals were collected and body mass index was calculated as Weight (Kg)/Height (m^2). The calculated BMI of the total population ranged from 13.17 to 32.88.Kg/ m^2. The mean and median BMI of the sample population was 21.51and 21.45 respectively. Based on that the sample population was categorized into three groups, low, moderate and high. The mean BMI of males (20.59) was less compared to females (22.23).From this table, we can see that obesity is more among females than in males and it is more so in the age group above 60 years. While there are 22.3% of females in the high BMI category in the age group of above 60, the percentage of males is only 8.3%.

3.6 Physical activity of sample population by sex

Table: 3.6 Distribution of Physical activity of sample population by sex

Physical Activity	Males (n=272)	Females (n=358)	Total (n=630)
Vigorous	24.6	7.3	14.8
Moderate	43.4	56.1	50.6
Light	32	36.6	34.6

All the values given above are in percentages and will add up to hundred vertically.

The physical activity of the population was categorized according to a checklist and also their occupational status. The majority of the sample population (50.6%) was in the moderate activity group.

3.7 Lifestyle Habits

Table: 3. 7 Distribution of sample population according to lifestyle habits

Variables	Ever		Never
	Present	Past	
Smoking			
Males (n=272)	39.7	29.4	30.9
Females (n=358)	0.6	0	99.4
Total (n=630)	17.5	12.7	69.8
Tobacco use			
Males (n=272)	25	9.9	65.1
Females (n=358)	10.3	2.5	87.2
Total (n=630)	16.7	5.7	77.6
Alcohol use			
Males (n=272)	19.5	18.7	61.8
Females (n=358)	0.6	0.3	99.2
Total (n=630)	8.7	8.3	83

All the values given above are in percentages and will add up to hundred horizontally

Information was also collected regarding the life style habits of the respondents, mainly on smoking, use of tobacco, and alcohol use. As expected, a significantly low proportion of females were found to smoke or consume alcohol. Overall, current smokers among the population were 17.5% and past smokers were 12.7%. The proportion of people who use tobacco currently was nearly 17%.

3.8 Biological milestones

Table: 3.8 Biological milestones of the sample population

Characteristics	Mean ± SD
Age of women (years)	60 ±10.9
Age at menarche (years)	15 ± 1.7
Age at natural menopause (years)	47.15 ± 6.2

Majority of the women in the study population attained menarche between 14-16 years. The mean age at menarche in this study group came to 15 ± 1.7 years and the median age at menarche is 15 years. Out of 358 females, 303 (84.6%) of the subjects have attained menopause. Among them, 258 women (72.1) had a natural menopause and the remaining 45 (12.5%) had a surgical menopause. The mean age at menopause is 47.15 ± 6.2 years and median age at menopause is 48 years.

Reproductive Health

3.9 Biomedical events: Out of the total women ten of them are unmarried and among married ones 22.3% of them had a history of abortion. About 19% of them had some sort of surgical interventions for gynecological problems. Of these 19%, 83.6% (56) had undergone hysterectomy and the remaining 16.4% had undergone D & C (This represents 15.6% and 3.1% of the total women respectively). The main reasons for hysterectomy were Tumours (2.5%) and Uterine prolapse (3.1%). Bleeding was also quoted as one of the important reasons for surgical interventions.

Out of the total 358 women 76.5% had never used any kind of contraceptive methods. The remaining 20.7%had used it. Ten of them were unmarried. While 19.9% of the women who had used some form of contraception had undergone permanent sterilization, the proportion of women who had used IUD and oral pills were negligible.

Among the 272 males, 7 were unmarried. The men were generally reluctant to talk about contraceptive use. None of the men admitted usage of any temporary methods of contraception, but 22 reported having undergone permanent sterilization (vasectomy).

Table: 3.9 Biomedical events in the sample population

Characteristics	Number	Percentage
Abortions in the past		
Yes	80	23
No	268	77
Total	348*	100
Surgical Interventions in the past		
Yes	67	18.7
No	291	81.3
Total	358	100
Surgical Interventions (details)		
Hysterectomy	56	83.6
D&C	11	16.4
Total	67	100
Reasons for surgical Interventions		
Tumors	9	13.4
Uterine Prolapse	11	16.4
Bleeding	47	70.2
Total	67	100
Use of Contraception (Females)		
Ever used	74	21.3
Never used	274	78.7
Total	348*	100
Use of Contraception (Males)		
Ever used	22	8.3
Never used	243	91.7
Total	265*	100

**Number of males and females using contraception do not match with the total figures because the total sample includes people who are unmarried. In the Kerala scenario it is culturally unacceptable to question the unmarried on methods of contraception, abortions etc.*

Section –2 Dimensions of morbidity

Under this heading we are discussing the prevalence, duration and distribution of acute, chronic and reproductive morbidity of the sample population. The menopause and associated symptoms and their prevalence are also discussed here.

Prevalence of Morbidity: Of the 630 persons, 26.5% reported an episode of acute illness on the day of survey, 39.7% reported experiencing an episode of an existing chronic problem and 27.3% reported no symptoms, but admitted that they suffered from some chronic problem on further probing. Six and a half percent reported no current problem.

Table: 3.10 Point prevalence of current morbidity, both acute and chronic

	Disease Condition	Total (%)
1.	Fever	2.5
2.	Cold and cough	7.0
3.	Acute Bronchitis	3.0
4.	Tonsillitis	0.2
5.	Headache	6.8
6.	Toothache	3.2
7.	Gas, Heart burn, Indigestion	3.8
8.	Diarrhoea / Dysentery	0.5
9.	Eye problems (Discharge, Congestion and Pain)	1.9
10.	Ear problems (Discharge and pain)	0.6
11.	UTI	1.9
12.	Accidents and injuries	2.1
13.	Arthritis	16.7
14.	Hypertension	9.5
15.	Diabetes Mellitus	7.5
16.	Back ache	9.5
17.	Asthma	7.5
18.	Chest pain	3.8
19.	Anemia	5.7
20.	Cataract	1.7
21.	Piles	1.3
22.	Pain abdomen (non-Specific)	2.7
23.	Heart ailments	1.0
24.	Peptic ulcer	1.4
25.	Chronic Bronchitis	2.2
26.	Goitre	0.6
27.	Skin diseases	1.7
28.	Joint pain	2.4
29.	Constipation	2.5
30.	Kidney problems	0.8
31.	Cancer	0.5
32.	Memory loss/Impairment	0.5
33.	Paralysis	0.5
34.	Varicose vein	0.2
35.	Senility	0.2
36.	Others	0.5

All values given above are in percentages

In the sample population there were 417 (Acute & Current chronic) people with current illness reporting 720 conditions, on an average 1.7 conditions per person. As it is evident from the tables, the subjects presented with a wide variety of acute and chronic illnesses. It is the non-communicable diseases like Hypertension, Diabetes Mellitus and Rheumatic Arthritis, in both, their acute and chronic variants, which formed the majority. The other common complaints were too diverse as to make any general statement on their nature.

3.11 Chronic Morbidity

Table: 3.11 Prevalence of chronic morbidity (includes current and long term)

	Chronic Morbidity	Total (N=630)	Males (n=272)	Females (n=358)
1.	Arthritis	40.5	27.6	50.3
2.	Hypertension	23	18.8	26.3
3.	Diabetes Mellitus	14.9	13.2	16.2
4.	Back ache	11.7	9.6	13.4
5.	Asthma	9.2	11.0	7.8
6.	Chest pain	7.0	7.0	7.0
7.	Anemia	6.5	5.9	7.0
8.	Cataract	6.2	6.6	5.9
9.	Piles	4.3	6.3	2.8
10.	Pain abdomen	4.1	4	4.2
11.	Heart ailments	3.8	4.8	3.1
12.	Peptic ulcer	3.0	4.0	2.2
13.	Chronic Bronchitis	2.9	4.0	2.0
14.	Goitre	2.7	0.7	4.2
15.	Skin diseases	2.4	3.3	1.7
16.	Joint pain	2.1	1.1	2.8
17.	Constipation	1.9	1.5	2.2
18.	Kidney problems	1.1	1.1	1.1
19.	Cancer	1.1	0.7	1.4
20.	Tumour	1.1	1.1	1.1
21.	Memory loss/Impairment	1.0	1.1	0.8
22.	Paralysis	0.6	0	1.1
23.	Varicose vein	0.5	0.7	0.3
24.	Hernia	0.3	0.7	0
25.	Senility	0.3	0.7	0

All values given above are in percentages

In our sample of 630 subjects 422 were suffering from some form of chronic illness, of which 250 had an episode of this on the day of the survey. Overall 422 people reported 959 conditions, that is an average of 2.27 chronic conditions per person. The burden of chronic morbidity is thus very high. This would perhaps not been captured if only current morbidity was considered.

3.12 Duration of Acute Illness

The people reported a wide range of diseases, when questioned on acute morbidity experienced on the day of survey. The duration of these illnesses ranged from 1 to 30 days with some people reporting the duration for these illnesses as long as 90 days (Table attached in appendix 3.9).

3.13 Duration of Chronic Illness

Generally, looking at the mean duration of individual illnesses, we can say that these conditions caused, on an average, a period of suffering ranging from 5 to 10 years. This is true for 76% of all conditions. Barring 4 conditions, the other 24% had an average period of suffering of less than 5 years.

Generally, looking at the mean duration of individual illnesses, we can say that these conditions caused, on an average, a period of suffering ranging from 5 to 10 years. This is true for 76% of all conditions. Barring 4 conditions, the other 24% had an average period of suffering of less than 5 years. (Table in appendix3.10)

3.14 Prevalence of gynaecological morbidity

Out of the 358 women, 8.7% of them were suffering from uterine prolapse, 6.4% had urinary incontinence and 5.3% have vaginal discharge. Uterine prolapse and urinary incontinence were more in above 60 age group than the below 60 age group.

Table: 3.14 Age wise distribution of the gynaecological morbidity

Gynaecological Morbidity	<60yrs. (n=200)	>60yrs (n=158)	Total (N=358)
Uterine prolapse	7.0	10.8	8.7
Urinary incontinence	5.0	8.2	6.4
Discharge per vaginum	6.5	3.8	5.3
No Gynaecological Morbidity	81.5	77.2	79.6

All the values given above are in percentages and will add up to hundred vertically

3.15 Duration of gynaecological morbidity

The majority was in the less than five years duration group but the mean duration for each condition is above five years. This is because in each category there were one or two people who were suffering from the condition for over 25 years (Table in appendix3.15)

3.16 Symptoms related to menopause

Among the 358 women, 303 (84.6%) of them had attained menopause. Among the menopausal women, 209 (69%) reported that, they do experience some sort of menopausal symptoms. The most common symptom associated with menopause were hot flushes (70%) followed by night sweats (50.7%) and insomnia (31.1%).

Table: 3.16 Symptoms related to menopause

Symptoms related to menopause N=209	Yes Percentage	No Percentage
Hot flushes	69.9	30.1
Night sweats	50.7	49.3
Weight gain	7.2	92.8
Fatigue	1.0	99.0
Abdominal pain	12.9	87.1
Vaginal dryness	8.1	91.9
Depression	1.0	99.0
Insomnia	31.1	68.9
Heavy bleeding	31.1	68.9

Section-3 a. Determinants of morbidity

3.17 Prevalence of Morbidity based on the severity by age and sex

The available data does not show any significant variation in morbidity by sex. We do not expect any change in prevalence of acute illness by age or sex and we did not find any, either. On the chronic disease front, if we take both the categories together (chronic and current chronic), it is seen that there is not much change in the prevalence pattern by sex or age groups. Perhaps the only finding worth mentioning is that, of the total number of people suffering from a chronic illness, majority in the group above the age of sixty are currently symptomatic.

Table: 3.17 Prevalence of Morbidity based on the severity by age and sex:

Morbidity	<60years		>60years		Total		Total
Sex N=630	Males n=136	Females n=200	Males n=136	Females n=158	Males n=272	Females n=358	
Acute	28	25	27.2	26.6	27.6	25.7	167(26.5)
Current Chronic	28.7	36	45.6	48.7	37.1	41.6	250(39.7)
Not current but chronic	30.1	31	23.5	23.4)	26.8	27.7	172(27.3)
No Morbidity	13.2	8	3.7	1.3	8.5	5	41(6.5)

All the values given above are in percentages.

3.18 Health Status and age group

Table: 3.18 Health status by age groups

Illness N=630	< 60years		> 60years		Total		P value
	Yes	No	Yes	No	Yes	No	
Acute Morbidity	14.0	39.4	12.5	34.1	26.5	73.5	0.847
Chronic Morbidity	34.0	19.4	33.0	13.6	67	33.0	0.060
No Morbidity	5.4	48	1.1	45.5	6.5	93.5	0.001

All values given above are in percentages and will add up to hundred horizontally

3.20 Educational Status and Health

Education wise the sample population was categorized into four groups. There is no relation between educational status and incidence of acute illness or chronic illness. However educational status is positively associated with good health. Here the χ^2 p value was <0. 001.

Table: 3.21 Educational Status and Health

Educational Status and Health						
N = 630	**No Schooling (n =83)**	**Primary (n=227)**	**Secondary (n=244)**	**Higher & above (n =76)**	**Total**	**P Value**
Acute Morbidity						
Yes	33.7	28.2	25.8	15.8	26.5	0. 068
No	66.3	71.8	74.2	84.2	73.5	
Chronic Morbidity						
Yes	62.7	69.6	65.6	68.4	67	0.637
No	37.3	30.4	34.4	31.6	33	
No Morbidity						
Yes	3.6	2.2	8.6	15.8	6.5	< 0.001
No	96.4	97.8	91.4	84.2	93.5	

All values given above are percentages and add up to hundred vertically

3.22 Occupational Status and Health

There is no significant difference between incidence of acute illness and chronic illness and occupational status. There is a significant relation between current occupational status and absence of illness (χ^2 P =0.013).

Table: 3.22 Occupational Status and Health

Occupational Status and Health								
Occupation N = 630	**Laborers (n=67)**	**Self employed (n=30)**	**Salaried (n=11)**	**House wives (n=288)**	**Unemployed (n=104)**	**Living of assets (n=130)**	**Total**	**P value**
Acute Morbidity								
Yes	29.9	30	18.2	24	32.7	25.4	26.5	0.542
No	70.1	70	81.8	76	67.3	74.6	73.5	
Chronic Morbidity								
Yes	68.7	53.3	72.7	70.1	64.4	63.8	67	0.420
No	31.3	46.7	27.3	29.9	35.6	36.2	33	
No Morbidity								
Yes	1.5	16.7	9.1	5.9	2.9	10.8	6.5	0.013
No	98.5	83.3	90.9	94.1	97.1	89.2	93.5	

All values given above are percentages and will add up to hundred vertically

3.23 Socioeconomic status and Health

We had assigned a score to each of the items listed in the SES check list, like type of house, assets etc. and we added up the scores to reach a total SES score which was categorized into three groups. But, when health status was tested for significance against this score, we could not find any significance. Therefore, we have chosen to use our own categorization of the study population by SES. We could find a strong association between the assessed SES and prevalence of acute illnesses. As we go up the Socio-economic strata, the prevalence of acute illness come down from 48.5 to 13.4. There was a significant association between the prevalence of chronic illness and the socioeconomic status. However, here the prevalence is going up as the SES improves, from 48.5% to 75.8%. In the lower SES, the percentage of people enjoying good health is 3% and in the Upper SES the percentage rises to 10.7%.

Table: 3.23 Socioeconomic status and Health

Socioeconomic status and Health					
N=630	**SES1 (Lower) (n=33)**	**SES2 (Middle) (n=448)**	**SES3 (Upper) (n=149)**	**Total**	**P Value**
Acute Morbidity					
Yes	48.5	29.2	13.4	26.5	<0.001
No	51.5	70.8	86.6	73.5	
Chronic Morbidity					
Yes	48.5	65.4	75.8	67.0	<0.004
No	51.5	34.6	24.2	33.0	
No Morbidity					
Yes	3	5.4	10.7	6.5	<0.049
No	97	94.6	89.3	93.5	

All values given above are percentages. The percentages add up to hundred vertically.

3.24 Type of cooking fuel and health

It is well known and a documented fact that type of cooking fuel used has a strong association with the incidence of respiratory illness. As respiratory illnesses form the major chunk of acute illness, it is only natural that there is a strong association between these two variables. The table shows that the percentage of people with acute illness increase from 21 to 30% as we move from the LPG category to the wood category. In our sample the groups of chronic illness include diseases like cardiovascular ailments,

arthritis, diabetes and gastrointestinal problems. These illnesses do not have any association with the type of fuel used. This table provides evidence to the fact that the type of fuel does have an association with good health. Among the wood users only 4.4% reported good health, whereas in LPG users, the percentage with good health was10%.

Table: 3.24 Type of cooking fuel and health

Type of cooking fuel and health				
N = 630	**Wood (n=387) (Predominantly or exclusively)**	**LPG (n=243) (Predominantly or exclusively)**	**Total**	**P value**
Acute Morbidity				
Yes	30	21	26.5	0.013
No	70	79	73.5	
Chronic Morbidity				
Yes	65.6	69.1	67	0.362
No	34.4	30.9	33	
No Morbidity				
Yes	4.4	9.9	6.5	0.007
No	95.6	90.1	93.5	

All the values given above are in percentages and will add up to hundred vertically

Life style factors

3.25 Smoking and Health status

There was no significant association between smoking status and acute illness. The group of chronic illnesses includes cardiovascular and non-communicable diseases like hypertension and diabetes, which are proven to have an association with smoking status and there was a significant association between smoking and Chronic morbidity.

Table: 3.25 Smoking and Health

Smoking and Health					
N=630	**Past Smokers (n =80)**	**Never (n =440)**	**Current (n =110)**	**Total**	**P Value**
Acute Morbidity					
Yes	26.3	24.5	34.5	26.5	**0. 104**
No	73.8	75.5	65.5	73.5	
Chronic Morbidity					
Yes	70	69.8	53.6	67	**0.004**
No	30	30.2	46.4	33	
No Morbidity					
Yes	3.8	5.7	11.8	6.5	**0.037**
No	96.3	94.3	88.2	93.5	

All the values given above are in percentages and will add up to hundred vertically

3.25.1 Prevalence of chronic illness and smoking among males: It is seen that smoking among males has got a significant association with prevalence of chronic illness.

Table: 3.25.1 Prevalence of chronic illness and smoking among males

Chronic illness N=272	Current smokers (n=108)	Past smokers (n=80)	Never smoked (n=84)	Total	P value
Yes	52.8	70	72.6	64	0.007
No	47.2	30	27.4	36	

All the values given above are in percentages and will add up to hundred vertically

3.26 Tobacco use and Health

There is no significant association between tobacco use and prevalence of morbidity. But there was some association between the absence of any illness and the use of tobacco.

Table 3.26 Tobacco use and Health

Tobacco use and Health					
N=630	Past use (n=36)	Never (n=489)	Current (n=105)	Total	P Value
Acute Morbidity					
Yes	27.8	24.9	33.3	26.5	0.206
No	72.2	75.1	66.7	73.5	
Chronic Morbidity					
Yes	66.7	67.5	64.8	67	0.864
No	33.3	32.5	35.2	33	
No Morbidity					
Yes	5.6	7.6	1.9	6.5	0.099
No	94.4	92.4	98.1	93.5	

All the values given above are in percentages and will add up to hundred vertically

3.27Alcohol use and Health

There is no significant association between alcohol use and acute and chronic morbidity. Also there is no significant association between alcohol use and health status.

Table: 3.27 Alcohol use and Health

Alcohol use and Health					
N=630	Past use (n=52)	Never (n=523)	Current (n=55)	Total	P Value
Acute Morbidity					
Yes	25	26.4	29.1	26.5	0.881
No	75	73.6	70.9	73.5	
Chronic Morbidity					
Yes	67.3	67.9	58.2	67	0.346
No	32.7	32.1	41.8	33	
No Morbidity					
Yes	7.7	5.7	12.7	6.5	0.126
No	92.3	94.3	87.3	93.5	

All values given above are in percentages. Percentages will add up to hundred vertically

3.28 Physical Activity and Health

There is no significant association between physical activity and prevalence of acute and chronic illness. From the tables we can see that, presence of any illness causes a significant reduction in the physical activity pattern. This a reflection of current life style if level of physical activity itself is determined by chronic morbidity, then this is not a determinant but a consequence of that morbidity. However it should be kept in mind that, the physical activity is related not just to illness alone, but also to factors like age and sex as can be seen from the succeeding analysis.

Table: 3.28 Physical Activity and Health status

Physical Activity and Health					
N=630	**Vigorous (n=93)**	**Moderate (n=319)**	**Mild (n=218)**	**Total**	**P Value**
Acute Morbidity					
Yes	18.3	27.3	28.9	26.5	0.137
No	81.7	72.7	71.1	73.5	
Chronic Morbidity					
Yes	64.5	65.5	70.2	67.0	0.455
No	35.5	34.5	29.8	33.0	
No Morbidity					
Yes	17.2	7.2	1	6.5	<0.001
No	82.8	92.8	99	93.5	

All values given above are in percentages. Percentages will add up to hundred vertically

3.28.1Physical activity pattern and age: Here we can see that moderate to vigorous physical activities are severely curtailed in the higher age groups. Females capable of vigorous activities is very few, compared to males. However, in the moderate category women seem to do better and this could be a reflection of their gender role, for which they ignore hardships like minor illness and age.

Table: 3.28.1 Age wise distribution of physical activity:

Physical activity pattern and age group					
N=630	**Vigorous (n=93)**	**Moderate (n=319)**	**Mild (n=218)**	**Total**	**P Value**
Age group					
<60years	84.9	66.8	20.2	53.3	<0.001
>60years	15.1	33.2	79.8	46.7	
Sex					
Males	72.0	37.0	39.9	43.2	<0.001
Females	28.0	63.0	60.1	56.8	

All values given above are in percentages. Percentages will add up to hundred vertically

3.29 Dietary pattern and health

There is no significant association between the health status and dietary pattern.

Table: 3.29 Dietary pattern and health:

Dietary pattern and health				
N = 630	**Vegetarian (n=17)**	**NonVegetarian (n=613)**	**Total**	**P value**
Acute Morbidity				
Yes	41.2	26.1	26.5	0.164
No	58.8	73.9	73.5	
Chronic morbidity				
Yes	58.8	67.2	67.0	0.468
No	41.2	32.8	33.0	
No Morbidity				
Yes	0	2.9	6.5	0.270
No	100	97.1	93.5	

All the values given above are in percentages and will add up to hundred vertically

3.30 Menopause and health

Acute morbidity is more a reflection of infectious diseases than any other life style or non-communicable diseases. And menopause was not found to be significantly associated with its prevalence. We have ample evidence from literature that, menopause has a strong association with many chronic illness involving cardiovascular and musculo-skeletal system. Our findings underline this association. This table shows that menopause does affect the health status of the women.

Table: 3.30 Menopause and health status

Menopause and health				
N = 358	**Attained (n=303)**	**Not attained (n=55)**	**Total**	**P value**
Acute Morbidity				
Yes	25.7	25.5	25.7	0.964
No	74.3	74.5	74.3	
Chronic morbidity				
Yes	71.9	54.5	69.3	0.010
No	28.1	45.5	30.7	
No Morbidity				
Yes	2.3	20.0	5.0	<0.001
No	97.7	80.0	95.0	

All the values given above are in percentages and will add up to hundred vertically

3.31Perceived present health status

Out of the total 630 individuals 46% of them said they were healthy even if they have some sort of illness. Among that 49% of them were males and 51% of them were females.

Table: 3.31 Age and sex wise distribution of perceived health status.

Age group	Healthy		Not healthy		Total
N=630	Males (n=142)	Females (n=148)	Males (n=130)	Females (n =210)	
<60Years	60.6	64.2	38.5	50	53.3
>60years	39.4	35.8	61.5	50	46.7

All the values given above are in percentages and will add up to hundred vertically

3.31.1 Perceived present health status and reported morbidity

Of the total 290 people who felt they were healthy one fifth and one third were actually suffering from some sort of morbidity .Out of 422 subjects with chronic illness, 185 (43.2%) feel that they are healthy and the remaining perceives themselves as not healthy. Among the 41 subjects who were not having any illness, 3 (7.3%)of them believe that they are not healthy.

Table: 3.31.1 Perceived present health status and reported morbidity

Health status	Healthy			Not Healthy			Total
Morbidity N=630	Males (n=130)	Females (n=210)	Total (n=290)	Males (n=130)	Females (n=210)	Total (n=340)	
Acute	36	31	67	39	61	100	167
Chronic	85	100	185	89	148	237	422
No morbidity	21	17	38	2	1	3	41

All values given above are numbers.

3.32 Reasons for ill health

Following were the reason given by the sample population regarding the reasons for ill health. Majority was of the opinion that the main reason for ill health is aging (55.9%). Slightly more than fourteen percent of them had an opinion that the stressful conditions in the past are another reason for ill health. Eleven percent of them had the opinion that hard work in the past could also be the reason for their present ill health.

Table: 3.32 Reasons for ill health by sex:

Reported reasons (N=630)	Males (n=272)	Females (n =358)	Total (n =630)
Aging	56.6	55.3	55.9
Hereditary	2.9	2.5	2.7
Stressful conditions in the past	14.3	14.2	14.3
Hard work in the past	11.4	11	11.1
Illnesses in the past	7.4	8.1	7.8
Surgical interventions in the past	1.8	3.6	2.9
Poverty	0.4	1.4	1.0
God's will	1.1	0.8	1.0
Geographical peculiarities of the region	1.1	0.8	1.0
Changes in the dietary pattern	2.6	0.8	1.6
Death or loss immediate relatives	0.4	1.2	0.8
Lack of family support	0	0.3	0.2

All values given above are in percentages

3.33 Sleeping pattern

Nearly seventy percent of the total had less than 7 hours of sleep and 31.4 of them had more then seven to eight hours of sleep.

Table: 3.33 Sleeping pattern by sex

Hours. Of sleep N=630	Males (n=272)	Females (n =358)	Total
7-8hrs or more (n=198)	32	31	31.4
Less (n=432)	68	69	68.6

All values given above are in percentages and will add up to hundred vertically

Section -3 b. Determinants of Nutritional status

3.34 Body Mass Index

Age: In all categories of BMI, the percentage of people above the age of 60 is lower than that of the percentage of people below 60. It shows that as age increases a high proportion become undernourished A third of the population in low BMI even in 45-60 age group indicating poor nutritional status.

Sex: There is a significant association between BMI and sex. In the normal and high categories of BMI, females form the majority, while in the low BMI category the percentage of males is high. This feature could be because of the postmenopausal increase in body weight of the females.

Table: 3.34 BMI and its determinants:

Variables	Body mass Index				
(N=621*)	Low (<20) (n=222)	Normal (20–25) (n=290)	High (> 25) (n=109)	Total	P Value
Age group					
<60years	46.8	57.5	58.7	53.9	0.029
>60years	53.2	42.5	41.3	46.1	
Sex					
Males	55.4	40.4	26.6	43.3	<0.001
Females	44.6	59.6	73.4	56.7	
Occupational status					
Laborers	14.9	10.0	4.5	10.8	<0.001
Self employed	5.4	5.5	1.8	4.8	
Salaried	0.9	2.8	1.0	1.8	
House wives	31.9	47.6	67.0	45.3	
Unemployed	24.8	13.8	8.2	16.8	
Living off assets	22.1	20.3	17.5	20.5	
Socioeconomic status					
SES 1 (lower)	9.5	4.1	0	5.3	<0.001
SES 2 (middle)	74.3	70.7	65.2	71.0	
SES 3 (upper)	16.2	25.2	34.8	23.7	
Menopause					
(N = 352*)	Low (<20) (n=99)	Normal (20–25) (n=173)	High (> 25) (n=80)	Total	P Value
Pre menopause	6.1	20.2	16.3	15.3	0.007
Post Menopause	93.9	79.8	83.7	84.7	

All values given above are in percentages and will add up to hundred vertically

(BMI could not be computed for 9 subjects, as basic measurements could not be taken for them. Three of these 9 were bedridden and the rest 6 did not permit measurement. In that 6 of them were females)*

Occupation: There seems to be a significant association between BMI and occupation. There is a variation across classes and this is not uniform. If we take them category wise, the unemployed category has its majority (52.9%) in the low BMI group, 38.5% in the Normal category and 15% in the high BMI group. Among laborers also the percentage of people is maximum in the low BMI group, with only 7.5% in the high BMI group. All the other categories were similar with the majority falling within the normal BMI range.

Socioeconomic status: There is a strong positive association between the BMI and socioeconomic status .As we go up the SES strata the average BMI tends to rise.

Menopause: The BMI and Menopause does have a strong association in the years immediately following menopause. The mean BMI among the pre- menopausal women

was 23.53 (n=54) and in the postmenopausal group it was 21.98 (n=298). The reason could be that the other factors like age, nutritional status and SES of our study population also coming into play here. In our study group the mean age of the postmenopausal population was 62.62 and that of the peri-menopausal group was 47.96. This wide variation shows that our sample population had only a small proportion of women in the immediate post menopause group.

Section – 4 Health seeking behavior

3.35 Curative care

The main source of medical advice is private (54 %). Twenty five percent of the people were using the public service alone. The remaining 20.6% was using both public and private service. Of our sample of 630, 93.5% were seeking medical advice from a health professional in general, 1.9% from traditional practitioners. One percent of them were treating themselves, and 3.6% made use of over the counter medication.

Table: 3.35 Health seeking behavior of the sample population by sector and type of provider

Service utilization (n=630)	**Males (n= 272)**	**Females (n=358)**	**Total**
Private	55.1	53.1	54
Public	21.7	28.2	25.4
Both	23.2	18.7	20.6
Source of medical advice			
Health professionals	90.4	95.5	93.3
Traditional practitioners	2.6	1.7	2.1
Self prescription	1.8	.6	1.1
OTC medication	5.2	2.2	3.5

All values given above are in percentages and will add up to hundred vertically

3.36 Preventive care

Only 1.9% of the sample were seeking medical advice in the absence of any illness as a preventive or monitoring measure. Only about half the proportion of females as males sought medical checks ups as a preventive or monitory measure.

Table: 3.36 Use of health services as a precaution against illness by sex:

Use of health check up (n=630)	**Males (n=272)**	**Females (358)**	**Total**
Yes	2.6	1.4	1.9
No	97.4	98.6	98.1

All values given above are in percentages and will add up to hundred vertically

Only 1.9% of the sample were seeking medical advice in the absence of any illness as a preventive or monitoring measure. Only about half the proportion of females as males sought medical checks ups as a preventive or monitory measure.

3.37 Health service utilization

3.37.1 Use of health service by age: Eighty-nine percent of the subjects seek treatment whenever they are ill. Seven percent of them seek treatment once in a month and 3% of them once in a week and 1% of them never utilize the health service at all . There is no significant difference in utilization of health service by older adults and aged ones.

Table: 3.37.1 Use of health service by age:

Use of health services	**Age group**		
N=630	**<60yrs (n=336)**	**>60yrs (n=294)**	**Total**
Frequently (once in a week)	1.8	4.1	2.9
Occasionally (Once in a month)	5.9	7.8	6.8
Whenever ill	91.1	87.4	89.3
Not utilizing at all	1.2	0.7	1

All values given above are in percentages and will add up to hundred vertically

3.37.2 Use of health services by sex: There is no significant difference here, by sex.

Table: 3.37.2 Use of health services by sex:

Use of health services N=630	**Sex**		
	Males (n =272)	**Females (n=358)**	**Total**
Frequently (once in a week)	3.3	2.5	2.9
Occasionally (Once in a month)	6.6	7.0	6.8
Whenever ill	88.3	90.2	89.3
Not utilizing at all	1.8	0.3	1.0

All values given above are in percentages and will add up to hundred vertically

3.37.3 Distance to the health facility: For the majority, the facility where they usually sought health care was within 10 kms while a significant proportion (18.7%) sought health care from more than 10 km away.

Table: 3.37.3 Distance to the place from where health care is usually sought

Distance to health facility	**Percentage (n=630)**
< 3km	29.7
3 to 10km	51.6
> 10km	18.7

All values given above are in percentages and will add up to hundred vertically

3.37.4 Permission needed: Nearly eighty seven percent of the females and 11.8% males have told that they have to take permission from other responsible family members to seek medical care.

Table: 3.37.4 Permission to seek medical care:

Permission to seek medical care	Sex		Total
(N=630)	Males (n 272)	Females (n =358)	
Yes	11.8	86.9	54.4
No	88.2	13.1	45.6

All values given above are in percentages and will add up to hundred vertically

3.37.5 System of treatment used for acute illness: System of treatment for acute illness majority of them opted for modern medicine for the treatment of such illness. Probably due to the immediate relief provided by these medications (Table in appendix 3.37.5)

3.37.6 System of treatment used for Chronic Illness: As far as the choice of the system of treatment for chronic illnesses is concerned, we can say that the lion's share was taken by Modern medicine, with Ayurveda bringing up a distant second spot. About seven percent of the people suffering from a chronic illness did not opt for any system of treatment for their condition (Table in appendix 3.37.6).

3.37.7 System of treatment used for gynaecological morbidity: Out of 31 women who had uterine prolapse 30(96.7%) of them have never sought any sort of medical advice for the problem. One of them (3.3%) is taking treatment from modern medicine. In case of urinary incontinence out 23women, 18(78.3%) have not taken any treatment,3 (13%) of them were taking modern medicine and one is following naturopathy. Fifteen (79%) of them who are suffering from discharge per vagina also never sought any type of treatment, the remaining four of them had taken treatment, two from modern medicine and two from naturopathy. Only 4.5% of the women sought medical help for the problems related to reproductive system recently (within 3 months). (Table in appendix 3.37.7)

Section – 5 Health Consequences

3.38 Functional capacity limitation by age and sex

Out of 630 subjects 18.4 % of them have difficulty in lifting 5kg weight and 11.2% needs someone's help or were not able to lift 5kg.Nearly fifty five percent of them had difficulty in walking up an down 15 steps and 8% of them need someone's help for the same. More than a quarter of the subjects (26.4%) are able to use some kind of transportation with difficulty for moving one place to another, 6.5% of them need help. While 40.5% of the subjects had difficulty in cutting toenails, 9.7% of them need help for the same. Thirteen persons had difficulties with dressing and another 13 need help for this. (Table in appendix 3.38)

3.39 Disability Status

There is a marginal difference in the proportions of males and females suffering from some sort of disability, with the proportion of females being slightly higher.

Table: 3.39 Disability status by sex

Disability Status	Normal		Partially Impaired		Totally impaired	
	Males (n=272)	Females (n=358)	Males (n=272)	Females (n=358)	Males (n=272)	Females (n=358)
Mobility	31.6	24.0	68.0	75.7	0.4	0.3
Hearing	86.8	85.8	13.2	14.3	0	0
Vision	16.2	15.4	83.8	84.6	0	0
Mental	99.3	100	0.7	0	0	0

All the values given above are in percentages.

3.39.1 Disability status by age and sex: Across age groups and sex, we could not find any definite pattern in changes of the disability status. However, it is clear that a substantial proportion of the subjects from either group suffer from some sort of disability. The proportion of those suffering from mental impairment was very low.

Table: 3.39.1 Disability status by age and sex

Disability Status N=630	Normal				Partially Impaired				Totally impaired			
Age	<60yrs		>60yrs.		<60yrs		>60yr		<60yrs		>60yrs	
Sex (n)	M 136	F 200	M 136	F 158	M 136	F 200	M 136	F 158	M 136	F 200	M 136	F 158
Mobility	47.8	35	15.4	10.1	52.2	64.5	83.8	89.9	0	0.5	0.7	0
Hearing	90.4	91.5	83.1	78.5	9.6	8.5	16.9	21.5	0	0	0	0
Vision	22.8	19	9.6	10.8	77.2	81	90.4	89.2	0	0	0	0
Mental	99.3	100	99.3	100	0.7	0	0.7	0	0	0	0	0

All the values given above are in percentages.

3.39.2 Action taken for those who disabled: Among those subjects who were having partial or total impairment 29.6% of the males and 44.9% of the females had sought treatment for mobility related conditions. Of those people who were having hearing problems, 16.7% of the males and 21.6% of the females also had sought treatment for hearing problems. For visual complaints 70.2% of males and 68.6 % of the females had sought treatment for the same.

Table: 3.39.2 Action taken for those who disabled:

Disability Status	Total with disability		Actions taken for those with disability	
	Males (n=272)	Females (n=358)	Males	Females
Mobility	68.4	48.0	29.6	44.9
Hearing	13.0	14.3	16.7	21.6
Vision	83.8	84.6	70.2	68.6
Mental	0.7	0	100	0

All the values given above are in percentages.

3.39 Ability to earn for a living

Out of the total 589 people who are having some kind of illness, 62.5% mentioned that, illness does affect their ability to earn for a living.

Table 3.40 People with illness and their ability to earn for a living

Earn for a living (N=589)	Males (n =249)	Females (n =340)	Total
Yes (n=368)	61.9	62.9	62.5
No (n=221)	38.1	37.1	37.5

All values given above are in percentages and will add up to hundred vertically

3.40.1 Chronic illness and ability to earn living: Out of the total 422 subjects with chronic illness 58.5% are not able to earn for their living due to illness. The remaining 41.5% of them were able to earn for their living even they are ill.

Table: 3.40.1 Sample population with chronic illness and ability to earn living by age and sex

Capacity to earn for a living	Chronic Morbidity				
(N=422)	<60yrs		>60yrs		Total
	Males (n =80)	Females (n=134)	Males (n=94)	Females (n =114)	
Yes	56.3	52.2	62.8	64.0	58.5
No	43.7	47.8	37.2	36.0	41.5

All values given above are in percentages and will add up to hundred vertically

3.40 Participation in Social Events

Out of the total 589 people who are having some kind of illness (either acute or chronic), 76.4% of them had mentioned that, illness affect their participation in social events.

Table: 3.41 Sample population with illness and their participation in social events by sex

Participation in Social events (N=589)	Males (n =249)	Females (n=340)	Total
Yes	71.1	80.3	76.4
No	28.9	19.7	23.6

All values given above are in percentages and will add up to hundred vertically

3.41.1 Chronic Illness and participation in social events: Seventy eight percent of the subjects with chronic illness are able to participate in social events even in the presence of illness. Twenty-two percent of them are unable to participate in social events.

Table: 3.41.1 People with chronic illness and their ability to participate in social events.

Participation in social event	Chronic Morbidity				
N=422*	<60yrs		>60yrs		Total
	Males (n=80)	Females (n=134)	Males (n=94)	Females (n=114)	
Yes (n=329)	65.0	72.4	81.9	90.4	78
No (n=93)	35.0	27.6	18.1	9.6	22

All values given above are in percentages and will add up to hundred vertically

Chapter IV
DISCUSSION AND CONCLUSIONS

4.1 Discussion

To put a number on the actual prevalence of morbidity, in both its acute and chronic forms for people above the age of 45 years was the main objective of the study. We found it to be 26.5% for acute illnesses and 67% for chronic illness. The proportion of people who did not report any illness was very low, at 6%. The two major studies, which provide data on prevalence of morbidity in rural population, give very different numbers. For e.g., the KSSP study of 1996 gives a figure of 12.9% for acute disease and a still lower figure of 11.5% for chronic disease[40]. All India survey of 1990 reports 23.5% prevalence for chronic diseases in rural Kerala. However, both studies are talking about the overall morbidity of the entire population and not of any specific age groups.

We also looked at chronic morbidity in some detail .We classified chronic morbidity into two classes i.e. Current Morbidity-Chronic, and Not Current-but Chronic morbidity in order to bring in the dimension of the level of suffering. Under this classification the prevalence of Current Morbidity-Chronic was found to be 39.7% (i.e. they were suffering from the condition on the day of the survey) and that of Not current – but Chronic morbidity is 27.3%.

It is apparent that these figures do not match with whatever data i.e. available at present. We can find many reasons for this discrepancy in figures. They could be due to : actual increase in morbidity in the population, perception of the disease by people, a real difference in illness burdens in the population[35]. It can also be due to the higher life expectancy in Kerala, as majority of the sample population was above the age of 60years. Emergence of non-communicable diseases like Diabetes mellitus, Hypertension etc as major contributors to overall morbidity also can be other reasons. This increase in acute

and chronic morbidity can only be explained by a combination of the above factors and not merely to any single factor.

The results of our study shows that the overall figures given by statewide or nation wide surveys cannot be taken at face value when looking at illness patterns of any specific geographical area. This also means that we may far off the mark in planning health interventions for the state as a whole based on such data.

There is not much difference in the morbidity status across gender. For acute illness it is slightly higher in males than females but this difference is negligible. But in current episode-chronic illness category females predominate. It is the same in case of the Not Current - Chronic category. But this observed difference was not statistically significant. It was found that the major five diseases in the population were non-communicable and they include Rheumatic Arthritis (40.5%), Hypertension (26.3%), Diabetes mellitus (14.9%), Back ache (11.7%) and Asthma (9.2%) and a significant proportion of them were females. This increase in the proportion of non- communicable diseases is an indicator of health transition-taking place in the state.

Of the 630 subjects, 422 (66.8%) were suffering from some form of chronic illness. Together these 422 people were suffering 959 conditions at an average of 2.27 conditions per person. There was not much difference between the average number of conditions suffered by males (2.12) and females (2.37). This is however opposed to what some earlier studies had revealed. Sharma (1972) had reported quoting data from a study conducted in Rajasthan, that males suffer from more conditions than females[42]. This difference could be due to the fact that our study included subjects of the age 45 and above whereas the Rajasthan study looked only at people above the age of sixty. Another possible explanation for this difference between our findings and those of others in this field is that the interviewer in our case was a female and a larger proportion of the respondents were females. Earlier studies too have quoted similar reasons to explain differences in their

results[66]. Of the 422 people suffering from chronic conditions, 250 (59.2%) were experiencing symptoms of the condition on the day of survey.

Many authors in the past have noted the incidence/prevalence and duration of the illnesses as the two important dimensions of morbidity[67]. Only if we add the duration to the prevalence of the condition will we get a clear picture of the level of true suffering of the population. Duration is also influenced by the stage of development of the condition, when it can be medically detected and it is also known to affect the health-seeking pattern of the population. The longer the suffering of the patient, the higher is the chance of him/her reporting sick. Advances in medical technology have also a role in the increasing mean duration of certain illnesses, as the patients are kept alive for a longer period of time. We have here the mean duration of chronic conditions. Over 75% of the chronic conditions had a mean duration of 5 to 10 years. The major illnesses in this category include cardiovascular illnesses, Diabetes mellitus and Musculo skeletal disorders. There were a few conditions, which had a longer duration of suffering, but the rest of them had a mean duration of less than five years.

One important outcome of our study was the prevalence and duration of gynecological morbidity. The most common conditions suffered were uterine prolapse, urinary incontinence and discharge per vaginum. This is in accordance with earlier studies which reports genital prolapse as one of the major diseases along with carcinoma cervix [29,30].

An interesting feature was that nearly 15.6% of the women had undergone hysterectomy. The indications quoted were uterine prolapse, bleeding PV and tumors. So the proportion of women suffering from gynecological problems is perhaps under-represented here. Majority was suffering from these conditions for a mean duration of between 5 to 10 years.

The median age at menarche was 15 years. Recent studies done in the reproductive age group shows the median age at menarche to be much lower, at 13.5 years [68]. This shows

that the age at menarche has been decreasing over the years. One of the reasons could be the change in the dietary pattern and the average nutritional level of the adolescents of the present generation. Eighty five percent of the women in our sample have attained menopause and the median age at menopause was 48 years. This median age is computed taking into account only those women who had had a natural menopause. Many studies have failed to differentiate whether the age at menopause data include both natural and surgical menopause[7]. As mentioned earlier, a significant proportion (14.85%) of these were surgical ones. The reported average age at menopause from European and US populations is between 48 to 52 years[7].

Nearly 69% of the women who had attained menopause had experienced some sort of symptoms related to hormonal variations, like hot flushes, night sweats, weight gain, insomnia and vaginal dryness. These findings are more or less similar to findings reported earlier in studies[69]. Hot flushes were the most common symptom reported and was closely followed by night sweats, with insomnia, weight gain and depression. The results show that even in rural areas, the women are aware of the changes that take place in the body at menopause. Most of the women (95.5%) did not seek any medical aid for their symptoms, as they believed it to be part of a natural physiological process of life.

We found a significant association between menopause and chronic morbidity. This association has been proven beyond doubt by numerous other studies from across the globe. Standard textbooks of medicine also quote many of these studies to explain the increased incidence and prevalence of chronic cardiovascular and musculoskeletal problems among the postmenopausal women[8]. Rheumatoid arthritis and other forms of joint disorders are associated with the menopausal transition and linkages of autoimmune disorders to hormone levels have been demonstrated[70]. There are papers, which give a very high prevalence rate for arthritis[43, 71]. In our study too we found that over 50% of the women suffered from some sort of joint pathology. One another explanation is that of the

peculiar terrain of the region. Being a hilly area, a person will have to either climb or descend a slope to go anywhere beyond fifty metres. This excess strain on the joints especially of those in the lower extremities could be the reason for the increased incidence of joint pathologies. The perception among the public and the medical officer of the local Primary Health Centre corroborated this view.

About half the population (46.1%) felt that they were healthy, in spite of their morbidity status. There was not much difference in this proportion among males and females. But as age advances, the general proportion of people who felt that they were healthy decreased. More than half the population felt that the reason for their present ill health is due to ageing, while a third felt that stressful conditions in the past, including hard work and illnesses were responsible for the present health state.

As age is concerned, we found that there is a marginal difference in the prevalence of morbidity, from 63.7 to 70.7%, as age increases. However it was not statistically significant.

Marital status was not found to have any association with current health status. Among the various categories denoting the subjects' marital status, the prevalence of chronic morbidity ranges from 66.7% in currently married to 69.9% in widowed. There are not many studies on the effect of marital status on health. A study by Madhiwala et al,(1998) reports a higher rate for married than unmarried or widowed women, but our results do not show this difference[47]. In fact, our results show a marginal increase in morbidity for widowed women. This difference could be because of the fact that the women who are currently married enjoys better family support and are emotionally and socially more stable thus, and also may be because they are able to seek better and earlier health care for their symptoms.

Contraception in any form was not very popular in our sample. Of the females, about 79% had never used any type of contraceptive method. Among males, it was even higher, 92% had never used any contraceptive methods. Of the population who had used contraception,

permanent sterilization was preferred by the majority (20% in females and 8.3% of males). Reasons for this could be many. Firstly, we are talking about people who may have completed their reproductive years decades ago, when most of the modern methods available now for contraception were not in vogue, especially in a rural backward area of the most backward district of Kerala. Another reason could be that our sample population was predominantly Christian (70%), and it is well known and documented that it is a religion, which has strong reservations against contraception. The seventies was a period when vasectomy camps were actively being promoted throughout the country and that possibly explains the comparatively high number of vasectomies among the males. In the past two decades, the number of vasectomies has declined steadily in the entire district as per District Medical Office figures. However, it should be noted that a significant proportion of the men who had undergone vasectomy, felt their present ill health is due to the procedure. Another factor could be that the researcher being a young female, the men and the older women may have found it difficult to talk about such matters.

There was no significant association between educational status and morbidity. However we found significant association between good health and education with a higher proportion of those with better education reporting absence of any sort illness. Similar studies have however reported higher levels of both mortality and morbidity among those with less education [48].

The type of cooking fuel had a significant association with morbidity as far as acute illnesses are concerned. Those using wood (exclusively or predominantly) had a higher risk of contracting an acute illness than those using other types of cooking fuel. This finding is in agreement with the study by Tord Kjellstrom et al, 1992, who also found an increased incidence of acute morbidity especially respiratory illness[17]. A higher proportion of LPG users (predominantly or exclusively) in our study reported absence any sort of morbidity.

Socioeconomic status (SES) had an important role in the incidence and prevalence of acute and chronic morbidity but the relations were diametrically opposite. Acute morbidity was more in the lower SES and chronic morbidity was more in the upper SES. The proportion of people enjoying good health also increased as we go up the SE strata. Major studies in this area are by Arun Bali (1997) and Youlian Liao (1998) but they did not differentiate between chronic and acute morbidity[23,44]. They have found an inverse relationship between ill health and SES. Our findings could be explained by the fact that among those from the lower SES, the type of living conditions and cooking fuel etc may be exerting their influence in the prevalence of acute morbidity, as shown earlier. Those of the higher SES are prone to more chronic and non-communicable diseases because of their diet, lack of physical exercise and possibly because of their higher BMI levels.

We had assessed the BMI of the subjects under survey. Though there were some studies, which demonstrated an association between BMI and morbidity, we could not find any in our case. There were however many other factors which were found to be significantly associated with BMI. These include age, sex, occupational status, SES, and in the case of women, menopause.

In our study, the mean BMI of the age group above sixty is 20.4 for males and 21.8 for females. This is slightly higher than the figures quoted by National Nutrition Monitoring Bureau, 1991 that gives figures of 19.7 and 20.9 for males and females, respectively[72]. The mean BMI in the age group above sixty is lower than that of the younger group. This could be because of the senile changes, which causes muscle wasting and also changes in dietary pattern. There could be a social explanation too for this. Especially among the poorer, working classes, as a person ages and becomes economically unproductive, the share of food allotted to him / her also will decrease, and more importantly, the quality of the food too will not be the same as that of the younger and working members.

BMI is strongly associated with sex as well. Women are more in number in the high and normal BMI categories but the males form the majority in the low BMI category. However

this should be seen in association with age and menopause. It has been proven scientifically that there is an increase in the body weight during the postmenopausal period. This increase is said to be at its maximum during the immediate postmenopausal period [73]. As mentioned earlier, there is a large difference in the mean age of postmenopausal women and of that in the peri-menopausal group. This could be one of the reasons why the said difference is not very much observable in our study group, where the mean BMI decreases as we go from pre-menopausal to post menopausal groups.

Occupation has a significant association with BMI but is not uniform across different classes. In the unemployed persons and also in the manual labor class, the larger proportion was in the lower BMI group. In the manual labor group, only 7.5% were in the high BMI group. The explanation however, could be different for each of these categories. In the unemployed, the reason could be that the low income leading to low food intake, and in the manual labor class, it probably is due to the excessive physical activity that is depleting the fat stores leading to low weight and thus low BMI. In the other occupational groups, the highest proportion was in the normal BMI group.

Physical activity was found to be significantly associated with the absence of illness. It looks more like a reflection of the current life style. We know that these two variables (physical activity and health) have strong inter-relations. Moderate physical activity has been documented to be protective against many chronic illnesses, [53, 54,55] but presence of illnesses also can curtail the level of physical activity one can undertake. In other words, physical activity level could be a determinant as well as a consequence of morbidity.

We could find a significant association between smoking and chronic illness. There is enough evidence in the medical literature to prove the association between smoking and chronic illnesses like cardiovascular diseases and diabetes mellitus[60, 62,74]. In our sample of 358 women, we found only 2 women who smoked, which we feel would be true for the entire state as smoking by women is a rare phenomenon in Kerala. In males, our data

showed an association between chronic illness and smoking, but contrary to earlier findings, the prevalence of chronic illness was lower among smokers and was significantly higher in the never smoked category. The reasons for this cannot be easily explained. Probably we should look at it in the context of sample size (the comparatively lower number of males) and other features like BMI, physical activity pattern, occupation and socioeconomic status.

Coming to alcohol use and health, we could not find any association between it and the prevalence of morbidity of the sample. The percentage of alcohol users was 19.5 and that of past alcohol users 18.8. This is not in agreement with earlier studies of this nature, which found alcohol use and chronic illness to be closely associated[57].

More than a half of the population (54%) sought medical advice from a private provider, and a quarter (25.4%) used the public sector, while 20.6% used the services of both sectors. This finding is almost exactly similar to the findings of a recent study by the KSSP, which found the proportion of the private sector users to be 58% and the public sector users to be 28%[66]. Earlier studies had found the private sector users to be much higher, at 67% [75]. A notable feature of our study area was that the major private hospitals and the Government Taluk Head Quarters hospital are both situated at an equal distance (8 km). It should also be noted that though the private sector has grown by leaps and bounds over the decades, the proportion of people using the public sector has not come down, in fact it has increased from 23% in 1987 to 28 % in 1996[66].

Majority (93.5%) of the people sought care from a qualified health professional, with only less than 2% going to traditional practitioners. However, about 5% were treating themselves. This could be an after effect of improved literacy and awareness on health related matters. Less than 2% of the population used health services, as a preventive measure against future illness and the proportion of males in this category was double that

of the females. There was no significant difference in health care utilization patterns by sex and age groups.

More than half the sample population had to seek permission from others in the family to go for medical care. The person was usually the head of the family, and always the person with earning capacity. The proportion of females (86.9%) who had to seek permission were more than the proportion of males (11.8%). The reason was simple; these people did not have the capacity to earn and were economically dependant on others for subsistence.

An overwhelming majority (83.2%) used Modern Medicine, with Ayurveda (10.9%), Homeopathy (1.2%) and other systems making up the rest. About 3% did not use any system for their ailments. This too is more or less in agreement with the findings of the Kunhikannan and Aravindan study of 2000, which give figures of 82% for Modern medicine, 11% for Ayurveda, and 7% for Homeopathy[66]. People have different preferences when it comes to certain specific illness like Arthritis, where the proportion of people using Ayurveda is about 25%. When we come to the choice of treatment for gynecological morbidity, the picture is different, as more than three quarters not opting for any system of treatment. On detailed probing, women mentioned their reluctance to seek care for these conditions because of the shame associated with discussing these problems with a stranger.

It is the impact that it makes on the daily activities that is more important than the mere presence of the illness alone, as far as the older people are concerned. We had devised a scale to assess the level of impairment the disease had made on the individual in carrying out his/her daily activities. We found a significant proportion of the sample to be partially or totally impaired in terms of mobility and vision (72.6 and 84.2% respectively). The proportion with hearing disability was 13.8%. The proportion of females was notably higher in all these types of disabilities. So also was the proportion of the people aged over 60, compared to the younger group, which is similar to the observations made by the WHO[76]. Most of the studies, which we have come across, do not give age specific figures

for the level of disability and so comparison was not possible. It is important to note that a greater proportion of females in both age groups sought medical help fro these disabilities except for problems related to vision. One of the reasons could be that their suffering was more severe, or more debilitating.

We find that the pattern and proportion of the sample population having some level of functional capacity limitation with the proportion being higher in the older age group and in females. Mobility was the most affected parameter with other activities like 'cutting toe nail' and 'lifting five kg weight' being the most affected categories. Mobility limitation was the most important finding even in other studies of similar nature[64]. Sachdev (1998) had reported that all aspects of functional capacity showed a decreasing trend as age advanced in females[57].

Nearly two thirds of the population felt that the illness affected their capacity to earn for a living. This is more so in females and in the higher age group. Similar was the case in the ability to participate in social events. Comparison was not possible, as earlier studies in morbidity did not give data in this respect.

4.2 Conclusions

Initially, when designing the study, there was an idea that the prevalence of communicable and non-communicable chronic illnesses would be more or less similar. Therefore an entire section, was set apart to dwell on the details on communicable diseases. In our study, however, the prevalence of infectious diseases was found to be very low. If we take into account the conditions that could have an infectious origin among those reported as acute illnesses, we could find the figure to be much lower than a fifth (17%) of the total. Among chronic conditions too the picture is similar, with more than 94% having a non-infectious origin. We should also keep in mind that these findings are from a typical rural village in one of the most backward districts of Kerala. True, there is a high prevalence (93.5%) of overall morbidity among the population and this is more evident in the older age group (>60 years). We can explain it by the increased life

expectancy of the population, whereby the risk of contracting a non-communicable disease increases and also by the changes in the dietary pattern, lifestyle and environmental factors. Alternatively, the decrease prevalence of acute morbidity a reflection of the population (45^{+}) studied as infectious disease morbidity tends to dominate in the lower age groups.

SES exerts its influence in the general morbidity pattern of the population, in both acute and chronic. The lower the SES, the characteristic features are the living conditions, in terms of cleanliness of the surroundings, dietary pattern, lifestyle practices and type of cooking fuel. SES also affects the health care seeking behavior. The above conditions may be responsible for the comparatively higher levels of acute morbidity in the lower SES groups and comparatively higher levels of chronic morbidity in the upper SES group. This highlights the important methodological issue of having to distinguish between chronic and acute illness in morbidity analysis. Chronic and acute morbidity may strongly be influenced by SES, but in opposite directions. When such information is aggregated, the strength of association may get fudged.

There has been a tremendous improvement in the health care delivery infrastructure in the village in the past three decades, with more than four private hospitals (including one with a capacity of 65 beds in a village of about 10,000 population!) and several other hospitals belonging to other systems of medicine. The health awareness of the people has improved manifold as is evident from the way they answer questions relating to morbidity. This has led to a change in the health care seeking behavior of the people and they, increasingly, seek care for even minor ailments, which in early days they would have simply ignored. Our study shows that the overall health care seeking behavior of the people to be on the high side, but when it comes to gynecological morbidity among women, the tendency is to either ignore it or to accept it as the inevitable clearly highlighting the gender dimension in health care seeking

When it comes to the use of health care services for preventive care, only 2% of the population made use of existing facilities and among this 2%, the proportion of females was just about half that of the males.

The nutritional status of the study population in general was low, and it has to be ascertained whether this was a 'cause' or a 'result' of the high morbidity. The same could be said of physical activity, as it also could be a determinant or consequence of morbidity and the overall level of physical activity decreased with morbidity.

There were a considerable proportion of people who had impaired functional capacity, which adversely affected their capacity to earn for a living. This limitation is more marked among the females. One of the reasons has been mentioned earlier and that relates to the hilly terrain of the area. Women folk are more involved in carrying weights and water over long distances and this could affect their lower joints, which leads to chronic mobility impairments. Added to this is the effect of mineral loss and osteoporosis brought about by the hormonal imbalance created by menopause or by premature menopause caused by surgical interventions. This may be the explanation for higher levels of functional capacity limitations observed among women.

We had actually estimated the burden of 'self reported morbidity' which could be interpreted as the 'prioritized felt demands' of the community and, possibly, this represents area where the focus should be set on, in planning future health care interventions.

4.3 Recommendations

From our study, it is evident that the people over the age of forty-five have problems, not only in terms of morbidity but also due to the disability induced by this morbidity and perhaps age itself. We have a strong case here for establishing a programme for the 45^{+}, not just to address their health needs, but also to support their social and economic needs. (The Government of Kerala already has a pension scheme for the aged, but the qualification criteria are so stringent, that the truly needy are often denied the benefit).

The Reproductive and Child Health (RCH) programme does address women's' gynecological needs, but as the name suggests, it is mainly targeted at the reproductive age group. From our study, we can see that a lot of elderly women are suffering from reproductive tract pathologies, but only a tiny proportion sought medical care for that. This is surprising as most of these women sought medical advice for other issues related to their health. Perhaps a socio-anthropological study, to look into the reasons for this neglect of uterine pathologies would throw light on the real issues involved here.

The epidemiological transition is well under way and perhaps nearing the touchline, as is evident from the high prevalence of non-communicable diseases and the comparative low burden of communicable illnesses. We, at present do not have any sort of programs targeted at this issue. Maybe the time has come for us to start seriously thinking about screening programmes for non-communicable diseases like hypertension, diabetes mellitus and coronary artery diseases. Our study reports just the reported morbidity, and perhaps a more detailed study to quantify the real morbidity is needed before launching any ambitious programmes on this issue.

Another area which needs more attention is in the way that most of the programmes are funded and implemented nationwide without understanding the ground realities in each area. We would recommend area specific planning and funding based on the felt-need in each area, broadly based on national guidelines.

REFERENCES

1 **Christopher J L Murray, Alan D Lopez**, " Mortality by cause for eight regions of the world: Global burden of disease study", The Lancet, 1997; 349: 1269-1276.

2 **Omran, Abdel R.** 1971, as quoted in **Dean T. Jamison, W. Henry Mosley, Anthony R.Measham, Jose Leis Bobadilla,**"Disease control priorities in developing countries," A world bank book, Oxford university press, October 1993; 51-61:673-696.

3 **Dean T.Jamison, W. Henry Mosley, Anthony R.Measham, Jose Leis Bobadilla,**"Disease control priorities in developing countries, " A World Bank Book, Oxford university press, October 1993; 51-61:673-696.

4 **World Development Report** :Investing in health, oxford University press, Newyork, 1993.

5 **Hakulinen, Hansluwka, Ad lopez and T Nakada**, "Global and Regional Mortality patterns by cause of death in 1980", International Journal of Epidemiology, 1986; 5: No.2: 26-233.

6 **Annie Tinker, Patrica Daly, Cynthia Green, Helen Saxenian, Rama Lakshminarayanan, Kirrin Gill**, 256 World Bank Discussion Papers, "Women's Health and Nutrition, Making Difference," 1994; 15-16.

7 **Mary Fran R. Sowers and Margaret T. La Pietra** "Menopause its epidemiological and potential association with chronic diseases," Epidemiological Review, 1995; 2: 287-601.

8 **Bjorntorp P,** "The associations between obesity, adipose tissue, distribution and disease," Acta Med Scand Suppl, 1988; 723: 121-134.

9 **WHO Technical Series Report,**" Research on the Menopause in the 1990s", 866 Geneva.

10 **Sundar, Ramamani,** "Household Survey of health care utilization and Expenditicture," New Delhi: NCAER (working Paper No. 53): 1995

11 **Srinivasan, K and Parasuraman, S,** "Population projections of India and the states: Revisions based on the 1991 census Results," International Institute for population sciences, Mumbai.

12 **Census India, Kerala, 2001**,Provisional population totals, Series-33

13 **S.K.Kacker,** "Hearing impairment in the aged," Indian Journal of Medical Research, October 1997:106:333-339.

14 **Sample Registration System,** Office of the Registrar General of India, 2000; 13:126-127.

15 **P.M Dalal**, "Strokes in the elderly prevalence risk factors and the strategies for prevention," Indian Journal of Medical Research, October 1997; 106:325-332.

16 **Jan Sundquist, Sven –Erik Johansson,** "Self-Reported Poor health and low education level predictor for Mortality: Population based follow up study of 39156 people in Sweden," Journal of Epidemiology and Community Health, 1991; 51:35-40.

17 **Richard G.A Feachem, Tord Kjellstrom, Christopher J.L Murray, Mead Over and Margaret A.Philips,** "The Health of Adults in the Developing World," Published for the World Bank, Oxford University Press.1992; 113-145:209-222.

18 **National Sample Survey**, "Socio economic profile of the aged person," NSSO Govt. Of India, 42 nd round, July 1986 to June 1987; No. 367.

19 **Rao. S.R and Townsend JW**, "Health needs of elderly Indian women: an emerging issue" in gender population and development Oxford university press Delhi, 1999; 340-363

20 **Ericus C A Mgilberts, Marinus JCW J Arnold, Diederick E Grobbe**, "Hypertension and determinants of blood pressure with special reference to socioeconomic status in a rural south Indian community", Journal of Epidemiology and Community Health, 1994; 48:258-261.

21 **Nair P.S,** "The aged in rural India: a study of the socioeconomic and health profile" in S.N Singh, M.K.Premi, P.S Bhatia, and A.Bose, Population Transition in India, B.R Publishing, New Delhi, 1989; 2:63-70.

22 **Bela Shah& A.K Prabhakar**, "Chronic Morbidity profile among elderly," Indian journal of medical Research, October 1997; 106:265-272, (From Secondary Data From ICMR supported studies)

23 **Arun P.Bali,** "Socio-economic status & its relationship to morbidity among elderly," Indian Journal of Medical Research, October 1997; 106: 349-360.

24 **S Elango,** "A study of Health and health related social problems in the geriatric population in a rural area of Tamilnadu," Indian Journal of Public Health, January – March 1998; 42:1: 7-8.

25 **Lan Darnton- Hill**, "Healthy aging and the quality of life," World health Forum, 1995; 16:335-342.

26 **Vijaya Kumar. S**, "Ageing in India: An Anthropological Outlook", Res Develop J 1995; 2 (1): 41-45.

27 **Dr. Sarala Gopalan and Dr. Mirashiva**, Voluntary health association of India, WHO, "National profile on Women, health and development country – profile – India", April 2000; 163-168

28 **Indira Jai Prakash**, "Women and aging," Indian journal of medical Research, October (1997;106: 396-408.

29 **Arora R.and Oumachigui**, "A Pattern of gynecological problems in elderly women (>60) in a tertiary hospital -a prospective pilot study," Journal of obstetrics and Gynecology India, 1992; 42:1:86-89.

30 **Debnath, S, Gita, R, Arora, R and RajaraM,P,** "A study of gynecological problems in post menopausal Women," Journal of Obstetrics and Gynecology of India.,1994,44,2:.286-289.

31 **Koeing etal,** "Investing women's gynecological Morbidity in India: not just another KAP survey", Reproductive health Matters, 1998; 6 (1) : 84 – 96.

32 **Registar General Of India**, Census 1991,Series 12, Kerala.

33 **Shaji, K Promodu, Tony Abraham, K.Jacob Roy and Abraham Varghese** ,"An epidemiological study of dementia in a Rural Community in Kerala", British Journal of Psychiatry ,1996;168:745-749.

34 **V. Ramankutty, K.G Balakrishnnan, A.K Jayasree, and Jessy Thomas,** "Prevalence of coronary artery disease in the population of Thiruvanathapuram.district, Kerala, India", International journal of cardiology, 1993; 39:59-70

35 **B. Gopalakrishna Kumar** "Low Mortality and high Morbidity in Kerala" Reconsidered, Population and development Review, 19,no.1, March 1993; 103.

36 **S.Irudaya Rajan, U.S Mishra**, "In population aging: Causes and consequences, Kerala Demographic transitions determinants and Consequences," Sage publications, New Delhi, 1997;.97.

37 **K.P Kannan, K.R Thankappan, V.Raman Kutty and K.P Aravindhn** in "Health and development in rural Kerala, " KSSP publication 1990:62-65.

38 **P .G.K Panikar and Soman**, " Health status of Kerala," Center for development studies, 1984; 71- 72.

39 **Abhusaleh Shariff**, "Interstate differentials in Morbidity health care utilization and health expenditure, In differential and determinants of morbidity in India", UNDP Research project on strategies and financing for human development, Report presented in the work shop on Morbidity Measurement and Health research, AMCHSS, Thiruvanathapuram, January 11,12, and 13, 1995

40 **Aravindan K .P and Kunhikannan TP,** A Kerala Sasthra Sahithya Parishad Publication, Health survey Report, Trivandrum, 1999

41 **Usha Bambawale**, "The abused elderly", Indian Journal of Medical Research, October 1999; Vol.106: 257-264

42 **C.K Purohit and Rameshwar Sharma**, "A study of General heath status of persons aged 60 years and above in rural health training center Area, Naila," Indian Journal of Medical Research, 64,2 February 1976:202-209

43 **AK Singh, Manju Singh and DS Singh**, "Health problems in rural elderly at Varanasi, UttarPradesh," Journal of Association of Physicians, India, 1996: 44: No. 8: 540-543

44 **Youlian Liao , Daniel L. Mc Gee, Jay S.Kaufinan, Guichan Cao.and Richard S.Cooper,**"Socioeconomic status and Morbidity in the last years of life," American Journal of Public Health, April 1999; 89:No.4:.569-571

45 **Judith H. Hibbard and Clyde R.Pope**," The quality of social roles as predictors of morbidity and mortality", Social Science and Medicine, 1993;Vol.36: 217-225.

46 **Siegel,J. S and Hoover S.L**," Demographic aspects of health of the elderly to the year 2000 and beyond, " World health statistics quarterly,1982;35:1.

47 **Madhiwala, Neha, Sunil Nandraj, Roopashri Sinha and Amar Jessani** (quoted by Dr. Sarala Gopalan and Dr. Mirashiva Voluntary health association of India, WHO, "National profile on Women, health and development country – profile – India ", April 2000; 163-16833-202.

48 **Adrienne E JM Cavelaars, Anton E Kunst , Jose JM Geurts, Robert Cria Lesi, Live Grotvedt, Vew Helmert, Ereo Lahelma, Olle Lunddberg, Jil Matyheson, Andreas Mielck, Andree Mizrahi, Arie Mizrahi, Niels Kr Ramussen, Enqrique Regidor, Thomas Spuhler, Johan P Mackenbacn,** "Differences in self reported Morbidity by educational level : A comparison of 11 western European countries , Journal of Epidemiology and Community Health : 1998; 52: 219-227.

49 **Ritu Sudhana, "** Measuring reproductive health: review of Community – based approaches to assessing Morbidity", Bulletin of WHO, 2000; 78(5):6

50 **Beaton, G.H** " Small but healthy? Are we asking the right questions"? Human oraganization.1989; 48:30-39.

51 **Pryer J.A** 1990, "Socioeconomic and environmental aspects of under nutrition and ill health in and urban slum in Bangladesh," London school of hygiene and tropical medicine.Ph.d thesis as quoted in health of the adults in the developing world. Richard G.A feachem, Tord Kjellstrom, Christopher J.L Murray, Mead Over and Margaret A.Philips. "The Health of Adults in the Developing World "Published for the World Bank, Oxford University Press.1992; 209-222.

52 **Gibson RS** "Principles of nutritional assessment," Newyork: Oxford university press: 1990:181.

53 **Powell K.E, P.D Thompson, C.J.Caspersen and JS Kendrick,**"Physical activity and the incidence of coronary heart disease," Annual Review of Public health 1987;8:253-287.

54 **Koplan J.P, C.J Casperson, and K.E Powell**,"Physical activity Fitness, and health :Time to act," Journal of the American Medical association 1989;262:2437.

55 **Sesso Howard D.Paffenbargar Ralph.S, Ha Tim, Lee Inmin**" Physical activity and cardiovascular risk in Middle Ages and older women", American Journal of epidemiology, 1999; 150:408-490

56 **Dr.Sachdev,** "Role of Physical Activity in Prevention and Modification of age Related mobility dysfunctions", In: Dr.P.C Battla, " Aged women coping with life" National institute of primary Health care, New Delhi, March 1998:5-8

57 **Grant and Ritson**, as quoted in "The Health of Adults in the Developing World" Published for the World Bank, Oxford University Press.1992;.113-145, 209-222

58 WHO, **1980,** " Problems related to alcohol": The prevention Debat, London: croom Helm

59 **Natani P.N**, "Role of alcohol in cancers of the upper alimentary tract: Use of model :in risk assessment," Journal of Epidemiology and Community Health, 1988;42:187-192

60 **Mellstrom D.etal,** "Tobacco smoking, aging and health among the elderly .a longitudinal population study of 70 year -old men and an age cohort comparison", Age and Aging 1982; 45.

61 **Gupta, P.C and K.Ball**," India: Tobacco tragedy, " Lancet, 1990; 335:594-595.

62 **Laurence G.Branch**,"Health practices and incident disability among the elderly," American Journal of public Health, December 1985;.75:No.12:1436-1439.

63 **Michael Davies**, "Epidemiology and the challenge of Aging,," International Journal of Epidemiology ,1985;14:No.1:9-18.

64 **Didi MW Kreigsman, Dorly JH Deeg, Jacques Th M van Eijk, Brenda WJH Penninx, A Joan P Boeke,** "Do disease specific characteristics add to the explanation of mobility limitations in patients with chronic diseases? A study in Netherlands," Journal of Epidemiology and Community Health, 1997; 51: 676 – 685

65 **WHO, "Lay reporting of health information",** 1978

66 **T.P Kunhikannnan, K.P.Aravindan,** " Changes in health status of Kerala" Centre for Development studies. Discussion paper No.20, 2000; 13

67 **S Ryan Johansson,** "The Health Transition: the cultural inflation of morbidity during decline of mortality", Health Transition Review, 1991; 1: 39 – 65

68 **Desai P, Hegde and Hazara M,** "Adolescent's menstruation: Perceptions and practices," Journal of Obstetrics and Gynaecology of India, 1990; 40:2:259-261

69 **Theresa George,** "Women in a south Indian fishing village: role identity, continuity, and the experiences of menopause," Health care for women International, 1996; 17:4:271-279.

70 **Goemaere S, Ackerman C, Goethals K et al,** "Onset of symptoms of Rheumatoid arthritis in relation to age, sex and menopausal transition", Journal of Rheumatalogy, 1990; 17: 1620 – 22

71 **Jeffrey S.Nevid, Specncer A. Rathus, Hannah R. Rubenstein,** " Health in the new millennium," Worth publishers, New York, 1998; 19

72 **P G K Panikar**, "Health Transition in Kerala", Discussion paper No. 10, Kerala Research Programme on Local Development, Centre for Development Studies, 1999

73 **Wing RR, Mathews KA, Kuller LH, et al**, "Weight gain at the time of menopause," Arch Intern Med 1991; 151: 97-102.

74 **USDHHS,** "United states department of health and services). Fifth special report to the US congress on Alcohol and health", Rockville, Maryland: National Institute on Alcohol abuse and Alcoholism, 1983.

75 **Dr. K.T Shenoy,** " Determinants of access to and Utilization of health care services in Kerala". Studies of human development, Project of United nations Development Programme, 1996.

76 **WHO Technical Report Series**. "The uses of Epidemiology in the study of the elderly", 706:43-44

APPENDICES

Appendix I	Questionnaire
Appendix II	Tables attached
Appendix III	Ward wise population of the Village (Muttom)
Appendix IV	Area map of the District (Idukki)

Appendix I

Schedule No:

Burden of self reported morbidity and its determinants among People above the age of 45 years

A Community based study in a rural population of Idukki District, Kerala.

(Achutha Menon Centre for Health Science Studies)

Investigator: Deepa Mathew **Date:**

Panchayat: Muttom **Ward No / Name:**

House Number:

Address:

Background information

1	Members in the house-hold	Adult M: F:			Children M: F:	Total
2	Age (in completed years)					
3	Sex				Male (1)	Female (2)
4	Religion	Hindu (1)	Muslim (2)		Christian (3)	Others (4)
5	Type of Family	Nuclear (1)			Extended (2)	
6	Education	No schooling (1)			Primary (2)	
	Secondary (3)	Higher (4)			Gradate (5)	& above (6)
7	Current occupation	Laborers (1)			Self employed (2)	
	Salaried (3)	Housewives (4)			Unemployed (5)	
8	Monthly Income				Rs.	
9	Marital status	Currently married (1)	Separated (2)	Divorced (3)	Widowed (4)	Never married (5)
10	Have you ever worked in the past?	Yes (1)	No (2)		**If No, go to SES**	
11	What did you work as?					
12	Which year did you stop working?					
13	How long had you worked? (Yrs)					
14	Why did you stop working?					
Socio-economic Status [SES]						
15	Type of house	Pucca (1)	Semi-pucca (2)	Katcha (3)		
16	What is your household expenditure last month? Rs…					
17	House Ownership	Rented (1)	Owned (2)			
18	Researchers Impression of the family SES	Lower (1)	Middle (2)	Upper (3)		
19	Separate room for cooking	Yes (1)	No (2)			
20	Source of lighting	Kerosene or gas or oil (1)	Electricity (2)	Other (3)		
21	Fuel for cooking	LPG (1)	Electricity(2)	Wood (3)	Cow dung cakes (4)	
	Kerosene (5)	Charcoal (6)	Biogas (7)	Combination(8)	Other…(9)	
22	Source of drinking water	Well or pipe or hand-pumb (own) (1)				
	Well or pipe or hand-pumb (Public)(2)	Other specify (3)				
23	Is the water source you use for bathing and washing within your house/compound or elsewhere?	Within the house (1)	Else where (2)			
24	How far is the water source?	… (Meters)				
25	Did you boil water before drinking?	Yes (1)	No (2)			
26	Toilet facility	Own flush toilet (1)	Flush toilet (public or shared) or			

	Own pit toilet (2)	Shared pit toilet or public pit toilet (3)	No facility (4)	
27	Owner ship of goods	Bicycle (1)	Motor cycle /Scooter (2)	Radio (3)
	TV Colour (4)	Telephone (5)	Refrigerator (6)	Others (7).....

Health Status: I would like to discuss your health status with you.

Acute Illness

28	Are you experiencing any ill health today? [including Reproductive Health]	Yes (1)	No (2)	**If No, go to 35**

29. What are the symptoms you are experiencing?

Symptoms

1.
2.
3.
4.
5.

30	Is this something you always have had or is it something that came on just recently?		
	Meaning experienced off or on over 1 year (Enter the symptom no. in appropriate columns)	Always have had (1) **[If yes, go to 35]**	Recently (2) **[If yes, continue with 31]**
31	For how long have you experienced .....now? (in days)		
32	What did you do for the symptoms you are experiencing? (Includes the system of treatment)		

	Mod.Med (1)	Ayurveda (2)	Homeopathy (3)	Combination (4)	Others (5) specify
33	Was the symptoms solved by that?		Yes (1)	No (2)	**If yes, go to 35**
34	What did you do next about it?				

Chronic Illness

35	Have you had any other health problem that you had for more than a year now but are not			
	experiencing any symptoms today?	Yes (1)	No (2)	**If No, go to 46**
36	If yes, What is it?			
37	How long you have had the symptoms? (in years)			
38	How often do you experience the symptoms? (Week / Month/ Continuous)			
39	When was it diagnosed? (in years)			
40	What did you do about for the symptoms you are experiencing? (System and treatment)			
41	Was the symptoms solved by that?	Yes (1)	No (2)	**If yes go to 46**
42	If no, what else did you do about it? (System and treatment)			
43	What was the consequence of the treatment?	Cured (1)	Partially cured (2)	No relief (3)
44	What else have you done about in terms of treatment?			
45	Why?			

46	Where do you get medical advice?	Health professionals (1)	Traditional practitioners (2)	
		Self prescription (3)	OTC medication (4)	
47	If seeking advice from health professional,	Private (1)	Public (2)	Both (3)
48	How frequently do you use health services?	Frequently (at least once a week (1)		

	Occasionally 1/month)(2)	Whenever ill (3)	Not utilizing at all (4)		
49	Do you go for regular check up even if there is no specific problem or as a precaution?			Yes (1)	No (2)
	1) If yes, , for what potential problem do you do this?				
50	How far is the health facility where you seek care is situated?			.....(Km)	
51	Is there any one in the household with same illness?	Yes (1)	No (2)	If yes, who...	
52	Does the symptoms that you experience limits your functional capacity in any way?				
	Yes (1)	No (2)	**(If no, skip table and questions on functional capacity)**		

53	**Disability**	**Status**	**Action Taken**	
			Medical	**Surgical**
a	Mobility	Normal /Impaired /Nil		
b	Hearing	Normal /Impaired /Nil		
c	Vision	Normal /Impaired /Nil		
d	Mental	Normal /Impaired /Nil		
e	Deformity	Congenital /Acquired		

Functional capacity limitation

54	**a. Lifting 5Kg:** Without difficulty (1) With difficulty (2)Only with help/ Not at all (3)
	b. Walking up& down 15 steps; Without difficulty (1)With difficulty (2) Only with help/ Not at all (3)
	c. Ability to move from one place to another place using some form of transport: Without difficulty (1) With difficulty (2) Only with help/ Not at all (3)
	d. Cutting toe nails: Without difficulty (1) With difficulty (2) Only with help/ Not at all (3)
	e. Undressing: Without difficulty (1) With difficulty (2) Only with help/ Not at all (3)

Reproductive History

55	How many children do you have?				
	If the subject is a male go to 76				
56	Type of delivery	Normal (1) (No....)		LSCS (2) (No...)	
57	Have you had any miscarriages/ abortions?	Yes (1)	No. (2)	If yes, how many...	
58	Any surgical interventions due to gynecological problems?	Yes (1)	No (2)	**If no, go to 61**	
59	If yes specify,	Hysterectomy (1)	D& C (2)	Others (3)	
60	What was the surgery performed for?				
61	Have you ever used any method of contraception?	Yes (1)	No (2)	**If no, go to 63**	
62	If yes, specify, **a,** Temporary contraceptive;	Oral pills (1)		IUD (2)	Condom (3)
	b. Permanent methods:	Laproscopic sterilization (1)	PPS (2)	Minilap (3)	
	c. Current use	Yes (1)	No (2)	If yes, which method...	
63	Age at menarche (in completed years)				
64	Have you attained menopause?	Yes (1)	No (2)	**If no, go to 69**	
65	If yes, age at menopause (in completed years)				
66	Is it a surgical menopause /natural menopause?				
67	Did you experience any symptoms related to menopause?			Yes (1)	No (2)
68	If yes , specify,				**Go to 71**
69	Are you experiencing any symptoms suggestive of menopause?			Yes (1)	No (2)
70	If yes, specify ...				
71	Did you seek medical help for problems related to changes in menstrual cycle recently?				
	Yes (1) No. (2)	**If no, go 75**			
72	If yes, periodicity	Too frequent (1)	In frequent (2)		
73	Flow	Heavy	Scanty	Spotting	
74	Any other symptoms...				

75.Are you experiencing any of the following problems?

Sl. no	Problems	Yes (1)	No (2)	Since when	Treatment sought	System of treatment
1	Urinary incontinence					
2	Uterine prolapse					
3	Discharge per vagina					

76	Are you currently using any method of contraception?	Yes (1)	No (2)	If yes, Specify …
77	Have you ever used any method of contraception?		Yes (1)	No (2)
78	If yes specify ……	Temporary (1)		Permanent (2)

79 Health Risk Factors

SI No	Health risk factors	Yes /No	If yes, Type	Since how Long	Frequency Day/Week/Month			Any difference from before? If yes specify….
1	Smoking		Cigarette/ Beedi/Others					
2	Tobacco chewing		Betalquid/Panmasala /Khaini/Others					
3	Drinking		Whisky/Brandy/Rum/ Vodka/Toddy/ Others					

80.If no, did you *ever*.

SL No	Health risk factors	Yes /No	If yes, Type	Since how Long	Frequency		
1	Smoking		Cigarette/Beedi//Others				
2	Tobacco chewing		Betalquid/Panmasala /Others				
3	Drinking		Whisky/Brandy/Rum/ Vodka/Toddy/ others				

81 Physical activity; Vigorous (1) Moderate (2) Light (3)

Check List for Physical Activity Categorization

Physical Activity Categories		
1.Vigorous Activities	2.Moderate Activities	3.Light Activities
Agricultural Work	Home maintenance of garden	Walking
Pulling Riksha/Cart	Maintenance of cattle	Walking to office
Digging	Fetching water	Desk work at office
Breaking stone	Carrying Wood	Watching TV
Exercise bicycle, rowing	Cooking	Reading Books
Carpentry Work/Masonry work	Washing Cloths	
Others Specify	Others specify	

82	Dietary Habit	Vegetarian (1)	Non –Vegetarian (2)	
83	Measurement Body Wt.	……. Kg.	Height …… cm	
84	How many children are living with you?		Male (1)…	Female (2)…….
85	How many children are going to school?			
86	How many hours of sleep do you usually get at night?			
	7-8 Hours (1)	Less (2)	More (3)	
88	Do you need anybody 's permission to seek health care for your condition?			
	Yes (1)	No (2)	If yes, whose…….	

89	Does your illness interfere with your participation in family /social events?	Yes (1)	No (2)
90	Did any of your family members /friends visit you when you were last unwell?	Yes (1)	No (2)
91	Did any of your family members /friends offer assistance for domestic arrangements when you were last unwell?	Yes (1)	No (2)
92	How often do you visit friends in the neighborhood?		
93	Do you think your illness or conditions has affected your ability or capacity to earn for a living?	Yes (1)	No (2)
94	What do you attribute your present health status to?		

Appendix II (Tables)

Table: 3.12 Duration of Acute Illness in days

	Acute Morbidity	Duration of illness in days		
		<5days	5-10days	>10 days
1	Fever (n= 16)	37.5	25	37.5
2	Cold and cough (n=44)	29.5	41	29.5
3	Acute Bronchitis (n=19)	15.8	26.3	57.9
4	Tonsillitis (n=1)	100	0	0
5	Headache (n=43)	37.2	25.6	37.2
6	Toothache (n=20)	35	15	50
7	Gas, Heart burn, Indigestion (n=24)	29.2	29.2	41.6
8	Diarrhoea / Dysentery (n=3)	66.7	33.3	0
9	Eye problems (Discharge, pain)(n=12)	50	16.7	33.3
10	Ear problems (Discharge and pain) (n=4)	75	25	0
11	UTI (n=12)	50	16.7	33.3
12	Accidents and injuries (n=13)	38.5	23.1	38.4

All values given above are in percentages and will add up to hundred horizontally

Table: 3.13 Duration of Chronic Illness in years:

SI No	Morbidity	Duration of illness in years			Mean Duration in years
		<5years	5-10years	>10 years	
1	Arthritis (n=255)	43.1	34.1	22.8	8.7
2	Hypertension (n=145)	50.3	35.9	13.8	6.5
3	Diabètes Mellitus(n=94)	37.2	36.2	26.6	8.4
4	Back ache (n=74)	52.7	33.8	13.5	7.3
5	Asthma (n=58)	50	27.6	22.4	8.9
6	Chest pain (n=44)	59.1	27.3	13.6	6.4
7	Anemia (n=41)	53.7	26.8	19.5	8.3
8	Cataract (n=39)	38.5	43.6	17.9	8.2
9	Piles (n=27)	26	33.3	40.7	13.2
10	Pain abdomen (n=26)	57.7	23.1	19.2	6.8
11	Heart ailments (n=24)	37.5	25	37.5	9.8
12	Peptic ulcer (n=19)	42.1	26.3	31.6	9.2
13	Chronic Bronchitis (n=18)	55.6	33.3	11.1	5.5
14	Goitre (n=17)	17.6	11.8	70.6	24.2
15	Skin diseases (n=15)	40.0	20	40	11.5
16	Joint pain (n=13)	69.2	30.8	0	4.4
17	Constipation (n=12)	50	41.7	8.3	6.7
18	Kidney problems (n=7)	100	0	0	2.7
19	Cancer (n=7)	42.9	42.9	14.2	8.1
20	Tumor (n=7)	71.4	28.6	0	4.1
21	Memory loss/Impairment (n=6)	100	0	0	3.4
22	Paralysis(n=4)	25	50	25	9.8
23	Varicose vein(n=3)	66.7	33.3	0	14.5
24	Hernia (n=2)	50	50	0	6
25	Senility (n=2)	0	100	0	2.5

All values given above are in percentages and will add up to hundred horizontally

Table: 3.1 5 Duration of gynaecological morbidity in years

	Gynaecological Morbidity N=358	Duration of illness in years			Mean Duration in years
		<5years	5-10 years	>10 years	
1	Uterine prolapse (n=31)	45.2	35.5	19.3	8.1
2	Urinary incontinence (n=23)	78.3	13.0	8.7	5.1
3	Discharge per vaginum (n=19)	47.4	26.3	26.3	8.2

All values given above are in percentages and will add up to hundred horizontally

Table: 3.37.5 System of treatment used for acute illness

Illness	System of treatment					
	MM	AY	HY	CN	NY	Nil
Fever (n=16)	68.8	6.2	0	0	0	25
Cold and cough (n=44)	54.5	2.3	2.3	0	0	40.9
Acute Bronchitis (n=19)	78.9	5.3	0	0	0	15.8
Tonsillitis (n=1)	100	0	0	0	0	0
Headache (n=43)	46.5	4.7	0	0	0	48.8
Toothache (n=20)	50	5	0	0	0	45
Gas, Heart burn, Indigestion (n=24)	33.3	20.8	0	0	0	45.9
Diarrhoea / Dysentery (n=3)	66.6	0	0	0	0	33.4
Eye problems (Discharge, Congestion and Pain) (n=12)	33.3	8.3	0	0		58.4
Ear problems (Discharge and pain) (n=4)	50	0	0	0	0	50
UTI (n=12)	33.3	0	0	0	0	66.7
Accidents and injuries (n=13)	69	0	0	0	0	31

All values given above are in percentages and will add up to hundred horizontally

Legend

MM-Modern medicine, AY-Ayurveda, HY-Homeopathy, CN-Combination, NY-Naturopathy

Table: 3.37.6 System of treatment used for Chronic Illness:

Illness	System of treatment					
	MM	AY	HY	CN	NY	Nil
Arthritis (n=255)	69	25	2.4	2.8	0	.8
Hypertension (n=145)	99.3	0	0	0	0	.7
Diabètes Mellitus (n=94)	98.9	0	0	0	0	1.1
Backache (n=74)	68.9	24.3	2.3	2.7	0	1.4
Asthma (n=58)	96.6	0	0	1.7	1.7	0
Chest pain (n=44)	93.2	0	2.2	0	0	4.5
Anemia (n=41)	73.2	9.8	0	0	0	17
Cataract (n=39)	84.6	0	0	0	0	15.4
Piles (n=27)	70.3	18.5	3.7	0	3.7	3.7
Pain abdomen (n=26)	80.8	7.7	3.8	0	0	7.7
Heart ailments (n=24)	100	0	0	0	0	0
Peptic ulcer (n=19)	100	0	0	0	0	0
Chronic Bronchitis (n= 18)	94.4	0	0	0	0	5.6
Goitre (n=17)	94.1	0	0	0	0	5.9
Skin diseases (n=15)	73.3	13.3	6.7	0	0	6.7
Joint pain (n=13)	76.9	23.1	0	0	0	0
Constipation (n=12)	75	16.7	0	0	8.3	0
Kidney problems (n=7)	100	0	0	0	0	0
Cancer (n=7)	85.7	14.3	0	0	0	0
Tumour (n=6)	66.7	33.3	0	0	0	0
Memory loss (n=6)	33.3	0	0	0	0	66.7
Paralysis (n=4)	100	0	0	0	0	0
Varicose vein (n=3)	100	0	0	0	0	0
Hernia (n=2)	100	0	0	0	0	0
Senility (n=2)	0	100	0	0	0	0

All values given above are in percentages and will add up to hundred horizontally

Legend

MM-Modern medicine, AY-Ayurveda, HY- Homeopathy, CN-Combination, NY-Naturopathy

Table: 3.37.7 System of treatment used for gynaecological morbidity:

Gynaecological morbidity	MM	AY	HY	CN	NY	Nil
Uterine prolapse (n=31)	3.3	0	0	0	0	96.7
Urinary incontinence (n=23)	13	0	0	0	8.7	78.3
Discharge per vagina (n=19)	10.5	10.5	0	0	0	79

All values given above are in percentages and will add up to hundred horizontally

Legend

MM-Modern medicine, AY-Ayurveda, HY -Homeopathy, CN-Combination, NY-Naturopathy

Table: 3.38 Functional capacity limitation by age and sex:

Functional Capacity N=630	Without difficulty				With difficulty				Not at all (only with help)			
Age	<60yrs		>60yrs.		<60yrs		>60yr		<60yrs		>60yrs	
Sex (n)	M 136	F 200	M 136	F 158	M 136	F 200	M 136	F 158	M 136	F 200	M 136	F 158
Lift 5 Kg	97.1	82.5	55.1	45.6	1.5	13.5	32.4	27.2	1.5	4	12.5	27.2
Walking up & down 15steps	60.3	47	25.7	14.6	37.5	50.5	63.2	68.4	2.2	2.5	11.0	17.1
Use of Transport	85.3	77	54.4	50	12.5	21	38.2	34.8	2.2	2	7.4	15.2
Cutting Toe nails	66.9	58.5	46.3	27.2	30.1	38.5	39.7	52.5	2.9	3	14.0	20.3
Undressing	98.5	98	95.6	91.1	1.5	.5	1.5	5.1	0	1.5	2.9	3.8

All values given above are in percentages.

Appendix III

Population of the Muttom Panchayat (based on 2000 Voters List)

SI No	Name of the ward	Population
1	Muttom Polytechnic	1090
2	Mathappara	931
3	Shankarapalli	736
4	Ottenthengue	882
5	Kakomb	997
6	Ellumburam	811
7	Muthirappara	916
8	Kocherry	973
9	Pazhayamattom	902
10	Edappali	953
	Total	9191

Muttom panchayat constitutes of 10 wards. Clusters were identified from each ward.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THRISSUR
TAMIL NADU
ERNAKULAM
KOTTAYAM
IDUKKI
PATHANAMTHITTA
INDIA
TAMIL NADU
Champakkad
Maraiyur
Babunagar
Kudakkadu
Kovilkadavu
Pambanpara
Puyankuzhi
Sembukulam
Kolachchivayal
Kandalur
Tattampara
Makaracnal
Minkutti
Parappayarkudi
Pullatottam
Kallelimedu
Pudu Kudi
Tirthamalakudi
Kovilur
Bhutattanpedu
Kuvapara
Anaimudi
Kuttampuzha
Perumuzhi
Anakkulam
Rajamala
Talaiyar
Chunduvarai
Vattavada
Nayapalli
Setvparvatipuram
Thattakad
Urulantanni
Mottanapara
Talakulam
Perumbamkuttu
Mankulam
Ellapatti
Injatotti
Mamalakandam
Mattupatti
Ilampalachen
Munnar
Kotamangalam
Fazhampalli
Chal
Ottapara
Devikulam
Neriyamangalam
Valara
Muvattupuzha
Irumpupalam
Pallivasal
Nadupara
Chittirapuram
Kunjitanni
Muttukad
Anairangal
Vannappuram
Amallakandam
Chengalam
Pottankadu
Vettuvanpara
Pattekkudi
Kachchinappara
Kaliyar
Varikkamuttan
Kattippara
Vellattuval
Manjakkuli
Talakkulam
Padinjare Kodikulam
Koduvelli
Venmattam
Mallappuzha
Ponmudi
Mullakkanam
Puppara
Kumaramangalam
Vandamattam
Kanukkuzhi
Rajakkad
Santanpara
Mayilakombu
Nayyasseri
Kampilikandam
Parattodu
Kalliimali
Senapati
Arikuzha
Pallikkamuri
Chelachchuvadu
Panikkankudi
Muniyara
Sankappanpara
Periyambra
Todupuzha
Ezhayanikuttam
Murikkasseri
Mullirikkudi
Vattappara
Uppukandam
Padamukham
Karittodu
Udumbanchola
Purapuzha
Nediyasala
Alakkodu
Chinikkuzhi
Upputodu
Bethel
Parattodu
Ilamdesam
Cheppukulam
PAINAVU
Kuninji
Karimkunnam
Pannimattam
Cherutoni
Mariyapurani
Idukki
Udayagiri
Manjappara
Nellapara
Kaikuntai
Ilayani
Muttam
Anakkayam
Pumala
Chattikkuli
Tankamani
Pachchadi
Nedumkandam
Tudanganadu
Kolapra
Adur
Nalayani
Murkadu
Koyippalli
Narakakanam
Chempalam
Kallar
Tukkupalam
Kuvappalli
Nadukani
Kulamavu
Nellippara
Santigram
Sanyasioda
Pallikkanam
Puttadu
Mulamattam
Irattayar
Kattakkanam
Kannikkal
Vellayamkudi
Muttam
Kanchiyar
Puliyamala
Kambam Mettu
Uluppuni
Palakavu
Toppippala
Vandamedu
Pala
Kuvalayattam
Ayyappankovil
Nariyampara
Mantippara
Narakakkuzhi
Kottamala
Chintalar
Kanavakkuli
Mall
Kochchara
Uttamapalaiyam
Erattupetta
Vagamon
Pashupara
Karuvakkulam
Puttadi
Mayiladumpara
Malayapuduval
Aladi
Chappattu
Pampumpara
Anakkara
Vedikuzhi
Chenkara
Anaivilasam
Mundapla
Elappara
Mukkulam
Kizhe
Mlamala
Chakkupallam
Nallatanni
Perundara
Dymock
Amaravati
Pallikkunnu
Kirikkara
Vallardi
Murekkadi
Kumili
Ponkunnam
Kuttiplangad
Kuttikkanam
Pampaner
Nellimalakkavala
Meloram
Pirmed
Tekkadi
Kanjirapalli
Peruvandanam
Murinjapuzha
Vandiperiyar
Chuzhuppu
Mundakayam
Palurkavu
Tekkemala
Periyar N.P. & WLS
Periyar Lake
Manjakkal
Vellani
Vallakkadavu
Mullakkudi
Cheruvalli
Erumeli
Tanikkudi
Uppupara
Muzhikkal
Manimala
Ezhukuman
Sabarimala
Pambayar
Pamba
Ranni
IDUKKI DISTRICT
Scale 0 5 Kms
Kakki