

**POPULATION AGING AND ITS IMPLICATIONS  
FOR HEALTH EXPENDITURE**



**JAWAHARLAL NEHRU UNIVERSITY**

**POPULATION AGING AND ITS IMPLICATIONS  
FOR HEALTH EXPENDITURE**

*Dissertation submitted in partial fulfillment of the requirements for the degree of  
Master of Philosophy in Applied Economics of the Jawaharlal Nehru University*

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M.Phil. Programme in Applied Economics

2007-2009

**CENTRE FOR DEVELOPMENT STUDIES**

June, 2009

*AFFECTIONATELY DEDICATED*

*TO*


*MY REVERED PARENTS*

*AND*

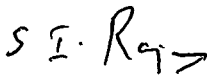
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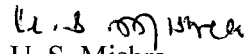
*I hereby affirm that the work for the dissertation, "Population Aging and Its Implications for Health Expenditure", being submitted as part of the requirements for the degree of Master of Philosophy in Applied Economics of the Jawaharlal Nehru University, was carried out entirely by myself and has not formed part of any other programme and has not submitted to any other institution/university for the award of any Degree or Programme of Study.*


June, 2009

  
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*Needless to mention, all errors and omissions in this work are mine.*

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# Population Aging and Its Implications for Health Expenditure

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## *Abstract*

*The effect of population aging which has already been experienced in the developed world, is now being felt in the developing regions as well with advances in the process of demographic transition. Being one of the population giants, India accommodates a large number of the elderly and the proportion of elderly is projected to increase significantly in the coming future. Not only is the magnitude and proportion of the elderly high but their well-being in terms of freedom from disease and disability is also a major area of concern. Aging is often associated with the increasing risk of disease and disability which gives rise to declining quality of life. As age advances, numerous physical and psychological changes in lifestyle assume significance among the elderly. Most of the aged suffer from some kind of ailment, and are generally unaware of its consequences as well as the relevance of health care intervention. Furthermore, the situation is made worse by the fact that such health problems lead to major disabilities and restricts their movements, which makes their life miserable. Such frequent disease burden among the elderly assumes high health expenditure. Health expenditure often constitutes a major share of the household's total consumption expenditure, which is disproportionate among the poor households. The hospitalisation cost of in-patient care assumes huge proportions especially in the case of the individual's proximity to death. Given this prelude, the present study is an attempt to examine the implication of population aging on health expenditure at the individual and at the household level in India. Further, the study tries to examine the burden of terminal expenditure (the expenditure just prior to death) in India. Apart from an inter-state analysis, the study explores these issues in depth with special reference to Kerala based on an independent survey enquiry on health expenditure.*

*To accomplish the aforesaid objectives, the NSS 60<sup>th</sup> Round (Schedule No. 25) on 'Morbidity and Health Care' and Kerala Migration Monitoring Study (2007) have been used. NSS data suggests that 24 per cent of the elderly reported their health status as poor with a slight disparity between males (22 per cent) and females (26 per cent). This proportion increases with the advancement in age. The proportion of elderly suffering from at least one ailment is around 44 per cent while 10 per cent of them suffer from at least two ailments. The higher incidence of disease among the elderly is associated with higher health care expenditure. Further, the findings advocate that the presence of elderly in a household has definite implications for the magnitude of health care expenditure. The study furthermore illustrates that death-related health expenditure has higher burden as compared to other health expenditure. Estimating the future cost of managing chronic diseases in Kerala, the study finds that it is going to increase considerably in the years to come in which majority of the increase will be attributed to the rise in the number of the aged.*

**Key Words:** Aging, Elderly, Health, Health Expenditure

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## INTRODUCTION

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### 1.1 Nature of the Problem

Population aging is an accepted reality in the developed world, which is steadily catching up in the developing world as well (World Bank, 2001; Kinsella and Velkoff, 2001) with advances in demographic transition<sup>1</sup>. Such a shift in demographic structure will ultimately result in a reduction in labour force participation rate in the long run (Rada, 2009; Ernisch, 2008), which will consequently have its bearing on economic growth. However, there are some optimistic views regarding the aging of the population which state that while there is an expected decline in labour force participation in a selected set of countries, there is an expected rise in labour force-to-population ratio in another set of countries. The reason for this is lower youth<sup>2</sup> dependency caused by low fertility, which will be more than enough to offset the skewing of adults towards the older ages at which labour force participation rate is lower. Labour force participation rate will, further, be enlarged by the rising female labour force participation rate associated with fertility decline<sup>3</sup> (Bloom, Canning and Fink, 2008). As a result of these processes, economic growth will continue its pace in the short run. However, persistent lower fertility will decrease per capita income in the long run (Bloom et al., 2009).

Being one of the population giants, India accommodates a large number of elderly, although in proportion terms, it is yet to match the developed world. The proportion of the elderly in India has risen from merely 5.6 per cent in 1961 to 6.76 per cent in 1991 and to 7.5 per cent in 2001<sup>4</sup>, and it is expected to go up further to 8.3 per cent in 2011 and up to 12.4 per cent in 2026 (India, Registrar General, 2006). Among the

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<sup>1</sup> Demographic transition is a result of shift from high fertility/mortality to low level of fertility/mortality. Reduction in fertility results into a decline into proportion of young population and reduction in mortality implies longer life for individuals. Both of these processes working simultaneously finally lead to aging of the population.

<sup>2</sup> According to most of the researchers, the 0-14 age group, among which labour force participation rate is low, is regarded as the 'youth dependent' population.

<sup>3</sup> With the decline in fertility, women will have more free time available, which will ultimately lead to increase in the labour force participation rate among them.

<sup>4</sup> Since the proportion of people over 60 in India has exceeded the benchmark of seven per cent in 2001 (the United Nations defines a country as 'aging' where the proportion of people over 60 reaches 7 per cent), India falls under the category of 'aging' country.

elderly, the percentage of population above 70 years of age has grown substantially from a mere 2 per cent in 1961 to 2.9 per cent in 2001. Furthermore, the percentage of 60-plus population to total population is expected to touch to 17.3 per cent in 2051 and the percentage of 70-plus population is also expected to rise up to 4.8 per cent in 2031 and 7.6 per cent in 2051 (Irudaya Rajan, 2008 ). All these trends indicate that Indian population is aging and the pace of aging is going to be more rapid in the coming decades. It is not mere numbers or proportions of elderly population, but their characteristics and composition too, which is significantly different in India.

India is one among few countries where sex ratio is in favour of males among elderly. This is quite surprising as we know that female life expectancy at 60 and 70 is higher than male life expectancy<sup>5</sup>. Sex ratio of the population aged 60 years and above is expected to decline from 1,028 males per 1,000 females in 2001 to 1,007 males per 1,000 females in 2051 whereas for population aged 70 plus it is expected to decline from 991 males per 1,000 females to 954 males per 1,000 females during the same period (Irudaya Rajan, 2008). These trends in share and composition of elderly population reveal: (a) rapid growth of the oldest among the old population, (b) the increase in the life expectancy at advanced ages, and (c) predominance of females at advanced ages. Given the projected duration of life in old age, the emerging concern relates to their well-being in terms of freedom from disease and disability, which has implication not only for the individual but also for the household and society at large. While increased longevity is desirable, being free from sickness is equally important. The Indian aging experience has been different on various counts like the health, education and dependency profile as well as longevity. Despite the fact that some of these dimensions of elderly population have received due attention in recent times, a few other issues still need to be studied. On this account, this research proposes to attempt an exploration of the issue of population aging and its implications for health expenditure. However, before arriving at research issues, it is important to discuss the relationship between the elderly and health, and the effect of increase in elderly population on health expenditure.

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<sup>5</sup> The possible reasons for the sex ratio bias against females among elderly cited in literature are under-reporting of females (especially widows), age exaggeration, low female life expectancy at birth, and excess female mortality among infants, children and adults (Sudha and Irudaya Rajan, 2003; Mari Bhat, 2002).

## 1.2 Elderly and Health

Over the past few centuries, nations have experienced an epidemiological transition characterised by declining death rates and shifting patterns of causes of death. Prior to this transition, people used to die mostly of infectious diseases (small pox, scarlet fever, tuberculosis, influenza, pneumonia, etc), which used to affect all the ages especially young population. With the control over infectious diseases, mortality is concentrated in the older ages and the primary causes of death are chronic degenerative diseases (heart disease, cardiovascular disease and cancer (Caldwell, 2001). The elderly are more likely to have health problems when compared with the general population. The process of aging is likely to be accompanied by changes in the patterns of disease and morbidity across time (Omran, 1971).

Young (1997), in his study, finds that the increasing age is characterised by progressive erosion of 'safety margins' like decline of various body functionalities such as bone mass, glomerular filtration rate, renal tubular function, lower limb explosive power, etc. Further, increasing age is also associated with rising prevalence of chronological pathologies. Supporting these results, Wensing (2001) also found that higher age was a predictor of poorer functional status in the Netherlands. Another study done by Bhatia et al. (2007) for the rural and urban areas of Chandigarh also corroborates the previous finding that the elderly are likely to have more health problems (around 86 per cent of the elderly reported one or more health-related complaints) and majority of the elderly were suffering from disorders of the circulatory system (51.2 per cent), musculoskeletal system and connective tissue problems (45.7 per cent).

The study done by Nandal, Khatri and Kadian (1987) reveal that the common problems among elderly are cough, poor eye sight, anaemia, dental problems, chronic body pain, hearing disorders, etc. Gupta and Vohra (1987) find that functional disorders precede organic disorders, which become more frequent beyond the age of 70. In the same line of study, Nagla (1987) provides evidence that the most common difficulty among the old people is in terms of walking, poor eyesight and impaired hearing capacity. Moreover, biological and social factors often interact to produce mental disease in old age.

Regardless of physical illness, the aged are more likely to have mental health problems, which arise from senility, neurosis and extent of life satisfaction. The prevalence of mental health problems in the elderly is partly a consequence of organic changes and physical disorders that impair brain function, and a partly a consequence of environmental and psychosocial stresses that afflict the elderly more often than the young. Loss of autonomy, bereavement, poverty and isolation are well known examples (WHO, 1989). Mental disorders are not just due to brain aging; losses associated with the quality of life and socio-economic problems are also responsible for advanced mental problems among the elderly (Prakash, 2004). Along with these factors, lifestyle factors also affect health and increases morbidity conditions among the elderly. For example, prevalence of asthma is found to be higher among the elderly who habitually smoked, consumed alcohol and chewed tobacco, whereas the incidence of TB is higher among those who used to be chain smokers (Mutharayappa and Bhat, 2008).

However, problems related to aging are not similar for males and females. It is generally found that female life expectancy is considerably higher than that for males. Nonetheless, it should be taken note that this increased life expectancy is not free from disease and is often characterised by extended chronic illness (Hess, 1990). According to Markides (1990), even though women live longer than their male counterparts, there is greater prevalence of nonfatal conditions, particularly arthritis, among them. At the same time, women also experience more physical symptoms and report greater levels of disability in old age than do men. Gupta, Dasgupta and Sawhney (2001) find that women are more vulnerable to ill health compared to men due to lack of productive employment and income, their widowhood status and low education. All of these make them dependent on others and also less empowered to voice their needs and problems. Sreerupa (2006) also observed the gender bias in health status and utilisation of health care services. Further, there is also an emerging concern regarding the increasing proportion of widows in India. Widowhood is a much greater risk factor for women as compared to men. Two reasons can be elicited from literature for gender disparity in widowhood in the Indian case: (a) longer life span of women compared to men and (b) the widespread custom of women marrying older men than themselves (Gulati and Rajan, 1999).



Another dimension of health of the elderly is the place of residence. Rural elderly are at increased risk of illness that is associated with multiple deprivations they experience like poverty, dependency as well as lack of access to health care. There is considerable evidence to suggest that aged persons in rural areas experience symptoms of physical ill health at a significantly higher rate than their urban counterparts (Hendricks and Turner, 1995). In another study, Dandekar (1996) observes health-related quality of life of the elderly, especially women from rural areas, to be considerably lower in India when compared to other countries. Further, there are considerable evidences to suggest that marital status is positively associated with survival and health outcomes (Goldman, Koreman and Weinstein, 1995).

Apart from above mentioned fact, vulnerability to specific diseases depends on the characteristics of individuals and their access and utilisation of health care. The health of a person may also be affected by the preference for a particular lifestyle by the individual. The food habit, to a great extent, determines the health of the individual. There are many diseases that surface during adulthood and remain till death. All these necessitate a micro verification of the longevity experience and its bearing on the kind of health care expenditure incurred by individuals.

### **1.3 Elderly and Health Expenditure**

Over the past few decades, health expenditure has risen continuously in India. In the Indian scenario, the state has been an important provider of health care services. However, in spite of all the efforts, the share of public sector health expenditure has been minimal and private household health expenditure constitutes around two-third of all health expenditure (Bhat and Jain, 2006). The private health care system growth in India has been unchecked and unregulated, which has further resulted in underdeveloped health services and poor health of the population (Duggal, Nandraj and Vadair, 1995). Private health expenditure has grown substantially faster than real incomes over a period of time (Bhat and Jain, 2006). This has serious implications because of the fact that the financial burden borne by the household will be substantial, especially in the case of the poor household. The situation is worse when the patient happens to be breadwinner. While analysing the health expenditure for the Jalgaon district of Maharashtra, Duggal and Amin (1989) find that while morbidity rates increase with rise in income and class status, non-utilisation of health facilities

declines with rise in class status. In the same line, Sen and Rout (2007) explore that income of the household has significant impact on health expenditure. All these studies clearly indicate the relevance of the issue of health expenditure.

It should, however, be noted that all the aforesaid studies (which are in Indian context) have analysed health expenditure in per capita terms. But then the question of comparability of per capita health expenditure arises while comparing across regions because health-related vulnerability is not independent of age and stage of life. Simple comparison of per capita health expenditure clearly ignores the demographic profile of the population and therefore demographic transition needs to be accounted for in the analysis mentioned above. The combined effect of aging and its associated vulnerability to health problems results in rising health expenditure with age and therefore, old age becomes a major determinant of the rise in health expenditure (Dormont, 2007). Large increase in disability due to aging is a well-established phenomenon and this association between aging and disability will lead to potential increase in the number of people requiring medical services (Mayhew, 2000).

As physical and mental health tends to deteriorate with age, the elderly need much more health care. In addition, the elderly often need medical care, which involves relatively expensive treatment and frequent hospitalisation. As a result of this, per capita health spending among the elderly is three to five times more than that of young population (Reinhardt, 2003). Therefore, it is expected that population aging will lead to rise in health care costs of the economy exponentially (World Bank, 1993). However, Reinhardt et al. (2002) establishes a weak relationship between per capita health care spending and the proportion of the old in OECD countries. This is more striking in the US, where the proportion of the population above the age of 65 is relatively small compared with the OECD average, but per capita health spending was 134 per cent higher than the OECD median in 2000. Despite this high health care expenditure, there is no evidence that Americans have better health or even utilise more health care services than the OECD median (Anderson et al., 2003).

The higher incidence of death due to prevalence of more severe diseases increases health-related costs among the elderly. Using the panel data two-part model, Seshamani and Gray (2003) show that approaching death affects costs up to 15 years prior to death and the health care cost increases ten times from five years prior to

death. The concentration of medical care expenditure in the last years of life is also evident in particular disease categories such as heart disease and cancer (Riley et al., 1987). The OECD (1997) study also confirms the finding that there is disproportionate health expenditure incurred during the terminal years of life and health care costs in the year or two preceding death: in some countries one-half of all health care expenditure occurs in the last two years of life. The possible explanation for high health expenditure related to death may be heavy reliance on home-nursing care services by the extreme elderly (Roos et al., 1987). On the contrary, there are studies according to which health care expenditure per person during last year of life actually declines with age and similar patterns were found regardless of sex, race and cause of death (Levinsky et al., 2001; Pearls and Wood, 1996).

Similarly, studies do find rise in health expenditure in old age, but this is primarily because mortality rates increase with age and health care expenditure increases with proximity to death (Yang Norton and Stearns, 2003; Seshamani and Gray, 2004). These studies tend to suggest that proximity to death rather than age is the predictor of high health expenditure among the elderly. Nonetheless, it should also be kept in mind that increasing age is responsible for declining health status leading to increased health expenditure, and ultimately to death. Further, Lubitz et al., 2003 highlight that the elderly who are healthier have a higher life expectancy than those who are in worse-off position. But the cumulative health expenditure up to death is found to be similar for both the groups. Thus, decline in age specific mortality rates due to recent advancements in medical technology has been successful in postponing death to later ages. Nonetheless, the problem is solved only partially (Seshamani and Gray, 2004).

Given this prelude, growth in the elderly population and prevalence of chronic diseases among them raises concerns regarding the overall burden of care for those with physical and cognitive limitations, and the health care costs of the society. The burden will depend largely on whether the added years are lived with or without major disabilities. If extending life increases the burden of disease in a population by lengthening the time between onset of chronic disease and death, then population aging is likely to entail large increase in health expenditures. On the other hand, population aging does not necessarily have a negative effect on population health in the reverse case (Uhlenberg, 2006). Thus, increase in health care expenditure among

elderly may increase owing to two factors: (a) increasing life expectancy at older ages<sup>6</sup> and (b) early onset of the disease among such people. If an individual experiences a chronic ailment at an early age and lives with the disease substantially longer, he will have to bear higher health expenditure. Larger the gap between onset of such disease and death, higher will be the expenditure.

#### **1.4 Research Gap**

The scanty literature reviewed above informs on the health-related vulnerability of the rising elderly population. The susceptibility to diseases varies according to various socio-economic dimensions like economic status, gender, place of residence, marital status, etc. The higher vulnerability to diseases among the aged gets reflected in higher health expenditure among the elderly. These problems accompanied by increase in the population share of the elderly suggest that the health of the aged needs special attention by researchers and policymakers. In the Indian context, sufficient evidence exists pertaining to the kind of deterioration in physical and mental health in old age (Rajan, 2004; Rajan, 2008; Alam, 2008; Gupta, Dasgupta and Sawhney, 2001). Although there are few studies which have tried to analyse the health expenditure patterns in India, there is no systematic exploration regarding the burden of health expenditure that could arise due to the longer life span of the elderly with multiple chronic ailments. Further, the literature reviewed makes it clear that the health expenditure increases much more as death approaches. This important implication of aging on rising health expenditure has not been analysed in the Indian context. Given these research gaps, the present study is a modest attempt at exploring the impact on health spending owing to the rising number of elderly population in India.

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<sup>6</sup> Tabata (2004) shows that life expectancy has a positive impact on the growth of the economies in which life expectancy is relatively low but that it may negatively affect the growth of the economies where life expectancy is relatively high.

## 1.5 Objectives and Approach

Based on the research gaps discussed earlier, the broad objective of this study is to examine the burden of aging in terms of health expenditure. The specific objectives of the study are as follows:

1. To examine the effect of population aging on health expenditure at the macro level;
2. To understand how population aging gets reflected in health expenditure at the household level;
3. To inspect the burden of death-related health expenditure.

The analysis will be carried out for major Indian states to understand the macro-level implication of population aging. We also explore the issue of rising health expenditure at the household level (micro-level), that is, how aging affects different households (say, for example, various social groups, wealth quintiles, etc.).

Aging is a multi-faceted and multi-disciplinary concept. For a layman, aging may mean growing older; however, there is unanimity among scholars that chronological age is a meaningless variable (Ferraro, 1990; Maddox, 1968). Age is only a way of marking human events and experiences; these events and experiences matter more than the mere duration of the life lived. Therefore, aging is viewed differently by biologists, psychologists, sociologists, demographers and people of other disciplines, and therefore various concepts of aging have various notions like biological aging, physical aging, psychological aging, sociological aging and demographic aging. Nonetheless, one common fact among all these disciplines is that aging brings about many key issues among which health-related problems are of immense importance. However, before analysing any issue related to aging, one must define aging and fix a criterion to separate aged people from the rest of the population. Therefore, there is a need to fix a certain criterion for our analysis and the threshold of old age must be defined. In this study, '60' is set as cut-off point of old age. This demarcation is based on the criterion of retirement from the labour market and in India, retirement age is fixed as 58 or 60 in most of the government jobs and for all practical purposes, individuals aged 60 and above are considered to be 'senior citizens'. There are both

advantages and disadvantages in setting '60' as the cut-off point. However, the advantages seem to outweigh the disadvantages<sup>7</sup>. For cross-cultural comparison, a single threshold of age must be adopted and therefore, for the current study, '60' is set as the threshold age.

## 1.6 Data Source and Methodology

Data sources used for the present study are NSS 60<sup>th</sup> Round (Schedule No. 25) on 'Morbidity, Health Care and Condition of Aged' (2004), population projections provided by India, Registrar General (2006) and Migration Monitoring Study (2007).<sup>8</sup> Out of these, NSS 60<sup>th</sup> Round raw data provides detailed information on the health status of the whole population, including the aged. NSS gives two kinds of information regarding the health of the elderly; the first is self-rated health<sup>9</sup> and second is about prevalence of ailment. As per the questionnaire, self-assessed health of an elderly is categorised into three – excellent, good/fair and poor. The data further informs us about the health care utilisation pattern of the patients. NSS data includes information regarding the health expenditure incurred by individual both during the last 365 days and during the last seven days. In the present study, the analysis of health expenditure accounts for the last 365 days only. The obvious reason for not analysing the health expenditure during last seven days is that the information collected about health expenditure during last seven days may not reflect the true

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<sup>7</sup> The obvious demerit of this criterion is that it ignores the fact that a large proportion of elderly women have not been in gainful employment, and that the age of retirement varies not only between countries but also within countries. The chronological age also ignores the biological, sociological and psychological dimensions. This method of demarcation of the aged is arbitrary and it does not necessarily imply a transition from active to passive life. A large chunk of population above this threshold age is capable of carrying out economic and other activities.

<sup>8</sup> Migration Monitoring Study (2007) is the third round of the Migration Monitoring Studies conducted by the Research Unit on International Migration of the Centre for Development Studies. Households were randomly selected from all the 14 districts and all the 63 taluks of the state. The thrust areas covered in the survey are migration, remittances and employment. This round of the survey is different from the previous rounds as it also covers topics like education and health, amenities in the households, possession of consumer durables and household indebtedness.

<sup>9</sup> However, doubts are raised over whether self-rated health really represents the health status of a person or not. The relationship between poor self-reported health and excess mortality has been well established for developed countries as well as developing countries (Idler and Benyamini, 1997; Benyamini and Idler, 1999; Frankenberg and Jones, 2004; Fielding, 1995). The study for Indonesia by Frankenberg and Jones (2004) shows that in low-income settings, individuals who perceive their health as poor are significantly more likely to die in subsequent follow-up periods than their counterparts who report their health as good. This result holds true for both men and women and remains even after inclusion of nutritional status, physical functioning, symptoms of poor physical health and depression and hypertension. The above discussion indicates that perceived health status is a good predictor of actual health status and hence it is taken as an indicator of health status of the elderly for the current study.

picture. This is because there may be many people who might have suffered from severe illness during the last one year and also might have incurred heavy health expenditure. However, such people are not covered when we enquire only for last seven days. Therefore, there is high chance of underestimation of health expenditure. However, there could be the other case also when the person might have incurred health expenditure only during the last seven days and not before.

Expenses incurred for treatment as the in-patient of a hospital which is provided in the dataset are of two types – medical expenditure for the treatment during the stay at the hospital,<sup>10</sup> and other expenses not included in first category.<sup>11</sup> The focus of the study is on the medical expenditure for treatment during stay. Inter-state comparison of health expenditure has been made to assess the burden of aging through simple cross-tabulation. Simple comparison, nonetheless, ignores the fact that the aged are much more prone to chronic diseases as compared to other segment of population and the prevalence of disease also varies across states. Therefore, disproportionate index (DI) has been computed for such an adjustment, which is calculated as follows:

$$DI = \frac{\text{Likelihood of morbidity for elderly}}{\text{Proportion of health expenditure spent on elderly}}$$

$$\text{Likelihood of morbidity of chronic diseases for elderly} = \frac{P_1/(1 - P_1)}{P_2/(1 - P_2)}$$

Where,

$P_1$  = Proportion of elderly who have chronic diseases, and

$P_2$  = Proportion of non-elderly who have chronic diseases.

The implication of aging on various socio-economic dimensions have been also analysed at the household level. The study also examines how the presence of elderly persons in the household makes a difference to the household health expenditure. The

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<sup>10</sup> It includes expenditure incurred on doctor's/surgeon's fee, medicines, diagnostic check, bed charges, attendant charges, physiotherapy, personal medical appliances, others (food and other materials, blood, oxygen, cylinder, etc.) and expenditure not reported anywhere else reported.

<sup>11</sup> Such expenses comprise of expenditure on transport (other than ambulance), lodging charges of escort(s) and other such items.

analysis has been replicated for Kerala using Migration Monitoring Study (2007) for a more in-depth analysis. Further, to elaborate on the expected burden of aging, the future cost of certain diseases for the elderly and non-elderly is estimated using the following formula-

$$\text{Estimated cost of diseases} = \text{ASMR} \times \text{CD}_i \times P_i^t$$

Where,

$$\text{ASMR} = \text{Age Specific Morbidity Rate} = \frac{nM_x}{nP_x}$$

$nM_x$  = Morbid population in the age group x to (x + n),

$nP_x$  = Population in the age group x to (x + n),

$\text{CD}_i$  = Per capita cost of disease for  $i^{\text{th}}$  age group,

$P_i^t$  = Projected population for  $i^{\text{th}}$  age group at time period t

## 1.7 Chapter Outline

This study is classified into five chapters. The first chapter introduces the issue of concern along with the proposition to evaluate implications of aging on health expenditure in India. The second chapter deals with the health status and health-seeking behaviour of the elderly and analyses the implication of aging in terms of health expenditure in India; it also makes an inter-state comparison. Further, quintile-wise burden of aging is assessed at the household level. Death-related health expenditure is examined in the third chapter. Chapter four examines disease-related expenditure with special reference to Kerala. Finally, chapter five concludes.



## **Morbidity and Health Care Expenditure**

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### **2.1 Introduction**

Aging is associated with increasing risk of disease and disability. As age advances, several physical and mental changes take place in the adverse direction. Most of the aged suffer from some kind of ailment, are generally not aware of the consequences and need of health care services (Goswami et al., 2005). The situation is made worse by the fact that, more often, health problems lead to major disabilities and restrict the individual's movement, which makes their life miserable. Further, changing household structure implies an alteration in the living arrangements of the elderly making them more insecure (Johnson, Stevens and Irudaya Rajan, 2005). Higher prevalence of chronic diseases among the elderly has serious implications for health spending. Once a chronic disease affects a person, it recurs till the end of life. Since episodes of chronic diseases are more frequent, their burden is more compared to other types of diseases. In many cases, when the poor do not have enough income to meet this expenditure, they have to sell their property or borrow from the market or from relatives, which further affects their health by adversely influencing their future income and thereby, consumption level. Moreover, the high cost of medical expenditure has an effect not only on the patient but also on other family members. In this chapter, we have tried to explore the link between aging and health and then examined how the deterioration in health is linked to rise in health expenditure. For this purpose, the effect of aging population will be looked into both at the individual and the household level for the major Indian states.

This chapter is divided into five sections. After the introduction in the first section, the next section provides an overview of the health status of the elderly and the pattern of utilisation of health care facilities by them. The economic burden of aging is examined in the third section. The fourth section offers a broad understanding of the economic burden of the elderly on the household. The last section summarises the chapter.

## 2.2 Health Status and Health Care Utilisation

**Table 2.2.1: Perceived Health Status of the Elderly by Place of Residence and Sex for All India, 2004**

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Excellent/ very good	6.3	3.5	4.9	8.4	5.1	6.7	6.8	3.9	5.3
Good/fair	71.4	69.9	70.7	72.6	71.7	72.2	71.7	70.4	71.0
Poor	22.3	26.6	24.5	19.0	23.2	21.2	21.5	25.8	23.6

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Table 2.2.1 shows the perceived health status of the elderly. The proportion of the elderly reporting poor health for all India is 23.6 per cent. It is also evident from the table that the proportion of elderly reporting poor health is higher in rural areas (24.5 per cent) compared to the urban area (21.2 per cent). Further, it can also be noticed that the female elderly are at a disadvantage with regard to health status as it can be observed from the table that the proportion of female elderly reporting poor health is 26.6 per cent, which is higher than the 22.3 per cent of their male counterparts in the rural areas. Similarly, for urban areas too, comparatively higher proportion of females report their health as poor (the corresponding figures for females and males are 23.2 per cent and 19 per cent respectively).

From Table 2.2.2 it is clear that as age increases, the proportion of people reporting poor health also increases, and that the proportion is highest for the 80 and above age group. This proportion reporting poor health among the elderly varies substantially across Indian states, with Kerala placed at the top and Tamil Nadu at the bottom. Such a variation could perhaps be due to varying perception regarding ill health across regions, which is conditioned by the health-seeking behaviour on one hand and access to health infrastructure on the other. Further, as this description is restricted for the elderly, varying longevity itself might be shaping this perception to a large extent across regions. More than the varying perception regarding poor health, it is evident that elderly perceive poor health differently with increasing age across states. For instance, this progression is moderate in Punjab, Haryana, Himachal and Gujarat as against other states where it is intense.

**Table 2.2.2: Proportion of the Elderly Reporting Poor Health by Age across Major Indian States, 2004**

	60 and above	60-69	70-79	80 and above
Andhra Pradesh	25.1	19.9	33.3	40.5
Assam	25.6	20.8	39.4	56.9
Bihar	25.9	19.1	38.2	52.9
Goa	21.3	13.8	27.8	49.6
Gujarat	13.1	11.3	12.8	28.3
Haryana	18.3	13.5	21.6	34.0
Himachal Pradesh	17.7	13.0	17.6	37.3
Jammu & Kashmir	27.8	11.5	51.3	72.3
Karnataka	19.2	12.9	33.2	36.0
Kerala	37.2	27.9	44.6	57.3
Madhya Pradesh	24.7	18.3	34.5	55.6
Maharashtra	18.6	12.3	27.6	38.1
Orissa	29.6	21.7	46.2	58.8
Punjab	18.9	15.5	21.2	38.3
Rajasthan	23.3	17.2	27.3	45.5
Tamil Nadu	12.3	8.6	16.5	29.9
Uttar Pradesh	26.6	19.7	34.7	52.6
West Bengal	35.2	29.0	45.0	48.6
<b>All India</b>	<b>23.6</b>	<b>17.6</b>	<b>31.6</b>	<b>45.8</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

To further the discussion regarding the impact of aging on deterioration of physical health status, the disease prevalence among the elderly is presented. The pattern of disease prevalence might help in clarifying on the differential reporting on poor health status across states. In other words, this may provide a clue as to whether the perceived health status reflects the observed ill health as indicated by the prevalence of various ailments among the elderly. Prevalence of ailments among the elderly by place of residence and sex is shown in Table 2.2.3. The table reveals that as much as 39 per cent of the elderly have at least one ailment. Prevalence of ailments is

relatively higher among female elderly compared to their male counterparts. The table also spells out the rural-urban difference in the disease prevalence among the elderly; 44 per cent of the elderly are suffering from at least one ailment in urban areas whereas the corresponding figure for rural areas is 37 per cent. Similarly, the proportion of the elderly having at least two ailments and at least three ailments is relatively higher in urban areas compared to rural areas. Gender difference is also observed in the prevalence of ailment for all India, disease prevalence being marginally higher for females. Proportion of elderly having at least one ailment is 39.5 per cent for females, whereas it is 38.2 per cent for males. It can also be noted from the table that there is not much variation in the disease prevalence among males and females in the rural areas; the proportion of female elderly suffering from at least one ailment or at least two ailments is higher than their male peers by not more than one per cent. On the other hand, in case of urban areas these discrepancies are 3.2 per cent and 1.4 per cent respectively.

**Table 2.2.3: Prevalence of Ailment among the Elderly by Place of Residence and Sex for All India, 2004**

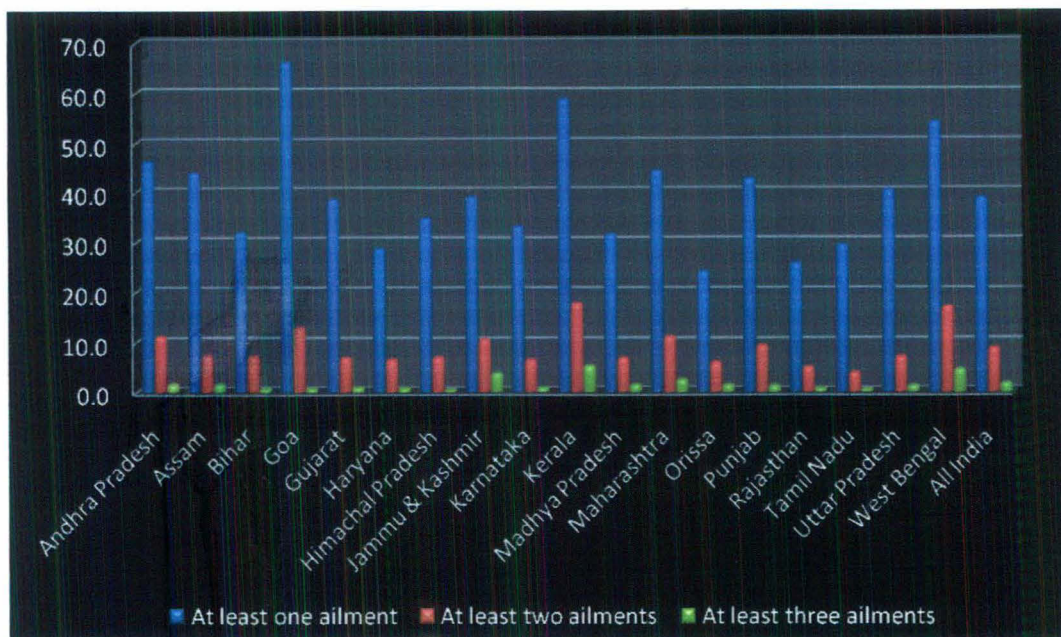
	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
At least one ailment	37.0	37.6	37.3	42.3	45.5	44.0	38.2	39.5	38.9
At least two ailments	7.8	8.5	8.2	10.7	12.1	11.4	8.5	9.4	9.0
At least three ailments	1.7	1.7	1.7	2.1	2.7	2.4	1.8	1.9	1.9

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Further, state-wise prevalence of ailment among the elderly is shown in Figure 2.2.1. From the figure, it is surprising to notice that the percentage of elderly having at least one ailment is highest for Goa (66.2 per cent) followed by Kerala (59 per cent) and West Bengal (54.2 per cent). On the other hand, Orissa, which is the poorest state in India, has least percentage of elderly who have at least one ailment. Disease prevalence among the elderly is less also for the states like Rajasthan, Madhya

Pradesh and Bihar, which fall under the category of BIMARU states.<sup>12</sup> A similar kind of trend is observed for the elderly having at least two ailments and at least three ailments, with Kerala and West Bengal having the highest proportion.

**Figure 2.2.1: Prevalence of Ailment among the Elderly, 2004**



*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

In the above graph, we have shown the prevalence of multiple ailments among the elderly. This does agree to some extent with the perceived health status reported by the elderly. More than understanding the morbidity and perceived health status among the elderly, it is also pertinent to examine the pace of deterioration in health status of the elderly with advancing age. Table 2.2.4 illustrates the proportion of the elderly in different age groups who have at least one ailment. It is evident from the table that prevalence of ailment increases with the advancement of age; 34 per cent of people in 60-69 age group suffer from at least one ailment, whereas the proportion increases up to 47 per cent and to 53 per cent for age groups 70-79 and 80 and above respectively for all-India. The table also reveals that a relatively higher proportion of female elderly suffers from at least one ailment compared to their male counterparts across all age groups. It can also be observed that such difference is found to be more in urban areas. For example, the proportion of females suffering from at least one

<sup>12</sup> The term BIMARU was coined by Ashish Bose. The term BIMARU is coined by taking the first letter of four states: Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh.

ailment in the 60-69 age group is four per cent higher than that of their male counterparts in urban areas, while it is only one per cent in the case of rural areas. Similarly, for the age group 80 and above, 59 per cent of the female elderly suffer from at least one ailment, which is 4 per cent higher than the disease prevalence among their male counterparts. Further, it can also be taken in note that disease prevalence is more in urban areas in comparison to rural areas across all age groups. The proportions of elderly suffering from at least one ailment in urban areas are 39 per cent, 50 per cent and 57.3 per cent in age groups 60-69, 70-79 and 80 and above respectively, whereas the corresponding figures are 32 per cent, 46 per cent and 52 per cent in rural areas, which are obviously lower than the corresponding figures in urban areas.

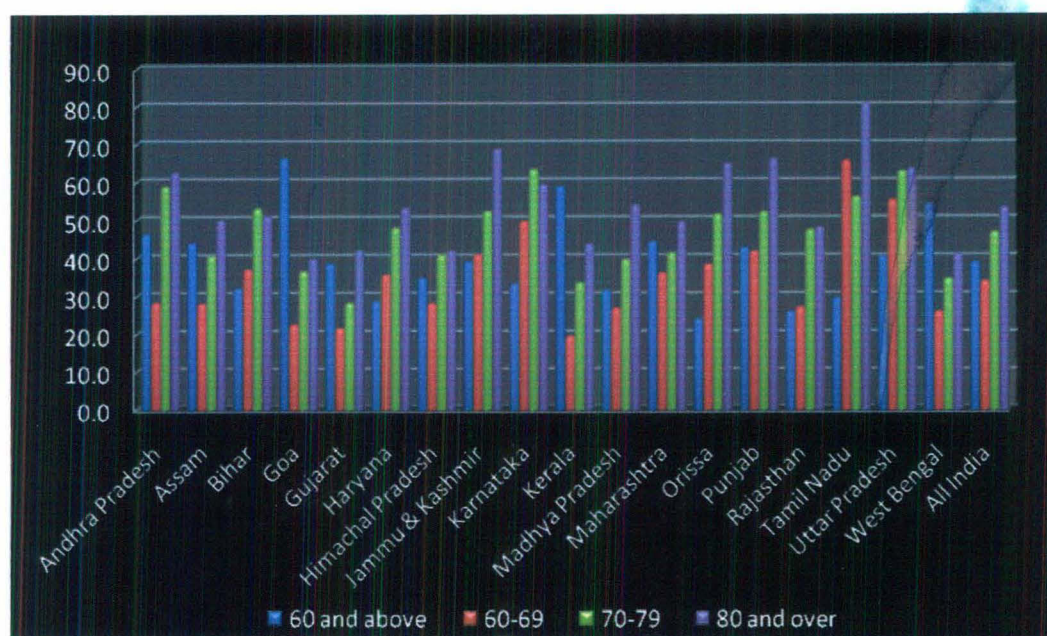
**Table 2.2.4: Prevalence of Ailment among the Elderly in different age groups by Place of Residence and Sex for All India, 2004**

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
60 and above	37.0	37.6	37.3	42.3	45.5	44.0	38.2	39.5	38.9
60-69	31.8	32.7	32.3	37.0	41.2	39.1	33.0	34.7	33.9
70-79	44.7	46.6	45.6	50.1	50.8	50.5	46.0	47.7	46.8
80 and above	52.9	50.7	51.9	55.2	59.2	57.3	53.5	53.3	53.4

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Prevalence of ailment in different age groups across major Indian states is shown in Figure 2.2.2. The figure clearly illustrates that prevalence of ailment has increases with age across all states except Bihar, Karnataka and Tamil Nadu. This result is well supported by the study of Young (1997) in which he shows that aging leads to decline in physiological functions and that it is also characterised by the rising prevalence of chronic pathologies. The loss in physiological functions can be largely attributed to the loss of functioning cells. Another study by Wensing et al. (2001) also supports our result that higher age leads to poorer health status.

**Figure 2.2.2: Proportion of the Elderly having at least One Ailment in Different Age Groups, 2004**



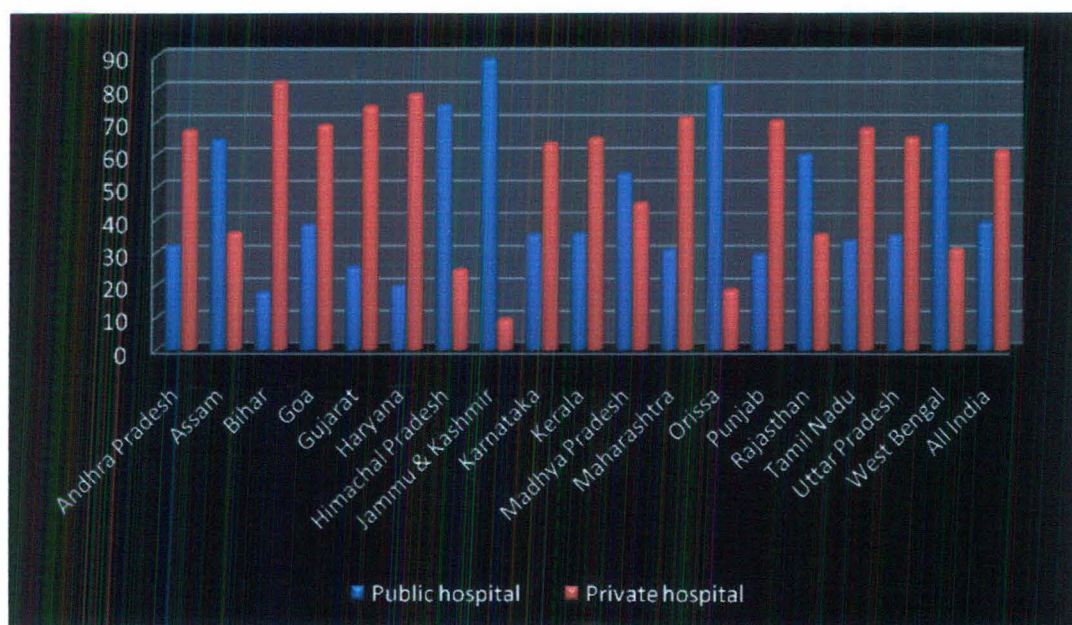
*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Given the increasing morbidity levels with increasing age among the elderly, it is also imperative to know their health-seeking behaviour in terms of varying institutions. The NSS 60<sup>th</sup> Round data provides information about the kind of hospital and ward people are going to for the treatment. This has its own implications for the magnitude of health care costs and may be dependent on the availability of health care institutions in different regions. On this count, we examine the reported health expenditure by the elderly and its dispersion across Indian states.

NSSO provides data on two categories of the public health system, namely, 'Public Hospital' and 'Public Dispensary'. Here, both these categories are merged to get data for the public health sector as a whole. Finally, we have two categories – 'public' and 'private'. Figure 2.2.3 illustrates the type of hospital used by the elderly. From the figure, it is evident that the proportion of elderly going to public hospitals for treatment is highest in Jammu & Kashmir followed by Orissa, Himachal Pradesh and West Bengal. It is surprising to note that use of private hospitals for treatment is highest for Bihar. The possible explanation could be inadequate public health infrastructure. Further, the existing public health facilities may not be offering the desired quality of service. Hence, the disproportionate use of private health care in

Bihar may not be a choice of the elderly, but rather than a compulsion. Health care utilisation among the elderly in terms of public-private divide indicate a stricter pattern like in the better off states where the private sector is predominant and vice versa. This observation is supported by a variety of factors. The preference for the private sector could be due to their better accessibility on the one hand and better quality service when compared with public sector institutions on the other. Out of eighteen states studied, public sector utilisation with regard to elderly health care is higher for seven states. This private-public divide in health care utilisation is not that simple to explain as it has its own bearing on the differential health seeking behaviour because pattern of access and provisioning of such care varies across states. Nonetheless, one can expect an obvious consequential impact of this on the expenditure incurred on health care by the elderly.

**Figure 2.2.3: Type of Hospital Used by the Elderly in Last 365 Days, 2004**



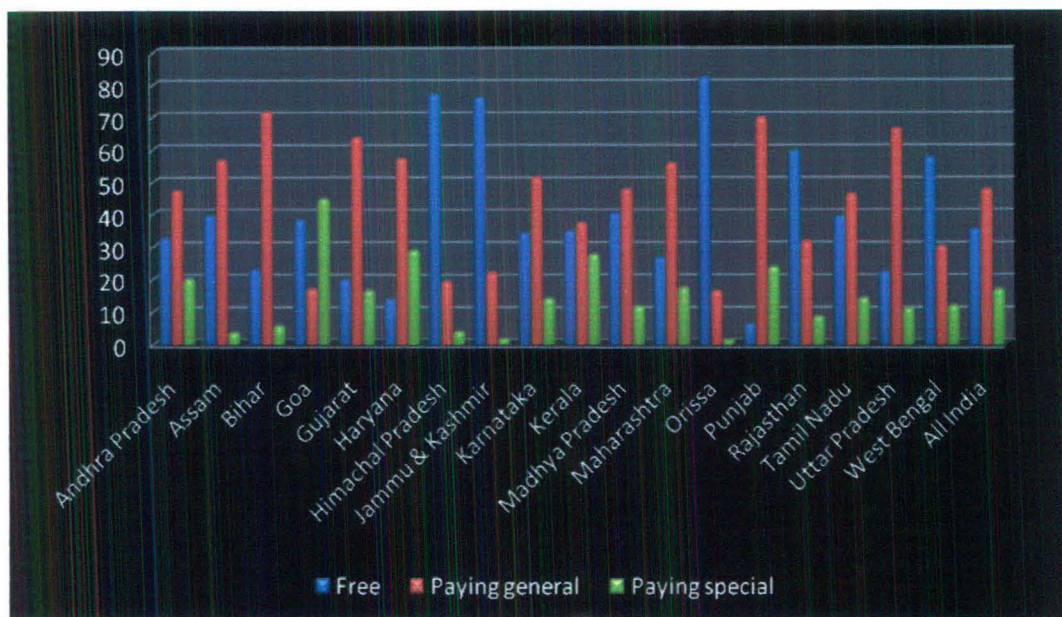
*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Further, to strengthen our argument that there is a tendency for the richer sections to care more about their health and hence to be ready to pay more for achieving better health status, the pattern of use of ward has been shown in Figure 2.2.4. The figure clearly indicates that the percentage of people going to 'paying special' wards is more in economically well off states such as Goa, Haryana, Kerala, Punjab and Andhra Pradesh, whereas this percentage is lower for lesser developed states like Orissa,



Assam, Bihar and Rajasthan. It can also be noted that this percentage is low for some of the well off states namely, Himachal Pradesh and Jammu & Kashmir. This could be partly because of the limited accessibility of services due to undulating topography of these states, which increases the transaction cost of the people.

**Figure 2.2.4: Type of Ward Used by the Elderly in the last 365 Days, 2004**



*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

### 2.3 Cost of Hospitalisation

Till now we have discussed the morbidity risk and preference for private health care among the elderly. This phenomenon is more intense among the richer states when compared to the poorer states. Given the frequent morbidity and preference for private health care, there is an obvious need to assess the expenditure associated with it. Analysis of expenditure may confirm the likelihood of frequent morbidity resulting in greater expenditure and the like.

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In Table 2.3.1, we have shown the per capita hospitalisation cost during last one year. The total per capita hospitalisation cost is seen to be the highest for Kerala (Rs 509 per year) followed by Punjab (Rs 469), Haryana (Rs 372), Tamil Nadu (Rs 298) and Himachal Pradesh (Rs 288). It is to be noted that all these states which are incurring high hospitalisation cost are economically developed states. Further, it is revealed that the per capita hospitalisation cost for elderly is around four times higher than that of the non-elderly. We have already shown that aged people are more prone to



experience morbidity compared to non-elderly population. It is not only the high disease prevalence among the elderly but also the type of disease which has implications for high health expenditure. Ranks of the states according to cost of hospitalisation are also shown in the table; the state, which has the highest per capita cost is ranked number one. It needs to be noticed that Punjab ranks first in terms of per capita hospitalisation cost for the elderly followed by Kerala, Tamil Nadu, Maharashtra and Gujarat. On the other hand, this cost is lowest in Assam both for the elderly as well as the non-elderly. This is also true in the case of 'BIMARU' states.

Another indicator, which can be used as a proxy of the burden of hospitalisation, is 'duration of stay' in hospital. Longer duration of stay implies more critical disease and hence more hospitalisation cost. Hence, longer duration of stay in a hospital signifies higher financial burden. Table 2.3.2 shows duration of stay in hospital, which is the number of days spent in hospital per episode as in-patient. The table clearly highlights that there is no significant difference in duration of stay between the elderly and non-elderly; the length of stay being marginally higher for the elderly. This is exceptionally high for Assam (22.3 days) followed by Himachal Pradesh (13.3 days), Jammu & Kashmir (12.0 days), Bihar (11.2 days) and Andhra Pradesh (10.8 days). On the other hand, duration of stay per hospitalisation for the elderly is the high for the states like Himachal Pradesh (13.1 days), Punjab (12.5 days), Bihar (12.4 days) and Rajasthan (12.1 days).

We have already seen that per capita health expenditure for the elderly is much higher than that of non-elderly. At the same time, proportion of health expenditure to total expenditure spent on the elderly is higher than their share in total population. Therefore, it appears that the elderly are well taken care of. However, with the expenditure being adjusted for the disease (since the elderly are more vulnerable to get the disease), the proportion of health expenditure spent on the elderly is not high compared to their share in total population.

**Table 2.3.1: Cost of hospitalisation per Capita (in Rs) per Year, 2004**

	<b>Elderly</b>		<b>Non-elderly</b>		<b>Total</b>	
	Per Capita Cost	Rank	Per Capita Cost	Rank	Per Capita Cost	Rank
Andhra Pradesh	492	12	163	8	186	8
Assam	181	18	47	18	54	18
Bihar	288	15	68	17	81	17
Goa	753	6	109	13	171	9
Gujarat	917	5	178	7	226	7
Haryana	615	8	350	3	372	3
Himachal Pradesh	545	10	263	4	288	5
Jammu & Kashmir	327	13	86	16	102	16
Karnataka	643	7	125	11	160	11
Kerala	1505	2	382	1	509	1
Madhya Pradesh	276	16	98	15	109	15
Maharashtra	925	4	216	6	272	6
Orissa	214	17	102	14	112	14
Punjab	1558	1	372	2	469	2
Rajasthan	590	9	139	9	167	10
Tamil Nadu	1108	3	224	5	298	4
Uttar Pradesh	318	14	121	12	135	13
West Bengal	514	11	127	10	154	12
<b>All India</b>	<b>623</b>		<b>154</b>		<b>187</b>	

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

**Table 2.3.2: Duration of Stay in Hospital (in days) for In-patient per Episode, 2004**

	<b>Elderly</b>	<b>Non-elderly</b>	<b>Total</b>
Andhra Pradesh	9.8	11.0	10.8
Assam	11.7	24.1	22.3
Bihar	12.4	11.0	11.2
Goa	5.7	5.6	5.6
Gujarat	6.6	6.7	6.7
Haryana	6.6	8.5	8.2
Himachal Pradesh	13.1	13.4	13.3
Jammu & Kashmir	11.4	12.1	12.0
Karnataka	10.8	8.7	9.1
Kerala	9.4	8.7	8.9
Madhya Pradesh	7.4	9.1	8.9
Maharashtra	9.3	7.4	7.8
Orissa	8.3	8.9	8.8
Punjab	12.5	10.0	10.5
Rajasthan	12.1	9.8	10.2
Tamil Nadu	8.9	8.2	8.3
Uttar Pradesh	9.9	9.6	9.6
West Bengal	10.2	9.5	9.6
<b>All India</b>	<b>9.5</b>	<b>9.1</b>	<b>9.2</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Table 2.3.3 shows the adjusted proportion of health expenditure and extent of disproportionateness. It is observed from the table that the share of health expenditure to total health expenditure for the elderly is much higher than their share in total population (more than three times). However, the fact that elderly are likely to have more health problems than other segments of the population makes it necessary to adjust these figures for chronic diseases. After the adjustment for chronic diseases, the stark difference between health expenditure on the elderly and their share in total

population comes down. It is revealed from the extent of disproportionateness and the disproportionate index<sup>13</sup> that expenditure incurred on the elderly in some of the states is not in keeping with their population share. The worst among such states is Assam followed by Jammu & Kashmir, Punjab, Madhya Pradesh and West Bengal. On the other hand, there are also some states like Goa, Tamil Nadu and Gujarat, where such disproportionateness is the least, indicating the adequate attention given to the elderly.

**Table 2.3.3: Proportion of Health Expenditure Spent on the Elderly, 2004**

	Proportion of health expenditure spent on the elderly to total health expenditure	Proportion of 60 & above population to total population	Likelihood ratio of the elderly being affected by chronic diseases	Proportion of elderly adjusted for diseases	Extent of disproportionateness	Disproportionate index
1	2	3	4	5	6	7
Andhra Pradesh	18.6	7.0	2.3	16.1	-2.5	0.9
Assam	16.4	4.9	8.1	39.6	23.1	2.4
Bihar	20.0	5.6	2.1	11.6	-8.4	0.6
Goa	42.3	9.6	1.5	14.8	-27.5	0.4
Gujarat	26.6	6.6	2.5	16.6	-9.9	0.6
Haryana	12.2	7.4	0.8	5.6	-6.6	0.5
Himachal Pradesh	17.0	9.0	1.4	12.7	-4.3	0.7
Jammu & Kashmir	20.0	6.2	5.4	33.5	13.5	1.7
Karnataka	26.6	6.6	4.8	31.9	5.3	1.2
Kerala	33.2	11.2	2.9	32.8	-0.4	1.0
Madhya Pradesh	16.1	6.4	4.3	27.5	11.5	1.7
Maharashtra	27.0	7.9	2.8	22.1	-4.9	0.8
Orissa	15.9	8.3	2.7	22.3	6.4	1.4
Punjab	26.3	7.9	4.9	39.2	12.9	1.5
Rajasthan	21.8	6.2	4.3	26.3	4.4	1.2
Tamil Nadu	31.2	8.4	1.9	15.6	-15.5	0.5
Uttar Pradesh	14.9	6.3	1.5	9.8	-5.1	0.7
West Bengal	23.3	7.0	4.5	31.1	7.8	1.3
<b>All India</b>	<b>23.1</b>	<b>6.9</b>	<b>2.9</b>	<b>19.7</b>	<b>-3.4</b>	<b>0.9</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

<sup>13</sup> For details on the methods of calculation, see the Methodology section in chapter- I

So far the analysis illustrates that health expenditure is higher for the elderly and that no systematic effort is being made to keep health spending on par with the magnitude of the elderly population and their higher health-related vulnerability. The consequence obviously is that a significant share of such expenditure is being met by individuals and it therefore becomes important to analyse the source of financing of such expenditure. Table 2.3.4 demonstrates the source of finance for medical expenditure of the elderly. The source of finance is categorised into three: financing predominantly in terms of household income and savings followed by borrowing and finally, contributions by relatives and friends. Although this pattern depicts the kind of strain that health expenditure imposes on household and individuals, a comparison of this is made across the elderly and non-elderly. The extent of strain follows a more or less uniform pattern with the difficulty being more on account of the elderly. In addition to this, it depicts systematic variation across states as well. These variations are perhaps in keeping with the differences in health care utilisation across states. The striking feature observed is that most of expenditure on elderly care is out of the income and savings of households. The only solace is that cost of elderly care is less prone to make households incur debt when compared with the same for non-elderly cost of care.

**Table 2.3.4: Source of Finance for Medical Expenditure for the Elderly In-patient, 2004**

	Household income/savings		Contribution from friends/relatives		Borrowings and other sources	
	Elderly	Non-elderly	Elderly	Non-elderly	Elderly	Non-elderly
Andhra Pradesh	36.5	31.8	6.4	5.8	57.1	62.4
Assam	62.7	64.4	5.5	7.7	31.9	27.9
Bihar	59.2	44.4	7.1	11.2	33.7	44.4
Goa	90.0	66.8	5.1	9.9	4.9	23.3
Gujarat	58.9	41.2	19.3	21.3	21.8	37.5
Haryana	51.7	46.6	8.4	11.9	39.8	41.4
Himachal Pradesh	61.7	42.3	17.2	21.7	21.1	36.0
Jammu & Kashmir	75.5	66.6	7.0	7.7	17.5	25.7
Karnataka	55.0	40.0	10.2	8.9	34.8	51.2
Kerala	47.2	36.7	17.5	11.8	35.3	51.4
Madhya Pradesh	72.8	46.1	10.0	13.8	17.2	40.0
Maharashtra	60.6	47.4	10.8	14.4	28.6	38.2
Orissa	52.9	41.7	5.5	9.5	41.6	48.8
Punjab	51.1	50.3	21.3	17.8	27.6	31.9
Rajasthan	47.8	40.3	4.7	5.3	47.6	54.4
Tamil Nadu	36.6	36.2	9.0	7.6	54.4	56.2
Uttar Pradesh	58.7	44.7	15.3	17.4	26.1	37.9
West Bengal	68.0	44.3	8.0	13.9	24.0	41.8
All India	52.5	43.0	12.2	12.8	35.3	44.2

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

## 2.4 Economic Implication of Population Aging at the Household

Having observed a pattern of differential burden of health among the elderly and non-elderly along with the source of raising such funds for health care, it becomes pertinent to find out whether the presence and predominance of the elderly in households makes it differentially burdensome. In this regard, we present an analysis

of per capita cost of hospitalisation among households seeking health care during the survey reference period according to the number of elderly in households.

**Table 2.4.1: Per Household per Capita Hospitalisation Cost for the Households from which Persons have Sought Treatment, 2004**

	Households with no elderly	Households with one elderly	Households with two elderly	Households with more than two elderly	All
Andhra Pradesh	5976	12829	10826	3549	6982
Assam	4978	5448	5549	@	5056
Bihar	7204	7901	16997	@	7571
Goa	3615	14098	983	3878	4699
Gujarat	5831	9403	5466	7873	6389
Haryana	11012	7774	5475	3370	10222
Himachal Pradesh	8276	7002	5493	7112	7942
Jammu & Kashmir	5209	6095	11841	3890	5448
Karnataka	5785	7008	8672	17768	6290
Kerala	3733	5392	4908	4685	4175
Madhya Pradesh	4908	5301	5404	2288	4919
Maharashtra	6727	9851	9340	10957	7481
Orissa	4351	4733	5252	6549	4437
Punjab	13317	16687	17599	25102	14378
Rajasthan	6961	9051	12199	13714	7492
Tamil Nadu	6247	7962	17523	8248	7113
Uttar Pradesh	8966	9060	6525	7815	8912
West Bengal	5109	6175	11154	9561	5520
<b>All India</b>	<b>6371</b>	<b>8113</b>	<b>8942</b>	<b>7469</b>	<b>6760</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

*@ No cases reported*



Per capita hospitalisation expenditure shows a systematic increase with increasing number of elderly in India as a whole and in its states (Table 2.4.1); it increases from Rs 6,371 for the households with no elderly to Rs 8,113 for the households with one elderly and to Rs 8,942 for the households with two elderly. This clearly indicates that the presence of an aged person in the household leads to higher health expenditure. Although this systematic rise in expenditure is not confirmed beyond two elderly, this could be because of the coexistence of more than two elderly in a household in rarer circumstances. Nevertheless, this observation that households with elderly are prone to higher health expenditure compared with those without elderly is sufficient to argue the case of rising health expenditure due to the presence of elderly persons in a household. Moreover, the NSS data also reveals the variation in the cost of hospitalisation across place of residence and gender dimensions (Table not shown). Per capita cost of hospitalisation for the households with no elderly is Rs 5,550 in rural areas whereas it is Rs 7,942 for urban areas. Similarly, huge rural-urban disparity is observed in the cost of hospitalisation for the households with one elderly, households with two elderly and household with more than two elderly. Further, the data also spells out the gender discrepancy in the cost of hospitalisation for the elderly, the cost being relatively higher for males. Per capita cost of hospitalisation for elderly is Rs 6,970 for males while it is Rs 6,302 for females. But this trend is reversed in case of households having two elderly and households having more than two elderly.

While this confirmation on the higher health expenditure among household with elderly is self-explaining given the health-related vulnerability among the elderly, it becomes important to understand the characteristics of the households accommodating elderly more frequently than others. Such characteristics include social groups as well as economic classes defined in terms of quintile class as regard to consumption expenditure. The earlier results find that the presence of elderly makes a difference in the per capita hospitalisation cost for the household. At this stage, it becomes imperative to check what category of household these people actually belong to. For example, the households in the depressed section of the society have a higher burden as compared to the households belonging to the affluent section. Shown in the Table 2.4.2 is the distribution of population for various social groups across different income quintiles. It can be noted from the table that more than 40 per

cent of elderly are mostly confined to first income quintile in case of ‘Scheduled Tribe’ (ST) and ‘Scheduled Caste’ (SC). On the other hand, in case of the ‘Others’ category, 40 per cent of elderly is concentrated in the fifth income quintile. There is more or less equal distribution of elderly and non-elderly population in ‘Other Backwards Caste’ (OBC) category.

**Table 2.4.2: Distribution of Population for Social Groups across Income Quintiles**

		Income Quintiles				
		First	Second	Third	Fourth	Fifth
Schedule tribe	Elderly	45.5	17.2	10.6	13.2	13.6
	Non-elderly	36.2	24.3	16.9	13.8	8.7
Schedule caste	Elderly	40.7	18.7	16.6	14.7	9.3
	Non-elderly	29.8	24.7	19.4	16.0	10.0
OBC	Elderly	23.2	15.6	21.0	20.5	19.8
	Non-elderly	18.6	23.7	22.8	19.6	15.4
Others	Elderly	13.3	10.4	16.0	20.3	40.0
	Non-elderly	12.3	16.9	18.2	24.0	28.5
Total	Elderly	22.0	13.9	17.9	19.4	26.8
	Non-elderly	19.6	21.7	20.3	20.1	18.3

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, ‘Morbidity, Health Care and Condition of Aged’ (2004).*

The caste-wise results throw light on some interesting observations (Table 2.4.3). It is seen that per capita hospitalisation cost is higher for the non-elderly in the households which belong to ST or SC. On the other hand, it is higher for elderly in the case of the OBCs and ‘Others’ category of households. It is noticed that the hospitalisation expenditure is highest for the ‘Others’ category followed by the OBC category. This expenditure is much lower for SC and ST households. A positive relationship is identified between wealth and household expenditure, as clearly indicated in the table. This finding corroborates our earlier argument, that people with higher incomes are more health conscious.

After pointing out the type of households which bear more burden, it becomes essential to discuss the proportion of their household expenditure which is going to

hospitalisation expenditure. From Table 2.4.4, it is very clear that households in the first quintile are spending a higher proportion of their income on hospitalisation expenditure. When we move across higher quintiles, this proportion tends to decline. It can also be observed that this proportion is the least for the households with no elderly.

**Table 2.4.3: Per Household per Capita Hospitalisation Cost for Different Social Groups and Income Quintiles, 2004**

Social Group	Income Quintiles					Total	
	First	Second	Third	Fourth	Fifth		
Schedule tribe	Elderly	2222	4243	5917	3314	8009	3914
	Non-elderly	2681	3155	3522	3802	13653	4077
Schedule caste	Elderly	2213	3384	3450	5902	10033	3993
	Non-elderly	2573	3711	5811	6504	9770	4806
OBC	Elderly	3396	5682	6280	7320	12991	7232
	Non-elderly	3497	4696	6124	6818	10399	6131
Others	Elderly	5189	4640	7356	10635	14688	10470
	Non-elderly	4370	4985	6584	8662	13181	8589
Total	Elderly	3487	4899	6318	8557	13822	8066
	Non-elderly	3351	4474	6111	7424	11930	6653

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

**Table 2.4.4: Proportion of Hospitalisation Expenditure to Total Household Expenditure for the Household from which Persons have Sought Treatment. 2004**

Income Quintiles	Households with no elderly	Households with one elderly	Households with two elderly	Total
First	19.9	25.2	23.5	20.7
Second	16.3	19.2	10.8	16.5
Third	16.3	17.0	19.4	16.4
Fourth	13.8	16.7	16.2	14.3
Fifth	11.7	13.2	13.7	12.1

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Table 2.4.5 demonstrates the type of hospital used by elderly across different quintiles. It is seen from the table that as the household moves up across the quintiles, the use of private hospitals also increase. There is not much difference in the pattern of use of hospital between rural and urban areas, except that the use of private hospitals is marginally higher in rural areas in the first and third quintile.

**Table 2.4.5: Type of Hospital Used by the Elderly across Different Quintiles, 2004**

	Rural		Urban		Total	
	Public hospital	Private hospital	Public hospital	Private hospital	Public hospital	Private hospital
First	50.8	49.2	55.9	44.1	51.4	48.6
Second	43.9	56.1	42.4	57.6	43.6	56.4
Third	31.9	68.1	42.5	57.5	34.9	65.1
Fourth	33.0	67.0	33.6	66.4	33.2	66.8
Fifth	24.7	75.3	24.7	75.3	24.7	75.3

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

## 2.5 Summary

The main findings of this chapter are as follows:

- One quarter of the elderly report their health as poor. This proportion increases with increase in age. Disease prevalence among elderly is very high and is more than 40 per cent. The prevalence of disease also increases with age.
- Overall, the use of private hospital services is more as compared to that of public hospitals. Utilisation of private hospital services is higher in economically developed states, Bihar being the only exception. The proportion of elderly admitted in 'special ward' category is also higher in the developed states.
- Per capita hospitalization cost for the elderly is four times higher than that for the non-elderly. This cost is higher for well-off states, the highest being for Kerala. All the BIMARU states have low per capita health expenditure.

- Duration of stay in hospital is almost same for aged and non-aged, though it is marginally higher for the elderly.
- The skewness in health expenditure towards the elderly tends to diminish when we adjust the aged population for their higher risk of getting diseases.
- 'Borrowings and other sources' as a source of finance is comparatively higher for non-aged population.
- The presence of elderly in the household augments the per capita hospitalisation cost for the household. Per capita hospitalisation expenditure tends to rise with the increase in the number of elderly in the household till the number of aged person goes up to two. But when the number of elderly per household increases beyond two, the per capita hospitalisation expenditure tends to decline.
- As we move up on the wealth quintile scale, per capita hospitalisation expenditure also increases. But the reverse is true with respect to the proportion of total health expenditure to total household expenditure.
- The utilisation of private hospitals gets higher as we move up on the wealth quintile.

In this chapter, we have provided brief idea about effect of aging on health care expenditure. The next chapter analyses the effect of terminal expenditure (i.e., the expenditure made just before dying) on the household and household members left behind.

## **Death-related Health Expenditure: Evidences from Indian States**

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### **3.1: Introduction**

In the previous chapter, we have shown that disease prevalence is higher among the elderly as compared to the non-elderly, which results in relatively higher health expenditure. As the person gets old he/she is more prone to disease, especially chronic disease. Once an individual starts to suffer from any chronic disease, it is very likely that the disease-related health problems would continue for a long time and as age progresses, the condition of the diseased person may further deteriorate. Under such circumstances, household members deploy their full potential to meet all kinds of medical expenditures, which can help to extend the life of the diseased person. Even when the individual's situation is very critical and death is inevitable, the household members continue to spend on resource-intensive treatment options and incur very high expenses to protect those few precious moments of life although they may be aware of the fact that their wish may not be realised. This is a situation in which spending defies all rationality.

As death-related expenditure could be abnormally high depending on the terminal illness<sup>14</sup> and its association with duration of hospital stay, this chapter makes an attempt to examine the burden of death-related health expenditure. The chapter is divided into four sections. Section 2 compares the disease prevalence among deceased elderly with that of all elderly, which includes those both dead and alive. It also examines the type of institution used by them for treatment. Section 3 analyses the cost of terminal expenditure by age, sex, type of disease and type of hospital and then examines their sources of finance for meeting this typical kind of health expenditure. Finally, section 4 summarises the main findings.

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<sup>14</sup> Terminal illness is an active and malignant disease that cannot be cured or adequately treated and that is expected to result in the death of the patient.

### 3.2: Deceased Elderly, Disease Prevalence and Hospital Use

To begin with, Table 3.2.1 shows the proportion of dead elderly who have received some kind of medical attention. It can be observed from the table that 64 per cent of the elderly who died had sought some kind of medical attention. There exists rural-urban difference in this phenomenon, given that medical attention at death is more among urban residents. There appears to be some gender difference in medical attention at death favouring females. While on the whole, medical attention at death is to the tune of more than sixty per cent, the urban rural difference is more for males in particular.

**Table 3.2.1: Medical Attention Received by Dead Elderly for All India, 2004**

	Male	Female	Total
Rural	61.7	65.3	63.1
Urban	66.7	65.9	66.3
Total	62.7	65.4	63.8

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

While medical attention at death could be on account of getting terminally ill patients to the hospital where they are declared dead on arrival of shortly afterwards, all cases of medical attention at death may not involve expenditure on account of treatment. From Table 3.2.2, it is apparent that only 20 per cent of the dead elderly had been hospitalised and this proportion varied widely between rural and urban areas. Such variation could very well be due to the rural-urban differential in availability of health infrastructure. In fact, the terminally ill are often brought to urban areas for treatment and as a result, there is a predominance of utilisation of urban health infrastructure for treatment of the elderly.

Given the magnitude of terminally ill elderly being treated in the urban areas being about one-third of all deceased elderly, there is a case for analysing the dimension of such terminal expenditure. This phenomenon is again urban biased, although there are 16 per cent of the cases in rural areas as well. There remains a gender dimension to the phenomenon with a preference for male elderly. To assume that such terminal

expenditure will be a burden for the households is supported by the fact that there are only 0.9 per cent of households in India with some form of health insurance and 1.1 per cent being covered under similar health schemes<sup>15</sup>. This abysmally low level of insurance coverage among Indian households is another reason leading to higher levels of health expenditure on account of terminal ailments of the elderly.

**Table 3.2.2: Proportion of Dead Elderly who had been Hospitalised, 2004**

	Male	Female	Total
Rural	17.9	13.0	16.0
Urban	36.2	28.5	32.5
Total	21.7	17.2	19.8

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

Apart from the magnitude of the phenomenon of hospitalisation on account of terminal ailments among the deceased elderly, it becomes imperative to analyse the same in terms of the kind of diseases associated with these hospitalisations. Tables 3.2.3 and 3.2.4 show the diseases most prevalent among all elderly and deceased elderly. It is evident from Table 3.2.3 that heart disease was the most prevalent disease among dead elderly, which was followed by bronchial asthma, cancer and other tumours, diabetes and neurological disorders. It should be noticed that all these diseases are chronic diseases. The table also reveals that pattern of disease prevalence varied between rural and urban areas. For example, heart disease and neurological disorders, which consisted around 44 per cent of all diseases prevalent among deceased elderly, were much higher in urban areas (approximately 21 per cent). On the other hand, in rural areas, bronchial asthma, heart disease and cancer and other tumours were more prevalent. This difference in prevalence of disease could be attributed to the different life style, food habits and the environmental conditions in these areas. The table also reveals the discrepancy in disease prevalence among males and females. Heart disease was the most common disease for both males and females. Bronchial asthma was widespread among males, whereas it was rare among females. 'Cancer and other tumours' and diabetes mellitus are very common among males. On the other hand, this was not the case for females. Here, it is worth noting that pattern

<sup>15</sup> These figures are calculated by the author using unit level records of NSS 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).



of disease prevalence was more or less the same for males in both rural and urban areas. However, there was a huge divergence in disease prevalence for females in rural and urban areas. Likewise, for deceased elderly, heart disease was the most prevalent among all elderly. But unlike deceased cases, cataract was also a major problem among all elderly<sup>16</sup>. The other common diseases were more or less same in both the cases; only the proportion varied. Although the pattern of disease prevalence was more or less same in both the cases, it should be taken note that the proportion of dead elderly suffering from chronic diseases was found to be more.

**Table 3.2.3: Prevalence of Disease among Deceased Elderly for All India, 2004**

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Heart disease	23.1	11.8	19.4	26.8	41.6	33.1	24.5	26.1	25.1
Bronchial asthma	28.5	1.9	19.8	6.8	1.7	4.6	20.4	1.8	13.5
Cancer and other tumours	5.0	21.8	10.5	5.6	11.3	8.0	5.2	16.8	9.5
Diabetes mellitus	1.0	16.6	6.1	8.3	3.6	6.3	3.7	10.3	6.2
Neurological disorders	0.0	4.7	1.5	18.5	0.4	10.8	6.9	2.7	5.3
Disease of kidney/ urinary system	6.5	0.0	4.4	6.5	1.6	4.4	6.5	0.8	4.4
Others	35.8	43.1	38.2	27.6	39.7	32.8	32.8	41.5	36.0

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

The common diseases found in case of deceased elderly are indicative of the duration of terminal stay at the hospital and its consequential expenditures. However, such expenditures could be different depending on whether public or private sector hospital services were used. Obviously, use of public institutions for terminal care might be less costly as against the private ones. Hence, it is pertinent to look at this aspect as we know that the type of institution utilised by the patient has much implication for health expenditure. Further, it is observed that the private hospital was the preferred destination for all elderly compared to the elderly who had been hospitalised and died.

<sup>16</sup> These findings are consistent with the study of Irudaya Rajan and Sreerupa (2008).

One inference could be drawn from this result, i.e., those elderly who seek treatment in public hospitals have a higher probability of dying than those who go to private hospitals. This could be indicative of the poor infrastructure of the public hospital. The other possibility could be the higher severity of disease among those who approach the public hospital. Before we move ahead, it should be mentioned that sample size for the dead elderly is very small for the states, and because of small sample size we cannot draw any statistically sound conclusion on interstate patterns. State-wise discrepancy is also visible in the pattern of hospital use for both dead elderly and all elderly. The proportion of dead elderly that had gone to private hospitals was the highest in Gujarat and Bihar, followed by Assam and Madhya Pradesh. It is seen that the pattern of hospital utilisation differed in rural and urban areas for both dead elderly and all elderly (see Table 3.2.5). The table also illustrates that proportion of dead elderly who had used public hospitals was more in urban areas compared to rural areas, whereas it was the reverse in the case of all elderly.

**Table 3.2.4: Prevalence of Disease among All Elderly, 2004**

	Rural	Urban	Total
Heart disease	8.0	16.4	10.9
Cataract	10.0	7.8	9.3
Bronchial asthma	8.4	6.9	7.9
Accidents/injuries	7.0	5.9	6.7
Disease of kidney	5.7	6.3	5.9
Diabetes mellitus	4.0	5.4	4.4
Hypertension	3.6	5.4	4.2
Cancer and other tumours	2.6	3.9	3.0
Others	50.7	41.9	47.7

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

**Table 3.2.5: Type of Hospital used by the Elderly in 2004**

	Rural				Urban				Total			
	Public hospital or dispensary		Private hospital		Public hospital or dispensary		Private hospital		Public hospital or dispensary		Private hospital	
	Dead elderly	All elderly	Dead elderly	All elderly	Dead elderly	All elderly	Dead elderly	All elderly	Dead elderly	All elderly	Dead elderly	All elderly
Andhra Pradesh	33.3	26.6	66.7	73.4	31.7	41.0	68.3	59.0	32.4	32.0	67.6	68.0
Assam	2.1	61.8	97.9	38.2	@	73.7	@	26.3	2.1	64.4	97.9	35.6
Bihar	@	18.5	100.0	81.5	@	9.6	100.0	90.4	@	17.6	100.0	82.4
Gujarat	@	25.7	100.0	74.3	@	24.7	100.0	75.3	@	25.4	100.0	74.6
Haryana	45.9	20.0	54.1	80	@	18.6	100.0	81.4	37.9	19.6	62.1	80.4
Himachal Pradesh	85.0	73.5	15.0	26.5	@	89.8	@	10.2	85.0	10.2	15.0	24.9
Jammu & Kashmir	100.0	91.1	0.0	8.9	84.8	83.4	15.2	16.6	90.9	89.1	9.1	10.9
Karnataka	63.4	41.7	36.6	58.3	100.0	22.1	38.2	77.9	62.6	35.4	37.4	64.6
Kerala	32.1	35.9	67.9	64.1	46.9	34.7	53.1	65.3	37.2	35.6	62.8	64.4
Madhya Pradesh	37.0	63.3	63.0	36.7	9.6	36.3	90.4	63.7	29.9	54.1	70.1	45.9
Maharashtra	35.6	31.4	64.4	68.6	83.2	29.9	16.8	70.1	64.0	30.7	36.0	69.3
Orissa	40.5	81.6	59.5	18.4	100.0	78.6	0.0	21.4	45.0	81.1	55.0	18.9
Punjab	64.6	28.2	35.4	71.8	43.2	32.7	56.8	67.3	60.8	29.4	39.2	70.6
Rajasthan	70.9	57.6	29.1	42.4	100.0	64.4	0.0	35.6	73.8	59.9	26.2	40.1
Tamil Nadu	60.5	38.7	39.5	61.3	47.9	24.6	52.1	75.4	53.6	33.6	46.4	66.4
Uttar Pradesh	73.4	37.5	26.6	62.5	64.8	31.0	35.2	69.0	72.8	35.2	27.2	64.8
West Bengal	93.3	77.9	6.7	22.1	94.8	59.6	5.2	40.4	94.2	69.0	5.8	31.0
All India	50.5	40.9	49.5	59.1	61.9	36.1	38.1	63.9	55.2	39.2	44.8	60.8

Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).

@ No cases reported

### 3.3: Death-related Health Expenditure and Source of Finance

Given the preference for private health care and the kind of chronic ailments experienced by the elderly, it becomes pertinent to examine the expenditure incurred in case of the deceased elderly to comment on the kind of burden it imposes on households. In fact, many of the chronic ailments experienced by the deceased elderly involve long duration of stay as well as complications needing costly interventions. On this count, this section examines the pattern of high prevalence of disease among the elderly who have died, and the expenditure incurred on them which gets reflected in high economic burden for both the individual and the concerned household. One way is through duration of stay in hospital; the more severe the disease is (as it might be in case of deceased elderly), the longer is the duration of stay in hospital, which means high health expenditure.

Duration of stay<sup>1</sup> in hospital for the elderly is illustrated in Table 3.3.1. Here terminal refers to those elderly who have died and non-terminal refers to those who had been alive after hospitalisation. It can be observed from the table that duration of stay in hospital is relatively higher for those elderly who have died for all India and most of the states. The obvious reason for this could be higher severity of the disease in deceased cases. Therefore, they were given more attention and needed to be hospitalised for longer duration. It can also be observed that duration of stay in hospital is higher in death-related cases for most of the states and it is the highest for Jammu & Kashmir (21.6 days) followed by Orissa (15.7 days), Bihar (14.6 days), Assam (14 days) and Rajasthan (13.1 days).

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<sup>1</sup> Duration of stay in hospital is number of days spent in hospital as in-patient for treatment per episode.

**Table 3.3.1: Duration of Stay in Hospital (in days) for the Elderly in 2004**

	Terminal	Non-terminal
Andhra Pradesh	12.7	10.7
Assam	14.0	13.3
Bihar	14.6	12.9
Gujarat	6.9	6.6
Haryana	6.4	11.9
Himachal Pradesh	9.9	10.0
Jammu & Kashmir	21.6	12.4
Karnataka	12.4	11.3
Kerala	8.4	10.8
Madhya Pradesh	8.9	8.2
Maharashtra	13.8	7.2
Orissa	15.7	6.6
Punjab	10.0	8.7
Rajasthan	13.1	9.6
Tamil Nadu	7.5	10.5
Uttar Pradesh	8.8	9.5
West Bengal	5.4	9.0
<b>All India</b>	<b>10.2</b>	<b>9.4</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

This relatively longer duration of hospital stay is associated with terminal cases and could be expensive given the high hospitalisation cost per year for the elderly who were hospitalised as shown in Table 3.3.2. Here terminal refers to the expenditure which has not resulted in a positive outcome, i.e., the person has died. Further, per capita per elderly person cost of hospitalisation for a period of one year is significantly higher in the case of terminal expenditure. The reason for this is quite apparent. As we know, in terminal cases, the condition of the person is critical and therefore requires rigorous medical attention, which costs more. The other explanation for high terminal expenditure may be longer duration of stay in hospital in terminal cases as seen in the preceding sections. State-wise differences can also be observed in

both the cases. Terminal expenditure was higher than non-terminal expenditure for all-India and most of the states except Karnataka, Madhya Pradesh, Punjab, Tamil Nadu and West Bengal.

**Table 3.3.2: Per Capita Cost of Hospitalisation for the Elderly who had been Hospitalised, 2004**

	<b>Terminal</b>	<b>Non-terminal</b>
Andhra Pradesh	19162	6654
Assam	9218	6180
Bihar	13876	19578
Gujarat	11993	7349
Haryana	10719	9430
Himachal Pradesh	12674	8282
Jammu & Kashmir	8614	9541
Karnataka	6476	4203
Kerala	9551	7571
Madhya Pradesh	1860	4990
Maharashtra	12767	5392
Orissa	11362	8647
Punjab	14337	9490
Rajasthan	15132	6750
Tamil Nadu	4813	8001
Uttar Pradesh	11049	5073
West Bengal	5500	10807
<b>All India</b>	<b>9947</b>	<b>8017</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

We have just observed the difference between terminal and non-terminal expenditure. At this stage, it is also important to notice the effect of age on health expenditure as it is known that people of different ages are prone to different kind of diseases and severity of the diseases also vary across different age groups, which furthermore, has implications for health expenditure. How per capita hospitalisation cost varies with age is shown in Table 3.3.3. The table clearly illustrates that overall per capita

hospitalisation cost was higher for females. This cost was lowest for age group 0-14 for both males and females. Per capita hospitalisation cost per year for the females who had been hospitalised was highest in the age group 15-44. The apparent reason for this is obvious, as we know that women in this age group die mostly because of pregnancy complications or reproductive problems and most of the time they have to go for many checkups and operations, which are often costly. When they are hospitalised, the family has to pay more for this in monetary terms. The table clearly demonstrates that per capita hospitalisation cost per year for the males who had been hospitalised was highest for age group '60-69', which clearly indicated the age effect on hospitalisation cost. The per capita hospitalisation cost then declined for next age group and afterwards increases.

**Table 3.3.3: Per Capita Cost of Hospitalisation per Year by Age Group for those who had been Hospitalised and Died, 2004**

	Male	Female	Total
0-14	5141	6290	5440
15-44	8708	14441	11216
45-59	8058	13298	9925
60-69	14051	11218	13035
70-79	11861	2242	7230
80 and above	9588	3276	8484
Total	8981	9876	9306

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

It is not only age, but also the kind of disease which determines health expenditure. However, it needs to be noted that the stage of the disease when entering a medical facility can also equally influence the health expenditure. If the disease is in its early stage, then obviously the health expenditure will be less. On the other hand, when the disease has advanced, the health expenditure will be high. But since NSS does not give information on the stage of disease in which the person is, we are unable to find its implication on the ensuing health expenditure thereon. Here, we have considered those diseases which were most prevalent among dead elderly. This is shown in Table 3.3.4. Before moving ahead, it is important to mention that all the figures given below are for those who were hospitalised. The table clearly shows that per capita

hospitalisation cost is highest for ‘diabetes mellitus’; followed by ‘cancer and other tumours’ and ‘disease of kidney/urinary system’. It is apparent that when the person is severely affected by a disease like a ‘kidney problem’ or ‘cancer and other tumours’, he/she invariably has to be admitted to hospital for an operation and most of the time these operations are costly. In case of a ‘kidney problem’, the kidney may have to be replaced, which makes the treatment dearer. Sex bias against females in health expenditure can also be noted from the table. Per capita health expenditure for dead male elderly is more than twice of that of females. It reaffirms on the typical Indian custom, where male members of the family are cared for more compared to female members especially in their old age.

**Table 3.3.4: Per Capita Cost of Hospitalisation by Type of Disease for the Elderly who had been Hospitalised and Died, 2004**

	Male	Female	Total
Heart disease	11925	2286	8256
Bronchial asthma	4553	3159	4483
Diabetes mellitus	42110	3043	17948
Neurological disorders	13180	2243	9137
Disease of kidney/urinary system	10529	22460	11319
Cancer and other tumours	32198	7887	16351
Total	12399	5984	9947

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, ‘Morbidity, Health Care and Condition of Aged’ (2004).*

The above section described the relevance of type of disease and its bearing on the cost of hospitalisation. But it is also well known that the type of institution chosen to avail care is also a major determinant of the cost of care. Table 3.3.5 clearly shows that cost of hospitalisation in private hospital for dead elderly was almost thrice the amount incurred in a public hospital. There can be two possible explanations for this. The first one is that private health care facilities are costly. This is because most of the time there is no good public hospital in the surrounding area; hence the private hospitals tend to have a monopoly and try to maximise their benefit by charging high prices. Second, private hospitals are better equipped with modern technical gadgets as against public hospitals, which make the former dearer compared to the latter. It is



remarkable to note from the same table that per capita hospitalisation cost for dead elderly was higher in rural areas in comparison with urban areas. The possible explanation may be poor condition of hospitals in rural areas. Because of poor facilities and lack of skills in rural hospitals, they might not be able to save the patient and therefore per capita hospitalisation cost for dead elderly is higher in rural areas.

**Table 3.3.5: Per Capita Hospitalisation Cost for Deceased Elderly by Type of Hospital for those who had been Hospitalised, 2004**

	Rural	Urban	Total
Public Hospital	5951	3588	4905
Private Hospital	16258	14754	15730
Total	11146	8149	9947

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

This extraordinary health expenditure on account of the deceased elderly is often borne by the family/household but it is interesting to look at the sources from where they raise such resources. These are often met out of household income, contributions from friend/relatives or 'borrowings or other sources'. It is important to look at this aspect because we know that if the source of finance is 'household income', then the household is in a relatively better position. But when the burden is heavy for the household, the source of finance is 'borrowings or other sources'. The severity is much more if the expenditure is met for the treatment and the patient does not survive. The details on sources of finance are shown in Table 3.3.6. It is very clear that when the person has died, the extent of borrowing was greater as compared to when the person has survived. This is mainly because of the fact that when the person is dying, his/her condition is critical and more money is required and hence family members do everything to save the life of the patient. They borrow to raise funds for the treatment and if required, they sell their property also. State-wise discrepancy can also be observed. 'Borrowings and other sources' were the major source of finance in the states like Rajasthan, Punjab, Orissa, Bihar and Uttar Pradesh. Here, it is worth mentioning that all these states are less developed, except Punjab. It is quite obvious that in less developed states, most people are not well off and hence unable to meet high health expenditure. They therefore have to borrow or sell their properties to get money quickly. On the other hand, household income/savings are a major source of

finance in states such as Madhya Pradesh, Himachal Pradesh, Jammu & Kashmir, Gujarat and West Bengal. The possible explanation could be as follows: it has already been shown that the majority of the dead elderly in states like Himachal Pradesh, Jammu & Kashmir and West Bengal had been admitted to public hospitals. Further, the findings have also shown that cost of hospitalisation is less in public hospitals. Therefore, people in these states are able to meet this expenditure through household income/savings. It should also be mentioned that bulk of the health expenditure is financed through household income/savings in most of the well-off states.

**Table 3.3.6: Source of Finance of Medical Treatment for the Elderly, 2004**

	Household income/savings		Borrowings and others		Contributions from friends and relatives	
	Dead elderly	All elderly	Dead elderly	All elderly	Dead elderly	All elderly
Andhra Pradesh	44.5	36.5	55.2	57.1	0.3	6.4
Assam	36.0	62.7	61.2	31.9	2.9	5.5
Bihar	36.2	59.2	62.2	33.7	1.6	7.1
Gujarat	63.3	58.9	2.4	21.8	34.3	19.3
Haryana	27.6	51.7	33.8	39.8	38.6	8.4
Himachal Pradesh	94.2	61.7	4.7	21.1	1.1	17.2
Jammu & Kashmir	76.0	75.5	14.5	17.5	9.5	7.0
Karnataka	57.3	55.0	39.3	34.8	3.4	10.2
Kerala	52.7	47.2	31.6	35.3	15.7	17.5
Madhya Pradesh	95.8	72.8	4.2	17.2	0.0	10.0
Maharashtra	44.9	60.6	44.8	28.6	10.3	10.8
Orissa	22.8	52.9	64.3	41.6	12.9	5.5
Punjab	18.1	51.1	81.9	27.6	0.0	21.3
Rajasthan	17.6	47.8	82.0	47.6	0.4	4.7
Tamil Nadu	50.9	36.6	45.7	54.4	3.4	9.0
Uttar Pradesh	52.0	58.7	39.8	26.1	8.3	15.3
West Bengal	57.9	68.0	33.0	24.0	9.1	8.0
<b>All India</b>	<b>44.3</b>	<b>52.5</b>	<b>48.3</b>	<b>35.3</b>	<b>7.4</b>	<b>12.2</b>

*Source: Computed by the Author using Unit Level Records of National Sample Survey 60<sup>th</sup> Round, 'Morbidity, Health Care and Condition of Aged' (2004).*

### 3.4: Conclusion

This chapter primarily exposed the pattern of disease prevalence among dead elderly, health expenditure incurred by them and source of finance for meeting this expenditure. This chapter also examined disease-specific cost of hospitalisation. The findings show that around 64 per cent of dead elderly had received some kind of medical attention and 20 per cent had been hospitalised. Analysing the disease prevalence among the elderly who have expired, the study finds that most prevalent disease among them was heart disease followed by bronchial asthma, cancer, diabetes and neurological disorders. These diseases constituted around 60 per cent of all diseases prevalent among them. Rural-urban differences were also found in disease prevalence among the dead elderly. Pattern of incidence of disease differed for all elderly and dead elderly. Further, it is found that use of private hospital services was more in case of dead elderly compared to all elderly. The pattern of utilisation of hospital by deceased elderly differed across states. The study also illustrates that duration of stay was more in terminal cases than non-terminal cases for all India and for most of the Indian states. State-wise analysis further suggests that the terminal expenditure was higher than non-terminal expenditure for elderly at the all-India and state-level except Karnataka, Madhya Pradesh, Punjab, Tamil Nadu and West Bengal. The apparent attributes of high death-related expenditure were longer duration of stay and critical condition of the person in case of deceased elderly. In case of Karnataka, Tamil Nadu and West Bengal, duration of stay in hospital was higher in the non-terminal case, which hinted that duration of stay had a direct implication for cost of hospitalisation. The influence of age on health expenditure has also been examined for deceased persons. The result indicates that health expenditure was the highest for age group 60-69. Then it declined for 70-79 group, afterwards it increased continuously. Further, the study finds that diabetes mellitus was the most expensive disease for deceased elderly followed by cancer and kidney disease, and per capita hospitalisation was more than three times higher in private hospitals compared to public hospitals. Furthermore, to examine the burden of health expenditure on the household, the source of finance for this expenditure has been analysed. The result demonstrates that 'borrowings and other sources' was the major source of finance for less developed states like Rajasthan, Orissa, Bihar and Uttar Pradesh. It was a major

source of finance in the case of Punjab also. On the other hand, 'household income/savings' was the major source of finance for Madhya Pradesh, Himachal Pradesh, Jammu & Kashmir, Gujarat and West Bengal. This could be because of the fact that most of the deceased elderly in these states except Madhya Pradesh went to public hospitals; it was already shown that the cost of hospitalisation in public hospitals is much lower in comparison to that in private hospitals. Since cost of hospitalisation was lower, most of the people in these states were able to meet this expenditure through household income/savings.

**Disease Prevalence, Health Seeking Behaviour and Cost of Chronic  
Disease among the Elderly in Kerala**

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**4.1 Introduction**

So far, we have found that there is high prevalence of diseases, especially chronic diseases, which consequently leads to high per capita health expenditure among aged people. Further, the findings showed that cost of hospitalisation was more in case of deceased elderly compared to that of all elderly. However, all the earlier analysis was confined to the aggregated level for all-India and the major Indian states. The present chapter is focused on the state of Kerala. Kerala is selected for in-depth analysis because it is the first Indian state to achieve below replacement level fertility,<sup>2</sup> and is hence two decades ahead of the all-India target year of 2011 (Rajan and Zachariah, 1998). The census projection also shows that the proportion of elderly in Kerala will rise from 10.6 per cent in 2001 to 18.3 per cent in 2026 (India, Registrar General, 2006). This evident shift in the population structure indicates intense aging of the Kerala population, which, in turn, has considerable socio-economic implication, viz., meeting health needs of and proper nutrition for the elderly, providing pension and social security, etc. Since, Kerala is much ahead of other states in demographic transition, it can be a role model for other states in tackling the emerging problems associated with aging. Given this backdrop, a modest attempt is made here to inquire into the health-cost implication of aging within the state. This chapter is divided into five sections. After the introduction in first section, a brief review about the sampling frame and the questionnaires is provided in second section. The third section examines the prevalence of disease among the elderly in Kerala and their health-seeking behaviour. Cost of diseases for elderly for the current and future periods is shown in the section four. Finally, section five concludes the chapter.

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<sup>2</sup> Replacement level fertility rate is the total fertility rate (2.05), which, if continues, will exactly replace the current population. Kerala achieved replacement level fertility rate in 1988.

## **4.2 Sampling of Migration Monitoring Study, 2007**

Most of the analysis in this chapter is based on Migration Monitoring Study (2007). The survey randomly collected 10,000 sample households from all the 14 districts of Kerala. The panchayats or municipal wards referred to as localities were used as the first stage sampling unit within a district. These localities were randomly selected with the probability proportional to the number of the households. The number of households in the sample was determined in proportion of to the number of households in that district according to the 2001 Census. It was further distributed between rural and urban areas according to their respective sizes in the census.

The survey covered the three broad areas namely, migration, remittances and employment. But, unlike the previous surveys done by the Migration Monitoring Study, the third round of the survey done in 2007 covered the other important thrust areas like education and health, amenities in the households, possession of consumer durables and household indebtedness. The survey facilitates the information regarding the health of the household members and health of the married women. The questions pertaining to health are illness prevalence, person to be contacted for treatment, place of consultation, cost of hospitalisation, prevalence of chronic diseases and expenses incurred for treatment.

## **4.3 Disease Prevalence and Health-seeking Behaviour among the Elderly**

Table 4.3.1 clearly reveals that 38.4 per cent of elderly were suffering from some kind of illness, which is two and half times higher than that of non-elderly for all-Kerala. This particular pattern of increased vulnerability to diseases among the elderly is consistent across all districts of the state. However, there is some variation in levels of morbidity among the elderly which is found to be highest in Malappuram (63.8 per cent) followed by Kasaragod (54.8 per cent), Kozhikode (45.2 per cent) and Thiruvananthapuram (41.6 per cent). Similarly, discrepancy in the prevalence of illness across the districts of Kerala can also be found in case of non-elderly. In case of non-elderly, Thrissur has the highest proportion (21.3 per cent) of ill population. It is followed by Alappuzha (20.4 per cent), Thiruvananthapuram (20 per cent) and Malappuram (19.3 per cent) respectively.

**Table 4.3.1: Prevalence of Illness during the Last Month for Kerala in 2007**

	<b>Elderly</b>	<b>Non-elderly</b>
Alappuzha	32.0	20.4
Ernakulam	24.0	13.8
Idduki	31.5	12.6
Kannur	37.7	6.0
Kasaragod	54.8	10.2
Kollam	47.9	19.0
Kottayam	30.8	10.0
Kozhikode	45.2	14.5
Malappuram	63.8	19.3
Pathanamthitta	37.4	15.6
Palakkad	28.9	13.2
Thrissur	39.0	21.3
Thiruvananthapuram	41.6	20.0
Wayanad	19.5	6.2
<b>All Kerala</b>	<b>38.4</b>	<b>15.3</b>

*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

Apart from the pattern of morbidity among the elderly and non-elderly population in the state, this morbidity is composed of specific diseases that is of greater interest in so far as its implications are concerned. We present below the prevalence of disease pattern according to broad age groups in Kerala. It is evident that the prevalence of selected diseases does increase with advancing age and does intensify beyond the age of sixty years. Among the selected set of diseases, blood pressure and diabetes are the two diseases which surface pretty early in life (onset is about 30 years of age). Diseases listed in Table 4.3.2 exhibit the systematic magnitude of intensification with age. Their onset being prior to the age of sixty years coupled with expectation of life years being reasonably high in Kerala provides the clue towards the rising cost of care owing to the phenomenon of aging in Kerala. The prevalence of these diseases being quite high in ages 75 and above informs on the need for institutional care which may add to the financial burden of such care in the state.

**Table 4.3.2: Prevalence of Chronic Diseases (Per 1000) in Kerala, 2007**

	0-14	15-29	30-44	45-59	60-74	75 and above
Diabetes	1.0	1.4	19.9	86.9	141.5	139.6
Heart problem	2.5	2.2	6.4	25.5	41.4	44.9
Arthritis	0.6	1.0	6.7	15.2	23.3	30.5
Cholesterol	0.3	0.6	6.5	20.7	19.0	17.4
Blood pressure	0.3	3.9	20.2	71.8	125.6	145.8
Asthma	6.7	3.1	9.9	24.2	42.1	61.1
Cancer	0.2	0.5	1.1	3.5	6.5	3.7
Kidney problem	0.7	0.4	2.2	3.0	3.6	6.2

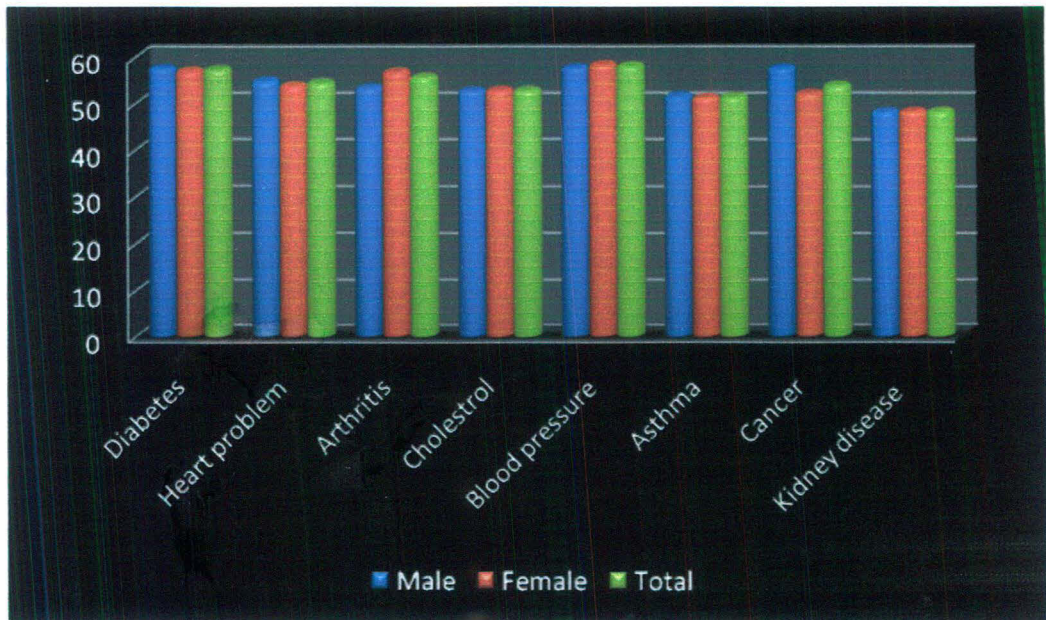
*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

To formulate an idea regarding the approximate cost of care in accordance with the prevailing scenario of age and stage of diseases, there is a need to approximate an average age of such diseases. Mean age of diseases has been calculated, which is shown in the Figure 4.3.1. It is clear that mean age of most of the diseases is beyond 50, which indicates that people at higher ages are more vulnerable to disease. Mean age for diabetes and blood pressure is 59, which is higher than the mean age of any other disease. It can also be noticed from the table that there is not much difference in the mean age of disease for male and female in the case of most of the diseases.

Table 4.3.3 illustrates the disease prevalence for all districts of Kerala for the elderly. From the table, it is very clear that diabetes and blood pressure are the most common diseases among elderly in all the districts except Thrissur, where prevalence of diabetes among all the diseases is least. Blood pressure constitutes around 27 per cent of all the diseases prevalent in Kerala for the elderly. Blood pressure together with diabetes comprises almost half of all the diseases in Kerala. The other common diseases among the elderly are asthma, heart problem and arthritis. District-wise difference can also be observed in the prevalence of diseases from the table. For example, diabetes is the most dominant of all diseases afflicting the elderly in Pathanamthitta, Idduki and Palakkad, where the share of diabetes is around 30, 28 and 27 per cent respectively. On the other hand, diabetes is less prevalent in Thrissur, Kannur and Malappuram.



**Figure 4.3.1: Mean Age of Chronic Diseases in Kerala, 2007**



*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

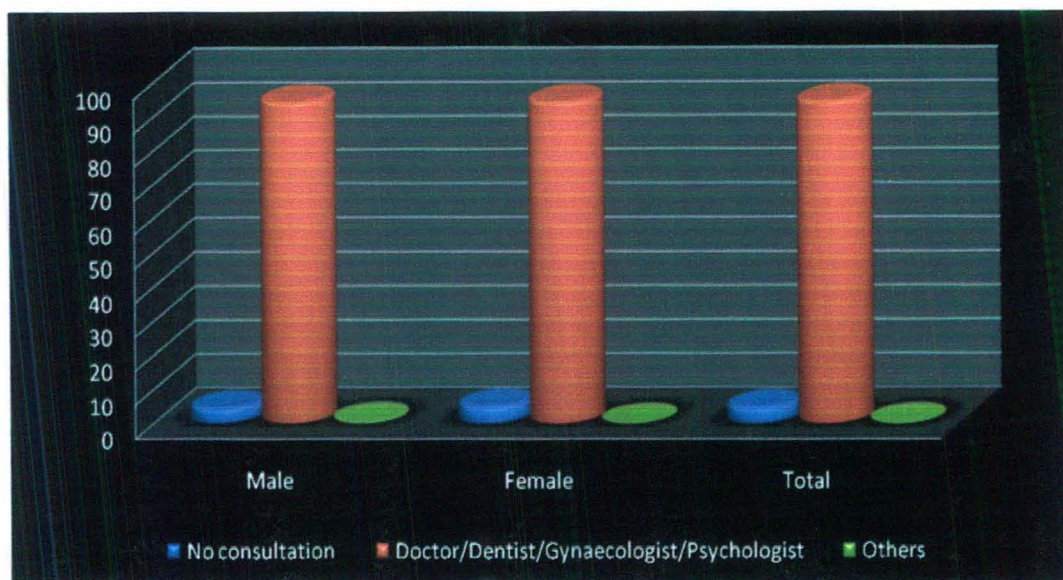
Following an understanding of the age pattern of disease prevalence in the state, it becomes pertinent to analyse the kind of care that individuals seek in the case of different ailments. From Figure 4.3.2, it becomes very clear that most of the sick people in Kerala seek treatment; only 5 per cent of the sick do not seek treatment. This observation suggests the existence of a well-developed medical system and the positive health-conscious behaviour of people in the state. From the figure, it can also be noted that around 95 per cent of people go to the doctor or health specialist for treatment. Not much gender difference is found in this health-seeking behavior.

**Table 4.3.3: Proportion of the Elderly with Chronic Disease by Type for Districts of Kerala, 2007**

	Diabetes	Heart problem	Arthritis	Cholestrol	Blood pressure	Asthma	Cancer	Kidney disease	Unclassified
Alappuzha	20.0	4.2	3.5	1.5	26.9	11.2	1.9	0.4	30.4
Ernakulam	20.9	14.2	0.8	3.9	24.0	10.6	0.4	1.2	24.0
Idduki	28.2	7.1	3.8	5.8	23.7	9.0	2.6	0.6	19.2
Kannur	10.5	8.2	6.8	5.9	32.9	9.6	0.0	0.5	25.6
Kasaragod	27.0	5.6	9.2	2.0	33.7	10.7	1.0	0.0	10.7
Kollam	23.5	7.4	3.7	9.9	33.3	11.1	0.0	0.0	11.1
Kottayam	18.6	6.8	6.8	2.7	27.4	14.1	1.5	1.1	20.9
Kozhikode	16.4	10.3	5.6	1.7	32.8	11.2	1.3	1.3	19.4
Malappuram	10.7	7.4	9.8	4.1	26.2	9.8	0.8	1.6	29.5
Pathanamthitta	30.3	4.8	4.8	1.3	17.3	9.5	2.2	1.3	28.6
Palakkad	27.4	6.8	4.3	2.6	21.8	8.1	2.1	0.9	26.1
Thrissur	5.3	12.3	3.5	0.0	29.8	10.5	0.0	1.8	36.8
Thiruvananthapuram	14.8	7.7	7.7	0.6	33.1	7.1	1.8	1.2	26.0
Wayanad	13.6	8.5	1.7	1.7	27.1	11.9	0.0	0.0	35.6
<b>All Kerala</b>	<b>20.3</b>	<b>7.7</b>	<b>5.3</b>	<b>3.0</b>	<b>27.4</b>	<b>10.3</b>	<b>1.3</b>	<b>0.9</b>	<b>23.9</b>

*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

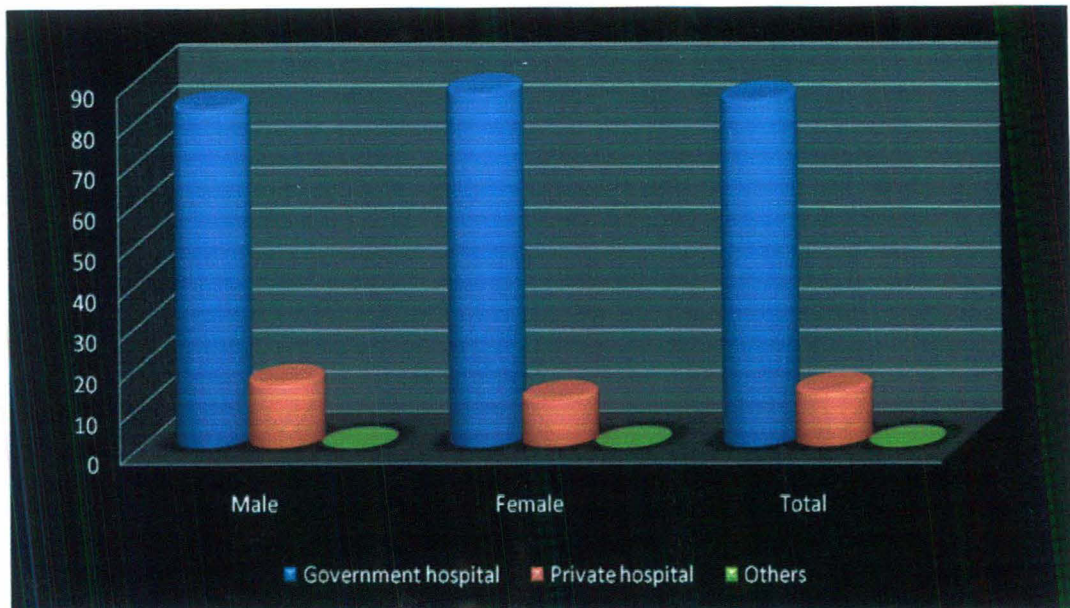
**Figure 4.3.2: Person Contacted for Treatment by the Elderly in Kerala, 2007**



*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

Furthermore, beyond the positive health-seeking behaviour, we have also examined the kind of medical institution preferred by the people. It is important to enquire about this because it is well known that if more people are going to public hospitals, it implies that they have relatively less financial burden as compared to those who are going to private hospitals for treatment because private hospitals are mostly profit-motivated and hence, expensive. The type of hospital utilisation is shown in Figure 4.3.3. The figure clearly reveals that majority of the elderly are going to government hospitals for treatment, which is in contrast with our previous findings from NSSO according to which private hospital utilisation was more compared to public hospital use. The reason why the proportion of elderly going to public hospitals is seen to be exceptionally high in the survey is that when the survey was conducted chickenguniya was widespread in all over Kerala and the government hospitals played a major role in eradicating the menace, while private hospitals could not participate in this in effort in an effective manner. Furthermore, the figure also demonstrates that the proportion of female elderly going to public hospitals is relatively higher, that is, it is 87.4 per cent for female elderly, whereas it is 83.3 per cent for male elderly.

**Figure 4.3.3: Place of Consultation for the Medical Treatment for the Elderly in Kerala, 2007**



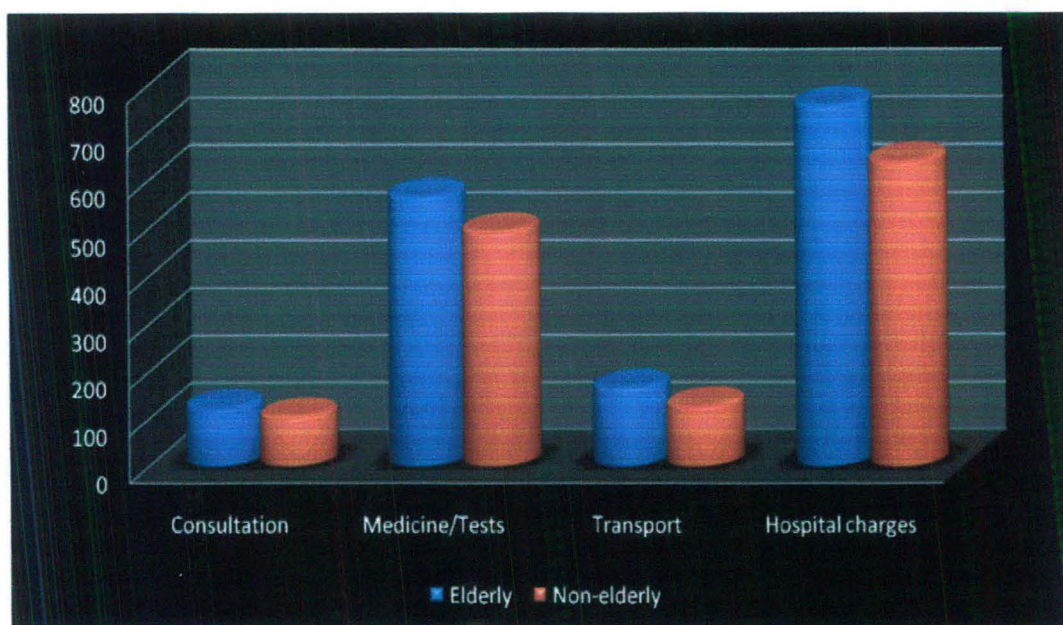
*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

#### 4.4 Cost of Diseases

So far, we analysed the prevalence of diseases and health-seeking behaviour of the elderly. In this section, we analyse the burden of diseases among the elderly in pecuniary terms. Shown in Figure 4.4.1 is the per capita cost of medical services per month for those who have availed and paid for the services. It is obvious from the figure that hospital charges are the most among all the medical services for both elderly and non-elderly; it is Rs. 762 and Rs. 645 per capita per month respectively for elderly and non-elderly. The figure also shows that the cost of medical services for the elderly is higher than that for non-elderly.

Table 4.4.1 illustrates the per capita cost of chronic diseases across ages for those who have obtained paid services. The table reveals that cancer is the most expensive disease (Rs. 764 per capita per month), which is followed by 'kidney problem' and 'heart problem'. It was expected that the diseases would cost more at higher ages, but there is no definite pattern emerging from the table. Nevertheless, it can be observed that per capita cost of most of the diseases is higher for the 60-74 age group than the average cost for all ages for all ailments except cholesterol and asthma. These findings are well supported by the study of Zachariah and Irudaya Rajan (2007), in which the results were similar.

**Figure 4.4.1: Per Capita Cost of Medical Services per Month (in Rs.) for those who have Paid in Kerala, 2007**



*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

Per capita cost of diseases per month for those who have paid for the treatment of the elderly is illustrated in Table 4.4.2. It is very clear that Ernakulam is the most expensive district; per capita cost of all diseases is Rs. 446 per capita per month, which is much higher than the cost incurred in any of the other districts in Kerala. Ernakulam is followed by Idduki in terms of expensive districts in Kerala. On the other hand, cost of disease is found to be low in Wayanad, Kollam and Kasaragod. It can also be noted from table that per capita cost is highest for cancer followed by heart problem and kidney diseases.

We have, so far, analysed the age specific prevalence rate of chronic diseases and age specific cost of chronic diseases per month. In this section, burden of chronic diseases has been estimated for Kerala for 2011, 2016, 2021 and 2026. Age specific cost of diseases and age specific prevalence rate obtained from Kerala Migration Survey is applied to census projections of Kerala Population to get the future cost of diseases. The estimation is based on certain assumptions, which are as follows: first, age specific morbidity rate is the same in the future. Second, age specific cost of chronic diseases does not change in the future. Figure 4.4.2 displays the projected population of Kerala for 2011, 2016, 2021 and 2026 done by the Registrar General of India

(2001) based on India, Registrar General, 2001. From the figure, it becomes clear that population in absolute terms in age groups 45-59, 60-74 and 75 and above will increase continuously for Kerala. However, population in age groups 0-14 and 15-29 will decline. For age group 60-74, there will be continuous increase in population from around 3 million in 2011 to 5 million in 2026. Similarly, increase in the population of age group 60-74 can be found from 1.1 million in 2011 to 1.7 million in 2026. A similar kind of trend can be seen in the age group 45-59. Population in age groups 0-14 and 15-29, however, will decline over a period of time.

**Table 4.4.1: Per Capita Cost of Chronic Diseases per Month for those who have paid in Kerala, 2007**

	0-14	15-29	30-44	45-59	60-74	75 and above	Total
Diabetes	308	256	214	215	242	336	239
Heart problem	542	303	512	501	579	431	510
Arthritis	194	434	279	243	269	204	258
Cholestrol	216	433	182	237	195	433	234
Blood pressure	90	188	196	191	208	215	201
Asthma	295	233	258	275	239	273	262
Cancer	675	767	407	693	1048	330	764
Kidney problem	1105	538	519	425	550	413	540
Others	246	297	304	293	288	264	287

*Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.*

**Table 4.4.2: Per Capita Cost of Diseases per Month for the Elderly who have paid in Kerala, 2007**

	Diabetes	Heart problem	Arthritis	Cholesterol	Blood pressure	Asthma	Cancer	Kidney diseases	Others	Total
Alappuzha	243	693	262	254	203	299	@	600	397	358
Ernakulam	400	592	299	414	261	367	2988	667	443	446
Idduki	318	942	283	173	182	199	@	@	474	418
Kannur	160	512	192	150	177	174	1500	350	260	268
Kasaragod	281	228	150	150	196	309	@	@	268	264
Kollam	125	322	68	106	133	160	100	167	175	209
Kottayam	292	555	258	225	270	263	560	@	286	319
Kozhikode	314	622	132	218	223	200	530	550	246	342
Malappuram	305	698	389	390	268	277	454	417	280	361
Palakkad	239	691	269	158	201	352	1500	725	310	325
Pathanamthitta	155	530	198	431	161	173	550	300	279	276
Thrissur	372	627	217	360	225	245	738	583	259	349
Thiruvananthapuram	214	386	281	125	216	207	500	600	219	304
Wayanad	122	260	33	@	107	170	@	750	165	157
All Kerala	266	536	248	252	210	251	940	500	281	325

Source: Computed by the Author using Kerala Migration Monitoring Study, 2007.

@ No cases reported.

**Figure 4.4.2: Projected Population of Kerala (in 1000)**



*Source: India, Registrar General, 2006.*

Estimated future cost of diseases is shown in Table 4.4.3. Age specific morbidity rate is multiplied with age specific prevalence rate and the corresponding population of Kerala to get the future cost of diseases for Kerala. Then cost up to age 60 has been added to get the cost of diseases for non-elderly and similarly cost of diseases from age 60 onwards is added to get the cost of diseases for elderly. Age specific future cost of diseases is shown in the Appendix. From the table, it is clear that the cost of all the diseases is expected to increase from Rs. 1,603 million in 2011 to Rs, 1,770 million in 2016 to Rs, 2111 million in 2026, in which the larger part of the increase is coming from the increase in the cost of diseases for the elderly. It should be also observed that cost of diseases for the elderly would come much closer to the cost to be incurred for non-elderly over a period of time. Though the cost of diseases will increase for both elderly and non-elderly, the increase is much more in case of the elderly. We can see from the table that cost of disease for the elderly will increase almost one and half times for the elderly from 2011 to 2026. On the other hand, cost of diseases for the non-elderly will increase from Rs. 978 million in 2011 to only Rs, 1,114 million in 2026. Another interesting finding revealed in the table is that for some of the diseases like diabetes, heart problem, blood pressure and cancer, the rate of increase in cost for the elderly will be so fast that it will, in fact, cross the cost which will be incurred by the non-elderly in 2026. For diabetes, the cost for the non-elderly will increase from Rs. 151 million in 2011 to merely Rs. 184 million in 2026



while it will increase from Rs. 160 million to Rs. 255 million for the elderly for the respective years. Likewise, it can also be noticed that rate of increase in the cost is higher for the non-elderly compared to the cost which will be incurred by the non-elderly. The table also demonstrates that three diseases, namely, diabetes, heart problem and blood pressure constitute more than half of the cost of all diseases.

**Table 4.4.3: Estimated Cost of Diseases per Month (In Rs. Million) in Kerala**

	2011			2016			2021			2026		
	Elderly	Non-elderly	Total	Elderly	Non-elderly	Total	Elderly	Non-elderly	Total	Elderly	Non-elderly	Total
Diabetes	160	151	311	187	165	351	199	176	375	255	184	439
Heart problem	97	119	216	114	128	242	143	135	278	155	140	295
Arthritis	27	42	68	31	45	76	39	47	86	43	48	90
Cholestrol	20	42	62	23	45	68	21	48	69	32	50	82
Blood pressure	117	120	238	137	130	267	159	139	297	187	144	331
Asthma	50	82	132	59	86	145	65	89	155	80	91	171
Cancer	23	23	45	27	24	51	36	25	61	37	26	63
Kidney problem	9	25	34	11	26	37	14	26	40	14	26	41
Others	122	375	497	142	391	533	171	401	572	194	404	599
Total	624	978	1603	730	1040	1770	846	1086	1933	997	1114	2111

*Source: Computed by the Author using Kerala Migration Monitoring Study (2007) and India, Registrar General, 2006.*

## 4.5 Conclusion

This chapter was focused on Kerala and 'Kerala Migration Survey, 2007' data was utilised for the analysis. The analysis reveals that prevalence of any kind of illness or injury among the elderly is two and half times higher than the prevalence of the same among the non-elderly. A huge difference is found in the prevalence of illness among the elderly across districts; it is as high as 63.8 per cent in Malappuram and as low as 19.5 per cent in Wayanad. Further analysing the prevalence of diseases among broad age groups, it is found that the prevalence increased with age. It is found to be exceptionally high for age groups 60-74 and 75 and above in comparison with other age groups. All these results indicate that the elderly are more prone to disease compared to any other age groups. Furthermore, to support the finding that the elderly are more vulnerable, mean age was calculated and the result indicated that mean age was above 50 for most of the chronic diseases, which again strengthens our earlier finding. After analysing the prevalence of illness and diseases, place of consultation was also calculated. The findings show that 95 per cent of the sick people in Kerala visit the doctor for treatment. This observation suggests towards the existence of a well developed medical system, people's access to health services and the health consciousness of the people of Kerala. At the same time, the result also makes it clear that there is almost no gender difference in the behaviour of people who seek treatment.

In the latter part of the analysis, we showed age specific cost of various diseases. The results show that per capita cost of disease, for those who have paid, is highest for cancer followed by kidney problems and heart problems. But no definite pattern has emerged for Kerala from the results regarding the impact of age on the cost of diseases, which is against our hypothesis of high per capita cost of disease in the later years of life. District-wise cost of diseases is also calculated and the result shows that per capita cost of disease is highest in Ernakulam followed by Idduki. On the other hand, the cost of the same is low in Wayanad, Kollam and Kasaragod.

In the final section of this chapter, the burden of population aging on health care expenditure is examined by estimating the monthly future cost of diseases for 2011, 2016, 2021 and 2026, using age specific prevalence rate of chronic diseases, age

specific cost of chronic diseases and the census projection of Kerala population. The findings demonstrate that cost of all the diseases will increase significantly from Rs. 1,603 million in 2011 to Rs, 1,770 million in 2016 to Rs, 2,111 million in 2026, in which the major part of the increase comes from the increase in the cost of treating disease for elderly. This indicates the growing burden of aging on the economy. Cost of diseases for elderly will eventually come much closer to the cost to be incurred for non-elderly over a period of time. The result also demonstrates that three diseases, namely diabetes, heart problems and blood pressure constitute more than half of the cost of all diseases.

## Appendix

**Table A4.1: Estimated Cost of Diseases per Month by Age Group (in Rs. 1000) for 2011 for Kerala**

	0-14	15-29	30-44	45-59	60-74	75 and above	Total
Diabetes	2498	3031	34613	111157	107261	52530	311089
Heart problem	10566	5609	26684	76251	75172	21649	215931
Arthritis	945	3530	15268	21996	19606	6977	68323
Cholesterol	526	2245	9628	29156	11645	8462	61663
Blood pressure	219	6113	32208	81866	81989	35150	237546
Asthma	15566	6039	20591	39589	31572	18665	132021
Cancer	1096	3404	3529	14563	21333	1382	45307
Kidney problem	6282	1591	9460	7696	6175	2879	34083
Others	50526	60426	128406	135606	87989	33709	496661
Total	88225	91988	280387	517881	442742	181402	1602624

*Source: Computed by the Author using Kerala Migration Monitoring Study (2007) and India, Registrar General, 2006.*

**Table A4.2: Estimated Cost of Diseases per Month by Age Group (in Rs. 1000) for 2016 for Kerala**

	0-14	15-29	30-44	45-59	60-74	75 and above	Total
Diabetes	2416	2912	35949	123443	126797	59894	351411
Heart problem	10220	5389	27714	84680	88864	24683	241550
Arthritis	914	3391	15858	24428	23177	7955	75723
Cholesterol	509	2157	10000	32379	13767	9648	68459
Blood pressure	212	5873	33452	90915	96922	40077	267451
Asthma	15056	5801	21386	43965	37322	21282	144812
Cancer	1061	3270	3665	16173	25218	1575	50962
Kidney problem	6077	1529	9826	8547	7299	3282	36559
Others	48871	58049	133363	150595	104015	38435	533328
Total	85337	88370	291212	575124	523381	206831	1770254

*Source: Computed by the Author using Kerala Migration Monitoring Study (2007) and India, Registrar General, 2006.*

**Table A4.3: Estimated Cost of Diseases per Month by Age Group (in Rs. 1000)  
for 2021 for Kerala**

	0-14	15-29	30-44	45-59	60-74	75 and above	Total
Diabetes	2328	2805	35992	134686	149892	49050	374752
Heart problem	9850	5190	27747	92392	105049	37747	277975
Arthritis	881	3266	15876	26652	27399	11919	85993
Cholesterol	491	2077	10012	35328	16274	4950	69131
Blood pressure	204	5656	33491	99195	114575	44124	297247
Asthma	14511	5587	21412	47969	44120	21234	154832
Cancer	1022	3150	3669	17645	29811	5695	60993
Kidney problem	5857	1472	9837	9325	8629	4979	40099
Others	47101	55910	133521	164310	122960	47759	571562
Total	82246	85114	291558	627502	618708	227456	1932584

*Source: Computed by the Author using Kerala Migration Monitoring Study (2007) and India, Registrar General, 2006.*

**Table A 4.4: Estimated Cost of Diseases per Month by Age Group (in Rs. 1000)  
for 2026 for Kerala**

	0-14	15-29	30-44	45-59	60-74	75 and above	Total
Diabetes	2223	2749	34711	144026	173328	81515	438553
Heart problem	9405	5086	26759	98799	121474	33594	295118
Arthritis	841	3201	15311	28501	31683	10827	90364
Cholesterol	468	2036	9656	7778	18818	13130	81887
Blood pressure	195	5543	32299	106075	132490	54545	331148
Asthma	13854	5476	20650	51295	51018	28965	171258
Cancer	976	3087	3539	18869	34473	2144	63087
Kidney problem	5592	1443	9487	9972	9978	4467	40938
Others	44971	54794	128770	175705	142186	52309	598735
Total	78526	83415	281182	671021	715448	281497	2111088

*Source: Computed by the Author using Kerala Migration Monitoring Study (2007) and India, Registrar General, 2006.*

## **Concluding Remarks**

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### **5.1 Conclusion**

Aging is a widely accepted phenomenon in developed countries and is steadily catching up in the developing world as well. India being a population giant accommodates a large number of elderly. The proportion of elderly in India has increased continuously over a period of time and has crossed the benchmark of seven per cent that categorises a nation as an aging country. These population trends suggest that the number as well as proportion of elderly has increased over the last few decades. All these changes indicate that there has been a significant change in age structure of population, which will continue in the near future too. Increasing age is often characterised by deterioration in both physical as well as mental health of the people, which makes them more susceptible to diseases, especially chronic diseases. In other words, aging ultimately leads to increase in morbidity. The high prevalence of diseases among elderly, however, is often determined by the lifestyle of the individual. The vulnerability differs across various dimensions, viz., gender, place of residence, etc. The high prevalence of disease among the elderly, further, has implications for health expenditure. Most of the literature in the Indian context have analysed health expenditure from various perspectives like inequality, trends in the public and private health expenditure, etc., though all these studies are based on the assumption that per capita health expenditure is comparable across regions. However, health expenditure is often responsive to the age specific vulnerability to diseases, and therefore age structure of the population has an important bearing on health expenditure which is overlooked in the analysis of the health expenditure. The present study intends to make a modest beginning in this direction and analyses the implication that aging has on rising health expenditure. As a person approaches death, one can expect higher health expenditure that may vary across individuals on account of the severity of the disease. With this background, the objectives of the study were to analyse the burden of population aging at the macro and micro levels. Finally, the study also examined the burden of death-related health expenditure. An attempt was also made to provide an analysis for the state of Kerala due to its uniqueness with

respect to demographic transition and the fact that it has achieved the replacement level fertility way ahead of other states, that is, as early as 1988.

First of all, analysing the health status of the elderly, the study finds that as much as 24 per cent of the elderly reported their health as poor, the proportion being relatively higher for females (26 per cent). Further analysis shows that the proportion of such people increases with age and it is as high as 46 per cent for the elderly of age group of 80 and above. Surprisingly, Kerala tops the list of people reporting their health as poor followed by West Bengal and Orissa. Contrary to this, the proportion of elderly having at least one ailment is found to be highest in Goa (around 68 per cent) followed by Kerala and West Bengal. Further, the study has revealed that disease prevalence among elderly increases with the advance in age for all the states except Bihar and Karnataka.

Regarding place of consultation for the sick elderly, the results of this study show that most of the people go to public hospitals for treatment. The findings furthermore reveal that more people seek treatment in private hospitals in economically well-off states compared to people in economically less-developed states. Such a pattern clearly hints that as people become richer, they prefer private hospitals to public hospitals. This is because when people have enough purchasing power they look for superior quality medical services, which they think are not available in public hospitals. While analysing health expenditure, the study finds that per capita health expenditure for the elderly is Rs. 623, which is almost four times higher than the per capita health expenditure of the non-elderly. Per capita health expenditure for those elderly who have been hospitalised, differs across states; it is highest for Punjab (Rs. 1,558 per year) followed by Kerala (Rs. 1,505 per year). When share of health expenditure on the elderly is compared to the share of the elderly in total population, it is found that share of health expenditure incurred on the elderly is much higher than their population share. However, such an observation could be misleading in the sense that the elderly stage of life is always associated with frequent morbidity and the consequent high health expenditure. Taking this into account, an adjustment is attempted in terms of the proportion of the elderly as well as their prevailing level of morbidity to comment on the proportional equivalence of the proportion of the elderly in population and the health expenditure incurred on account of them. Such an



exercise is attempted through the formulation of a disproportionate index that finds the difference between the proportion of the elderly in total population and health expenditure incurred on them to have narrowed down. Furthermore, the study has analysed the source of finance to examine the burden of health expenditure for in-patients in hospitals. The burden on the individual and the concerned household is higher when the source of finance is 'borrowings and other sources'. It is found that 'borrowings and other sources' is the source of finance for as much as 35 per cent of the elderly whereas it is relatively higher at 44 per cent in case of the non-elderly.

Thereafter, households are divided into four categories (HHs with no elderly, HHs with one elderly, HHs with two elderly, and HHs with more than two elderly) to explore the implication of the presence of elderly in the household and the ensuing household health expenditure. The result shows that per capita health expenditure is lower in case of non-elderly households and it increases with the increase in the number of the aged in the household till the number of aged in the household reaches two. This finding suggests that the presence of elderly does have an impact on the household health expenditure. It should, however, be borne in mind that the above result is only for those households from which the person has sought treatment. Furthermore, when the health expenditure is analysed across social groups and for different wealth quintiles, the findings show that per capita health expenditure is lowest for the households belonging to the 'others' category and lowest for STs. This may be because those in the ST or SC category may be in the lower income bracket and hence may not be able to spend money on health even in situations of dire need. The other interesting finding that comes out is that per capita hospitalisation cost for the household is higher for non-elderly than elderly in the households belonging to STs and SCs, whereas it is not so in case of OBC and 'others'. Further, the study shows that even though the households of lower quintile are spending less money on health in absolute terms but health expenditure constitutes the major proportion of total consumption expenditure. Health expenditure as a percentage of total consumption expenditure is as high as 21 per cent for households of the first quintile whereas it is only 12 per cent for the households of the fifth quintile. It should also be noted that households having no elderly have a lower proportion of consumption expenditure on health as compared to the aged households, that is, it is 25 per cent for the households having one elderly in comparison to 20 per cent for the households

having no elderly. This finding throws light on two crucial matters, which are as follows: first, since health expenditure constitutes the large chunk of the total consumption expenditure for the poor households, they have comparatively more burden because expenditure on health is made at the expense of other kinds of consumption expenditure. Households, sometimes, reduce their food expenditure to meet the health expenditure in certain cases. Second, the presence of elderly in the household has an implication on health expenditure. This result further strengthens our previous argument that health expenditure increases with the presence of elderly in the household.

Our analysis has showed that there is a rise in health expenditure among elderly due to their poor health condition. Cost of health care increases much more when the person approaches death and hence the family has to bear a greater burden in such cases. In this context, analysis is also done to examine the burden of death-related health expenditure. While analysing the disease prevalence among deceased elderly, the study finds that heart disease, bronchial asthma and cancer and other tumours were the most prevalent disease among elderly. Further, the findings suggest that disease prevalence among deceased elderly differed between rural and urban areas. More than one-third of the deceased elderly were suffering from heart disease in urban areas compared to only one-fifth of their rural counterparts. The analysis also points out that the disease prevalence varied between deceased elderly and all elderly. For example, one-fourth of the deceased elderly suffered from heart disease whereas it was 11 per cent for all elderly. Cataract was prevalent among 9 per cent of the elderly while it was very less prevalent among dead elderly.

After analysing the disease prevalence, the study examined the hospital use by deceased elderly. The result showed that the utilisation of private hospitals was relatively higher among the deceased elderly in contrast to all elderly. One obvious explanation for this phenomenon could be the more critical situation the patient undergoes prior to death. Since in most of the cases, private hospitals are relatively better in terms of quality of services offered, people prefer private hospitals in case the disease happens to be critical. Due to the critical situation of the patient just before death, people get more intensive medical attention, which is then reflected in high health expenditure that they incur. This is confirmed in the study, according to which

death-related health expenditure is higher than other health expenditure. Death-related per capita health expenditure for the hospitalised elderly was found to be higher than other kind of health expenditure for all-India and for most of the states. Death-related per capita health expenditure for the hospitalised elderly was found to be the highest in Andhra Pradesh (Rs. 19,162 per episode) followed by Rajasthan (Rs. 15,132 per episode) and Punjab (Rs. 14,337 per episode). Further, analysing the death-related health expenditure for broad age groups, the study finds that per capita cost of hospitalisation per year was the highest for the 60-69 age group (Rs. 13,035). As shown in our analysis, per capita cost of hospitalisation for deceased elderly is highest for diabetes mellitus (Rs. 17,948 per year) followed by cancer and other tumors (Rs. 16,351 per year) and disease of kidney/urinary system (Rs. 11,319 per year)<sup>3</sup>.

Furthermore, the disaggregate analysis for Kerala also confirms our hypothesis that elderly are more likely to have health problems. Prevalence of illness among elderly was 38.4 per cent, which was two and half times higher than the illness prevalence among non-elderly. District-wise discrepancy was also observed, being high for the districts like Malappuram (63.8 per cent), Kasargod (54.8 per cent), Kozhikode (45.2 per cent) and Trivandrum (41.6 per cent). On the other hand, prevalence of illness was low in Wayanad, Ernakulam and Palakkad. Examining the prevalence of chronic diseases for the broad age groups, the study finds that prevalence of chronic disease was much higher in the 60-74 and 75 and above age groups compared to any other age group. This result is further strengthened by finding that mean age of most of the diseases is beyond 50. All these results support our hypothesis of high disease prevalence among the elderly. Moreover, the study reveals that among all the diseases, diabetes and blood pressure are the most prevalent diseases. Analysing the disease specific cost, the study finds that per capita cost, for those who have paid is Rs. 764 for cancer, which is much higher than the cost of other diseases. Kidney problems and heart problems come next in terms of cost<sup>4</sup>. These findings reveal that burden of the disease for the individual increases much more if it happens to be cancer, kidney problem or heart problems.

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<sup>3</sup> However, it should also be kept in mind that not only the type of disease but stage of the disease also affects the cost of hospitalisation. But due to non-availability of the data, further analysis could not be done.

<sup>4</sup> It should be borne in mind that all these per capita costs are calculated only for those who have paid.

Furthermore, the future cost of diseases was estimated for Kerala to examine the rising burden of disease due to aging of the population in the near future. The estimated results suggest that cost of managing chronic diseases will increase significantly from Rs. 1,603 million in 2011 to Rs. 2,111 million in 2026, out of which the larger increase will come from the rise in health expenditure on the elderly. The cost of diseases for the elderly will increase from Rs. 624 million in 2011 to around Rs. 1,000 million in 2021. Cost of disease will also increase for the non-elderly but not at the same pace as for the elderly. All these findings suggest that the burden of aging in terms of high health expenditure is going to increase in the coming future with the increase in the proportion of elderly in Kerala.

## **5.2 Scope for Further Research**

There is a scope to make this research more resourceful. First, the current study finds that elderly are more prone to diseases. This issue can be furthered to examine the factors leading to deteriorating health problems among elderly. Second, disease specific health expenditure can also be adjusted for the stage of the diseases in which the person is to make our results more profound. Third, this study is limited to only those who had been hospitalised. But what happens to those who have not enough income to go to hospital and what is their coping strategy? Furthermore, one can analyse the extent to which household-level welfare is compromised due to ailing elderly and the associated health care cost. Strategies need to be planned towards financial and social protection for households accommodating ailing elderly. Finally, the burden of aging in terms of higher health expenditure can be analysed for the families covered by insurance and for the families not covered by insurance

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