CHAPTER I

INTRODUCTION

1.1 The Background

During the last century, Kerala witnessed a drastic decline in mortality and consequent expansion in life expectancy. This achievement is comparable with many developed countries (Parameswaran, 2000; Franke and Chasin, 2000; Parayil, 2000). According to some scholars, this change in Kerala was a result of superior medical care through primary health institutions and provision of water and sanitary facilities, which were mainly done after the formation of state in 1956 (Panikar and Soman 1984; Panikar, 1999). However, others argued that the beginning of the massive reduction in mortality in Kerala could be traced to long before the formation of Kerala as a state. According to them, the mortality reduction in the state was the result of social improvement especially through education climatic conditions and scattered pattern of settlements, and mysterious disappearance of the major causes of death, like plague (Bhat and Rajan, 1990; James, 2001, Panikar, 1999). However, there was no detailed historical assessment of the pattern of mortality in Kerala, which could bring greater clarity in this debate. The mortality decline in the beginning saw a sharp drop in death rates among young age group and later led to the concentration of death in middle ages in Kerala. It was similar to the experience of mortality transition in developed countries. However, the recent experience in the developed countries shows a further shift of death from middle ages to oldest ages as an indication of the advanced stage of mortality reduction. However, it is not clear to what extent Kerala is also experiencing such a drastic shift in mortality.

Many countries witnessed deaths from infectious and parasitic diseases being replaced by death due to chronic/degenerative diseases during the early stages of mortality reduction. It shifted the burden of diseases and death from younger to adult and older ages and this process came to be coined as epidemiological transition (McKeown and Brown, 1955; UN, 1962; Omran, 1971). However, the recent experience of advanced countries reflects a further decline in deaths in the adults ages and early old ages to the oldest ages mainly from chronic/degenerative diseases. This stage of epidemiological transition is called the ‘stage of delayed degenerative
diseases’ (Olshansky and Ault, 1986, Rogers and Hackenberg, 1987, Frenk et. al: 1990 and 1991). It may be pointed out that in the past, mortality reduction in Kerala was comparable with that of developed countries. However, studies linking shift in causes of death and age at time of death within the epidemiological theories are scarcely attempted in the state. This lacuna becomes severe when evaluating the contributors of mortality reduction such as environmental and behavioral changes, nutritional improvement, healthcare facilities, social and economic factors and the timely intervention of the state governments (Bhende and Kanitkar, 1977).

Changes in the healthcare strategy are necessary to address additional challenges emanating from chronic/degenerative diseases as well as concentration of deaths in adult and older age groups (Olshansky and Ault, 1986; Mesle and Vallin, 2002; Vallin and Mesle, 2004). The change in strategy consisted of a shift of focus from primary care to curative care and promotion of preventive measures against lifestyle diseases. Even though Kerala has already crossed early stages of epidemiological transition, there is no comprehensive inquiry into the nature of the recent transition both in terms of changing causes of deaths and prevalence of mortality and morbidity to figure out the effectiveness of existing healthcare measures. Studies pointed out that epidemiological transition has led to a crisis in the healthcare system in Kerala (Ekbal, 2007). A dramatic increase in lifestyle diseases, increasing number of aged people, soaring healthcare burden and insufficient public healthcare intervention are said to be the major causes of this crisis. The changes can be partly related to, or maybe even due to, the mismatches between the epidemiological transition taking place and the healthcare infrastructure available in the state (Ekbal, 2007). However, there are no studies on epidemiological transition, existing healthcare mechanism and healthcare burden in the context of Kerala.

State interventions played a prominent role in mortality reduction and changes in the causes of death in the early stages of the epidemiological transition in Kerala (Panikar, 1999). The expansion of primary healthcare facilities and awareness programmes against communicable diseases were the prominent interventions. Various state governments have been spending a considerable chunk of their budget for this purpose since the formation of the states. However, the proportion of health expenditure to total budget expenditure is declining. In the changing epidemiological
context, the state has to find additional funds to meet the increasing demand for curative and promotive care. Since the resources are scarce, the state needs to allocate funds effectively. However, the studies, which examine the effectiveness of public healthcare funding in the changing epidemiological context, are scanty in Kerala. A comprehensive understanding of public health expenditure and policies can help to find the ways in which the state may have to reorient its health systems.

1.2 Motivation for the Study

According to Omran (1971), the epidemiological transition is in line with changes in mortality, age structure, pattern of causes of death, healthcare and also with the nature of the socio-economic development of society. Several studies concluded that the developed countries improve the mortality reduction and life expectancy by postponing deaths into oldest ages (Crimmins, 1981; Pollard, 1982, Olshansky and Ault,1986; Mesle and Vallin, 2002). However, the experience of developing countries shows a different pattern. It appears that after the initial decline in mortality, the developing countries are unable to maintain the momentum. Though the developing countries have ample room for mortality reduction and life expectancy improvement, the pace of these changes declined steeply over the decades after 1960 (UN, 1979; WHO, 1982; Arriaga, 1989). It is interesting to study how Kerala, with early mortality advantage, was able to postpone death to oldest ages. Moreover, many reports show a possible variation in mortality rates across different regional and socio-economic groups such as castes, religious and occupational groups in Kerala (Census, 2001; Shyjan, 2009; RGI-SRS - Various Years; DSE-K - 2010). Therefore, an analysis of the variation in epidemiological transition by trends and determinants can shed light on to all the changes in a comprehensive way.

The second motivation of the study is the possible impact of epidemiological transition on the health of the population. Central to the issues of mortality reduction, aging and the epidemiological transition is the concern of healthcare of an ever-increasing survivor-population. Whether the extra years gained from mortality reduction especially in the middle and old ages, are spent in good health needs to be examined. Studies often show paradoxical results on the morbidity pattern in response to mortality reduction. Some studies argue that the morbidity will be concentrated at the age of death (Fries, 1980, 1987; Fries and Crapo, 1981) while others argue that the expansion of morbidity will keep pace with mortality reduction (Gruenberg, 1977,
Scheiner and Brody, 1983). Yet another group of scholars is of the view that the relationship between morbidity and mortality is determined by the effectiveness of the healthcare system in society (Verbrugge: 1991 and 1994). In the context of Kerala, such detailed enquiries about changing morbidity pattern and mortality are not yet available. Such an enquiry will help us understand the intensity of the burden of diseases and also the effectiveness of healthcare measures in the state in the context of epidemiological transition.

Finally, there have been only a few studies about the pattern of epidemiological transition in the context of developing countries. Most of the studies on epidemiological transition are done in the context of developed countries (Omran, 1971; Olshansky and Ault, 1986; Mesle and Vallin, 2002). Notably, these studies showed that the pace of transition was gradual and propelled mainly by the socio-economic factors in the developed countries. However, the epidemiological change was very rapid in developing countries; mainly part of medical care intervention in response to the infectious diseases. Thus, these countries experienced a sudden increase in the population of adults and elderly along with the chronic/non-communicable diseases among them, thus necessitating a sudden change in their healthcare system (Omran, 1971; Bobadilla and Possas, 1992). Since the provision of healthcare is the major determinant of the transition, further changes in the epidemiological transition (towards the delayed degenerative stage) will partly or, maybe even wholly, depend upon the existing healthcare mechanism in these countries. In this regard, the applicability of the theories, which were developed in the developed countries, may not be adequate to explain the phenomenon in the context of developing countries. Though a few studies are available in the developing countries, the complex epidemiological scenario among them makes it difficult to generalise their situations. Though the epidemiological transition in Kerala appears on par with the developing parts of the world, a detailed analysis of it can provide a different perspective on epidemiological transition in the developing countries.

1.3 Review of Literature

1.3.1 Epidemiological Transition – A Theoretical Review

Epidemiological transition refers to changes in the pattern of diseases prevalent in a society. It reflects changes in the causes of death; generally from infectious (pandemic) diseases to non-communicable (degenerative, lifestyle) diseases
(Caldwell, 1990; Namera, 1982). Omran (1971) argued that there were three ages of epidemiological transition, namely pestilence and famine, receding pandemics and age of man-made degenerative diseases. The age of ‘pestilence and famine’ was characterised by high and fluctuating mortality, mostly due to infectious diseases with average life expectancy of 20 to 40 years. Infectious and parasitic diseases like influenza, pneumonia, diarrhea and tuberculosis were the main killers in this age. The ‘age of receding pandemics’ was marked by the onset of a shift from infectious to chronic diseases and an increase in life expectancy. It was due to improvement in sanitation and standard of living, better medicines and enhancement public care measures. The third age, the age of degenerative diseases, was characterised by the predominance of chronic diseases or lifestyle diseases and the stabilisation of mortality at a low level and life expectancy of over 70 years.

A major feature of the different ages of epidemiological transition is its influence on the growth and age-structure of the population. Controlling mortality, especially from infectious diseases, will result in a boom in the population of children in the initial epidemiological ages. This will, in turn bring down fertility rate in the population of the subsequent ages (Omran, 1971). These changes will result in a high proportion of adults, increase the incidence of chronic diseases, cause higher morbidity and intensify the healthcare burden of the people.

Empirically, it was observed that a ‘cardio vascular revolution’ happened in most of the Western European countries with the advancement of medical technology, medical care and a change in lifestyle. The third age of the basic theory could not explain this phenomenon. Therefore Olshansky and Ault (1986), and Roger and Hackenberg (1987) extended the basic theory to accommodate a fourth age namely, ‘the stage of delayed degenerative diseases’ where there would be a possibility of rapid decline in death-rates.

Olshansky and Ault explained the ‘delayed degenerative stage’ as featured by life expectancy increased to over 80 years. According to them, three characteristics could appear in fourth stage of epidemiological transition. The first one included rapidly declining death rates, concentrated mostly in advanced ages with similar pace for males and females. Secondly, age pattern of mortality by cause remains largely the same as in the third stage, but the distribution of deaths for degenerative causes are
shifted progressively toward older ages. Finally, relatively rapid improvements in survival are concentrated among the population in advanced ages. The increased occurrence of non-fatal diseases such as dementia and arthritis etc., and decrease in the number of cardiovascular diseases are the peculiarities of this stage.

However, a fourth stage was introduced by Roger and Hackenberg to include violent deaths and deaths due to social pathologies (accident, suicides and homicides) and it is called the hybristic stage. This stage reflects a change in the underlying causes of mortality and morbidity. The term ‘hybris’ refers to excessive self-confidence or belief in invincibility. During the hybristic stage, morbidity and mortality are affected by man-made diseases, individual behavior and potential, and destructive lifestyles. Individual behaviour such as physical inactivity, unhealthy diet, excessive drinking, and cigarette smoking increase the risk of adverse health outcomes, including heart disease, diabetes, cirrhosis of the liver, and lung cancer. They further remarked that while most environment-based infectious diseases are eradicated during the hybristic stage, some infectious diseases are increasing in importance due to individual lifestyles and man-made causes. A well-known example of such an infectious disease is HIV/AIDS’.

Omran (1998) again added one and possibly two additional stages to his initial theory of three stages. The fourth stage is characterised by an ongoing rise in life expectancy until the age of 80 to 85 years followed by stability and decrease of cardiovascular disease as a cause of death and by the emergence of new diseases (HIV, Hepatitis B & C, Ebola etc.) and the revival of cholera, malaria, dengue, diphtheria, plague, tuberculosis etc (Omran, 1998). Omran’s revised theoretical model has been supported by Barreto (Barret et.al, 1998) in an anthropological approach. His theory focused upon resurgence of infectious disease marked by newly emerging, re-emerging and antibiotic pathogens in the context of an accelerated globalisation of human disease ecologies. The theory used the empirical biological explanation of genetic diversity of MHC glycoprotein (power to immune resistance) with various segments of population. It corroborated with migration of ‘African and Europeans with their own diseases’ to America where the native people with lack of genetic diversity, were ruined (Philips, 1997).
The medicinal approach to epidemiological transition was closely related to nutritional transitional (Cordain et al, 2005). Medicinal theories explain changes in diseases pattern interlinked with changes in lifestyle, especially food intake (calories intake) of human beings. The nature of the food consumption in the transition comprised excessive consumption of dairy foods, cereals, processed refined grains, refined sugar, vegetable oils, alcohol, salt, fatty meats etc. Change in food habits affected dietary indicators like glycemic content, fatty acid composition, macronutrient composition, micronutrient density, acid balance, sodium-potassium ratio as well as fibre content to transform prevalence of diseases. The main content of medicinal theories argued a shift in the pattern of diseases due to shift in consumption patterns towards ‘modern processes’.

Apart from these theories, researchers like Huyenen (2005), Mesle, Vallin and Adreyer (2002) and Casselli, Barbie and Yashin (1991) empirically studied patterns of disease prevalence in different countries and tried to link it with the different pace of development. The results of these studies showed corroborating evidence, like reverse transition of stages, overlapping and polarisation of transition of stages mainly due to emergence and re-emergence of diseases that crippled developmental policies.

Unlike Western and Northern European countries, Eastern European countries experienced a delay in the onset of the advanced age of epidemiological transition. The major cause was the high prevalence of death due to cardiovascular diseases, neoplasm and violence. Such a high death-rate was a result of a hazardous lifestyle of excessive use of alcohol, smoking and unhealthy food-habits. The state, which had a prominent role in reducing deaths due communicable diseases with improved public healthcare, failed to effect appropriate changes in lifestyle/behavior, which could lead to the advanced age of epidemiological transition. In terms of life expectancy, within 30 years, males only gained less than one year on average while females gained more than three years (Mesle et. al, 2002; Vallin and Mesle, 2004). The experience of such countries indicates the role of socio-economic and cultural factors and lack of state intervention in advancing epidemiological transition (Caselli, Barbie and Yashin, 1991; Caselli et. al, 2002).

The theories that explain the advanced stages of epidemiological transition were formulated in the context of the developed countries where the epidemiological...
transition took place gradually. These theories are found wanting when applied to the empirical situations of developing countries. It is because of the sudden decline in their mortality and fertility rates leaves a much shorter time to alter the health system to respond adequately to the health needs of adults and the elderly and, at the same time, maintain the efforts to reduce the burden of infectious diseases in children and reproductive health problems (Babadilla and Possas, 1992).

1.3.2 Epidemiological Transition in Kerala - Existing Literature

Studies indicate that Kerala also experienced an active epidemiological transition (Panikar, 1999; Shenoy, 2001; Navaneetham et.al:2005 and 2009). As a result, a favorable decline in infant, child and maternal mortality rates and high improvement in life expectancy occurred in the state. This achievement was attributed to public healthcare intervention such as vaccination and awareness campaigns, improved sanitation and safe water supply (Soman and Panikar, 1984; Panikar, 1999; WHO, 1984; Padmanabhan, 1987; Kannan et.al, 1991; Kabeer and Krishnan, 1992; Dreze and Sen, 1998). Nevertheless, significant contribution of environmental, social and behavioral factors were also noted in achieving favorable health indicators mainly in the earlier decades of last century in Kerala (Kabeer and Krishnan, 1992; WHO, 1984).

The first major attempt to study the epidemiological transition in Kerala was made by Panikar and Soman (1984), and the study found a ‘low level mortality co-existing with considerable morbidity, mostly caused by diseases linked to underdevelopment and poverty’. Even though the study by WHO (1984) in the same year had similar results, it also revealed simultaneous increase in the prevalence of chronic, lifestyle diseases and in life expectancy. It added that the then scenario of ill health was a product of a total way of life, which came from the socio-cultural factors of society. Interestingly, the situation in Kerala draws attention to the possibility of occurrence of lifestyle/chronic diseases even without a significant rise in per capita income. Later Panikar (1999) also found the overlapping of high prevalence of infectious and chronic diseases across the state with significant variations in different geographical regions.

However, recent studies show clear dominance of lifestyle/chronic diseases as a cause of higher-than-national-average mortality and morbidity in Kerala (Shenoy
Apart from these changes, a drastic increase in the incidence of social pathologies such as accidents, suicides, and homicides are also recorded in the state (Kannan et.al, 1991; Aravindan, 2000; Shenoy et al., 2001; NCRP, NATPAC and NCRB: Various Reports). In case of accidents and suicides as causes of mortality, Kerala ranked the 3rd and the 4th at the national level (Kannan et.al, 1991; Aravindan et.al, 2000) respectively. All this clearly indicates that the state may have already reached the third age of epidemiological transition (stage of man-made degenerative diseases). Along with the shifts in morbidity, increasing morbidity is also seen in the context of the aging population in Kerala. The projected increase in the proportion of the elderly in the population is 19 per cent in 2021 and 35 per cent in 2051 based on a growth rate of 30.22 per cent in 2001 for the old age group (60+ years, Bose, 2006).

In addition, there are significant variations in disease prevalence based on gender and socio-economic status reflecting the possibility of a heterogeneous pattern in the epidemiological transition within the state (Kannan et.al 1991; Shenoy and Shenoy, 2000; Mohanan et.al, 2000; Navaneetham et.al, 2009; Ashokan, 2009). For instance, the diseases like goiter, respiratory disorders and anemia are more common among socially and economically disadvantaged groups (Mohanan et.al, 2000). Similarly, the prevalence of hypertension, diabetes and cardiovascular diseases increases from low socio-economic status to high socio-economic status (Navaneetham et.al, 2009, Shenoy, 2001).

In short, the review of studies point outs that Kerala has been experiencing epidemiological transition. However, these studies are inadequate to answer the historical time bounds of the transition comprising the pattern of mortality reduction and also changes in the causes of deaths over the decades. No information is available of the recent changes in mortality and causes of death in adult and early old ages to oldest ages as noted in other countries. Moreover, the pattern of epidemiological transition in different regional, socio-economic groups are also not clear. A major

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1 NATPAC: National Transport Planning and Research Centre; NCRB: National Crime Record Bureau; NCRP: National Cancer Registry Program
lacuna of lack of such information is that it constrains an evaluation of healthcare policies and expenditures of the state for further effectiveness.

1.3.3 Epidemiological Transition and the State Responsiveness

A drastic change in the mode of state intervention will be required to tackle the healthcare burden that emerges from the epidemiological transition. Studies often highlight the burden of chronic/degenerative diseases that increases rapidly due to the changing age-structure due to the aging population and lifestyles in the final stages of epidemiological transition (Prasad, 2006). A viable solution from the governments will be to raise public awareness of lifestyle diseases and various medical interventions to address this issue (Prasad, 2006). At the same time, the government could also ensure the smooth functioning of the health sector to prevent or/and correct failures in the health sector through subsidization of public goods and equity when poor and vulnerable patients cannot afford healthcare through the health insurance (Peabody et.al, 1999).

The awareness programmes, anti-alcoholic-smoking campaigns and policies, effective interventions in medical technology and better healthcare facilities in many countries accounted for large reduction in the incidence of chronic/degenerative diseases (Royal college, 1962; Casselli et.al, 2002; Mesle and Vallin, 2002; Vallin and Mesle, 2004). On the other side, most of the governments in developing countries are being pressed to adopt the therapeutic medical model to deal with the burden of non-communicable diseases (Bobadilla and Possas, 1992). However, the health interventions of the most developing countries are often hampered by insufficient funds and often unable to meet the additional challenges posed by the chronic/degenerative diseases. As a result, such countries lack the required health infrastructure to deal with the most pressing healthcare needs of their populations (ibid). Such inadequacies along with the anomalies in the distribution and coverage of healthcare provisions have created a polarisation across various sub-groups in some developing countries (Bobabilla et.al,1992).

The health policies of the governments also have a prominent role to tackle the healthcare burden that emanates from the epidemiological scenario. Since the 7th Five Year Plan, the Central government has expressed concerns over the maintenance of a good healthcare system to deal with the chronic/degenerative diseases in India.
(Pratheeba, 2010). However, there are mismatches of the policies with ground realities, which further worsened the health scenario in the country. For instance, foreign-sponsored (especially World Bank) programmes during the post-SAP phase did not give emphasis to the prevailing epidemiological situation or socio-economic burden in India (Banerjee, 1999; Saxena, 2006). The drugs used for treatment of ischemic heart disease and cancer etc., have been brought out of the protective orbit of price control. The prohibitive rise in treatment costs resulted in a concomitant rise in the number of patients who abandoned treatment halfway, or, do not seek treatment because of economic exigencies (Prasad, 2006). Besides, mismatches also exist between the priorities and policy direction from the central government for the country as a whole, and the requirements of individual states (Kumar, 2005). The states that are advanced in epidemiological transition, like Kerala and Punjab where the lifestyle-related non-communicable diseases are prominent, seems to bear the burden of the mismatch of these policies.

Though the healthcare services come under the State List in India, Article 47 has emphasised that the major constitutional responsibility lies with the state governments. At a time of high prevalence of chronic diseases, aging population and mounting healthcare cost a significant intervention beyond primary healthcare is called for (GOK –Various Years). Therefore, a shift in the healthcare sector is necessary to match the higher level of epidemiological transition in Kerala. On the other side, the increasing prevalence of chronic diseases and the high demand for therapeutic healthcare services has fueled the mushrooming of private hospitals. However, the private healthcare system is a rare promoter of preventive lifestyle to tackle degenerative diseases (Kutty, 2006a,b). Notably, more than 44 per cent of people from the lower income groups seek help from the private healthcare system (Ekbal, 2007) and it has increased their per capita healthcare expenditure (Sadanandan, 2001; Ekbal, 2007). The financial burden of treatment has added an additional four per cent to the population below poverty line (Ashish, 2005; Kannan et.al, 1991). The changed epidemiological scenario resulted in the marginalisation of the poor (estimated to be 30 per cent of the population) and necessitated a comprehensive enquiry into the adequacy of public healthcare facilities, public health expenditure and health policies in Kerala.
1.3.4 Epidemiological Transition and State Health Expenditure: Studies in Kerala

Since the middle of the 19th Century, state health expenditure was as a major catalyst in reducing mortality from deadly diseases (Panikar and Soman, 1983; Panikar, 1999; Sadanandan, 2001). According to the Annual Administration reports of Travancore, 1.07 per cent of total budget was spent on public healthcare during 1863-1868, which rose to 5.03 during 1930-40. The major focus of those budgets was preventive care through surveillance and awareness against outbreak of epidemics like cholera, and vaccination against diseases like smallpox etc. As a result, such diseases were under control even before the formation of Kerala.

Soon after the formation of Kerala, the state governments continued to enhance the share of healthcare expenditure. The first budget of Kerala allocated 12.65 per cent of total expenditure to healthcare, which again increased to 16.27 per cent in 1970-71 (GOK, Various Years). Massive expansion in the healthcare infrastructure took place in those decades facilitating wider access to primary healthcare services even in the remote areas of the state. As a result, deaths due to infectious/parasite diseases and maternal and perinatal deaths drastically reduced in the state (Panikar and Soman, 1984). Moreover, it resulted in low mortality rates of infants and mothers and also high level of life expectancy at birth during those periods (CDS/UN, 1975; Panikar and Soman, 1984). Perhaps, such achievements could be a result of comprehensive health expenditure to address the then healthcare issues through primary healthcare intervention. However, different surveys have pointed out that the state has been experiencing high death-rates caused by chronic/degnerative diseases since the 1970s (RGI- CSDR, RGI – MCCD: Various Years). Such changes in the prevalence of diseases and causes of deaths is a call to the state to address the burden of chronic/degnerative diseases through effective curative (secondary) care in addition to primary healthcare.

The growth in number of beds and institutions in the public sector slowed down in the mid-1980s while the private sector surpassed the public sector in healthcare thereafter (Kutty, 2000). The percentage share of healthcare in the total expenditure declined to 8.60 percent during 1991-95. Moreover, the percentage share of expenditure categories in Kerala’s healthcare budget witnessed severe
compositional changes. The ‘Pay and Allowance’ increased over the decades while budgets for medicine and hospital accessories reflected a waning trend (Sadanandan, 2001; Bahuleyan, 2005). Spending on medical education, grants and medical establishments by institutions reduced over the decades while the state spending for medical college hospitals increased drastically (ibid).

Effective intervention of inexpensive primary healthcare could be a significant factor in achieving high healthcare indicators. However, in the context of changing epidemiological transition, a question can be raised whether the state is able to address chronic/degenerative diseases and injuries. Some studies have pointed out to the existence of poor medical facilities in the public healthcare system (Kutty, 2000). There are spatial inequalities in the distribution of government hospitals preventing access to secondary level health services in the state (Narayana and Kurup, 2000). However, the available studies are inadequate to reveal the adequacy of the existing public healthcare expenditure to address the emerging challenges in the context of epidemiological transition. They do not link the changes in deaths, its causes and the also the morbidity level with public healthcare expenditure and health policies in Kerala.

In short, the review of literature indicates the need to understand the state’s responsiveness in coping with the epidemiological transition in Kerala. There are no systematic studies that have examined the role of the state by its health expenditure and policies in the changed context of Kerala. Lack of such information can lead to a heavy healthcare burden for the people and also affect life in the advanced age of epidemiological transition in the state.

1.4 Research Issues

In recent years, Kerala has been facing a rather heavy healthcare burden of chronic degenerative diseases and population ageing due to the ongoing epidemiological transition. However, the existing studies are insufficient to identify the pattern of epidemiological transition and the effectiveness of the state intervention. The available studies often present a general in understanding rather than trace the path of epidemiological transition and the state’s interventions. As a result, the intervention of the state in the healthcare sector becomes ineffective and
necessitates a comprehensive analysis of the epidemiological transition and its healthcare implications.

A study relating the epidemiological transition and healthcare implications comprises three major issues. Firstly, it seeks to identify epidemiological transition through the changes in the mortality and the causes of deaths in Kerala over the decades. An analysis of such a perspective helps in understanding the role of the state in mortality decline and causes of deaths, and can point out the necessary areas for further intervention for prominent diseases among various sub-groups of the population. The second issue is the question of whether morbidity is changing along with reduction in mortality and the causes of death. Such an enquiry can help to understand the changes in diseases burden even in the context of mortality reduction. The third issue consists of the effectiveness of state intervention by budget allocation and implementation of policies. A study with such perspective can help to re-orient the government policies to tackle the burden created by the emerging epidemiological scenario.

1.5 The Research Gaps

The existing studies on the epidemiological transition and healthcare system in Kerala seems to miss some relevant linkages on mortality decline. There is a lack of information regarding mortality reduction at different historical periods as well as its present movements. The failure of the healthcare system in dealing with epidemiological transition can interrupt the mortality decline to the oldest ages. The reduction of mortality can be delayed or even increased in these ages, if the changes in lifestyle lead to greater prevalence of chronic/degenerative disease in an inadequate healthcare system. Therefore, understanding the mortality changes further requires information on the pattern of changes in causes of deaths over the periods. The mortality decline could again vary across the socio-economic groups based on the prevalence of diseases and availability of medical care. So far, comprehensive studies are not available on the changes in mortality, causes of deaths and their interrelationships in the Kerala context. At this juncture, the following questions can be raised:

- What is the pattern of mortality change in Kerala over the decades?
- What is the pattern of change in cause of death in the mortality decline?
• How does the mortality and cause of death vary across socio-economic groups?

A major lacuna in the available literature in the state is the lack of adequate information on the changes in morbidity corresponding to the mortality pattern over the decades. The variation in the morbidity with mortality is a key factor to understand the nature and efficiency of the healthcare mechanism to deal with the epidemiological transition. As noted earlier, an intervention through healthcare behaviour could reduce mortality rates without worsening morbidity. The alternative medical care measures could reduce mortality from most of the chronic/degenerative diseases but may increase the overall morbidity. However, there is inadequacy of information about the dynamics of morbidity with the mortality change in the state. This inadequacy consists of dynamics of age-specific morbidity rate, change in morbidity gap, existence of multiple morbidity and also morbidity across gender and social groups, which leads to some pertinent questions such as;
  • What is the status of morbidity in connection with mortality reduction?
  
  • How does the nature of morbidity vary across different segments of the population?

Other striking questions are about the healthcare burden that emerges from the high incidence of chronic/degenerative diseases in the state. Nevertheless, the individuals may respond to it by avoiding the health hazards and making ‘healthy choices’, either in their lifestyles or medical care and treatment. However, the healthcare burden is a factor that determines healthcare behavior. The healthcare burden could increase with the nature of medical treatment mainly as episode frequency in health-seeking, and the implicit and explicit cost of the treatment. Therefore, the questions that need to be asked are as follows:
  • What is the nature of the healthcare burden?
  • How do the people cope with changing epidemiological patterns?

Lastly, literature shows that health policies have played a key role in determining the movement and the burden of healthcare emerging from the epidemiological transition. This is an area of concern for the governments especially with regard to the delay in mortality reduction or the soaring healthcare burden in the course of
expansion of longevity with high morbidity. This context requires a retrospection of the role of states not only as providers of medical care but also as promoters and regulators of healthcare. The role of the state in such stages of epidemiological transition in western countries has been empirically proved. However, the applicability of this intervention in the Kerala context is questionable due to the insufficiency of the healthcare system and high level of morbidity. A high level of dependency among people, including the poor, on the private medical care system despite high healthcare burden is visible evidence. No study is available on the epidemiological transition with healthcare expenditure and changes in health policies in Kerala. Therefore, it leads to some important questions such as;

- How does state intervention vary across the stages of epidemiological transition?
- What is the role of the government policies in the current epidemiological scenario?
- How does public expenditure vary in the course of epidemiological transition?

1.6 Objectives of the Study

The study seeks to focus on six major objectives based on the above mentioned lacunae in research. The first objective overviews the approach of various governments to epidemiological transition. The consequent three objectives reveal the epidemiological transition in Kerala, which comprise of mortality and causes of deaths in the state. The fifth objective aims to trace out the disease burden to understand the severity of dominant diseases across various sub-groups of the population. The sixth objective identifies the existing role of state intervention and its effectiveness in modifying the existing healthcare interventions. The objectives are:

1. To critically review the state healthcare policies and approaches towards the epidemiological transition

2. To track the pattern of mortality in Kerala

3. To trace the changes in the causes of death in the state

4. To analyse the recent disparity in the level of mortality and causes of death among the sub-groups
5. To assess the morbidity pattern of the current epidemiological scenario

6. To analyse the trends and composition of public healthcare expenditure in the course of epidemiological transition in the state

1.7 Conceptual Framework

The review of theoretical and the empirical literature suggest that the heavy burden of chronic/degenerative diseases can be expected to be a part of the epidemiological transition. Hence, this calls for an alteration in the mode of healthcare to tackle these issues. The efficiency of such healthcare mechanisms will again determine the extent of the burden of healthcare and also the further movement of epidemiological transition towards advanced stages (age of delayed degenerative diseases). The theoretical relationship of these different components in the epidemiological transition is shown in Figure 1.1.
Role of state: 1 includes primary healthcare services such as vaccination, direct medical care for infectious diseases and perinatal, maternal and child care besides raising general awareness about health.

Role of state: 2 focuses on both curative and promotive healthcare mainly to the chronic/degenerative diseases and injuries, and also the old age care in addition to primary healthcare.

Source: Author’s Preparation from Various Literature Reviews
Figure 1.1 illustrates that the entire epidemiological transition has two phases linking three stages\(^2\). The first phase links the initial stage (Stage of Group I Causes such as maternal and perinatal death, and death due to pestilence and famine, infectious diseases) to the second stage (Stage of Group II causes such as lifestyle/degenerative diseases and also accidents and injuries) of epidemiological transition. This domain of Group II diseases is mainly because of three factors. The first factor, namely the increase in the population at risk (middle and old ages) as a result of absolute increase in the survival of youngsters and relative importance of this group by the corresponding fertility reduction followed by decline in Group I diseases. Secondly, the decline in Group I diseases can have a relative influence on Group II diseases. Similarly, the decline in Group I diseases can cause social, economic and behavioral changes which in turn can lead to an increase in the Group II diseases as a third factor of their dominance.

The second phase relates to the third stage of transition (survival to extreme old ages where the deaths due to the diseases related to extreme old ages or by the extension of life with Group II causes) from the second stage. This phase of change to extreme old ages is mainly because of two factors such as the healthcare behaviour and extensive medical care to deal with the Group II diseases. The healthcare behaviour consists of aversion to risk exposure by controlling hazardous habits, lifestyles, diet patterns etc., which can prevent the possibility of Group II diseases in the middle and early old ages. While death can be postponed by extensive medical care in the case of most of the Group II diseases, it depends on the financial and technological constraints of the existing healthcare system of the society. Moreover, it often creates chronic morbidity with the extension of life. Though the healthcare behaviour is viable in nature, in reality most societies depend on medical care as a solution to overcome these problems.

The state can play a prominent role in reducing the healthcare burden even in the second phase of epidemiological transition. In addition to primary healthcare, the state can intervene through various kinds of preventive, promotive and curative strategies to tackle the additional burden emanating from the final phases of the transition. Apart from this, the state needs to focus on the healthcare of aged people as

\(^2\) The study divides the four ages of epidemiological transition into three stages considering the nature of cause of deaths, age structure of population and also the life expectancy rate.
they become more in number in the advanced stage. However, the success of such attempts depends on how effectively the state intervenes in such situations.

1.8 Methodology & Data

At the outset, this study explores the approach of the state to the epidemiological transition by juxtaposing the information available from various sources mainly from government documents. Consequently, to figure out the epidemiological transition in Kerala and its possibility to achieve the advanced stage (stage of delayed degenerative diseases), the study largely followed the methodology suggested by Olshansky and Ault in 1986. Therefore, the study examines the pattern of mortality decline and concentration of such decline in each age and gender group, cause of death behind mortality reduction and consequent improvement in life expectancy as well as pace of survival among various age groups. At the same time, it mainly used the methodology followed by Sullivan (1971) for analysing the quality of life in Kerala in the context of mortality decline and corresponding increase in life expectancy by estimating Disability Free Life Expectancy. In the final part, it examines the role of the state in the epidemiological transition by reviewing various literatures as well as analysing the statistical information on health and related expenditure for various historical periods. It also uses regression analysis for finding out the causal relationship between epidemiological transition with socio-economic factors and state expenditure.

The first objective reviews the existing health policies and acts at various administrative levels in the pre and post periods of the state formation. The following three consequent objectives (2, 3 and 4) of the study broadly cover the pattern of epidemiological transition in Kerala, which is analysed as: the pattern of mortality change, changes in cause of deaths structure and also the status of these changes across the population sub-groups. The earlier two objectives among them will follow a time series analysis while the latter would focus on a cross sectional analysis. In the second objective, the changes in mortality rates will be analysed with regard to absolute and relative changes in mortality and relative importance of older ages. Similarly, in the third objective, the study proposes to focus on the absolute and relative changes in cause of deaths in Kerala in order to identify the changes in causes of death. In the fourth objective, the causes of death among different population sub-
groups will be explored by understanding their variations in the epidemiological transition.

The fifth objective of the study, an assessment of disease burden in Kerala will be carried out by an analysis of the pattern of morbidity. Moreover, the study seeks to analyse the variations in disease burden by analysing morbidity among different socio-economic groups. In the final objective, the study proposes to examine the state interventions through an exploration of the pattern of health expenditure at various levels of governments towards the changing healthcare necessities in Kerala at various historical time periods.

The analytical parts of the study will be carried out by using data from secondary sources. The first objective uses various historical documents of the princely states of Travancore and Kochi and the British government of Madras Presidency of the pre-independence era and the various budget documents of Central, State and LSGs of post-independence for a critical review. The reports of Census and Sample Registration System (SRS) will be used to analyse the change in mortality as part of the second objective. In the third objective, an analysis of causes of death by using data from reports such as Cause of Death Surveys - Rural (CDS-R), survey of Medically Certified Cause of Death (MCCD) and the Vital Registration System (VRS) will be carried out to understand the changing pattern of causes of death. Similarly, the fourth objective (difference in epidemiological transition across different sub-groups) will be achieved by analysing the registered cause of deaths in VRS in Kerala as on 2008.

To understand the disease burden of the recent epidemiological scenario as stated in the fifth objective, the study will use data from National Sample Survey Organization (NSSO) along with mortality information from the SRS data. For the sixth objective, the study will use the health expenditure data of Kerala availed from the various historical documents of Travancore and Kochi and British governments and the various budget documents of Central, State and LSGs for post-independence to examine how far the state expenditure has changed to address the epidemiological transition in Kerala.
1.9 Chapter Scheme

This thesis has been organised into eight major chapters considering its themes of content. The first chapter is ‘Introduction’ (present chapter) that comprises the motivation of the study, literature review, research gaps, objectives, conceptual framework, methodology and data for the analysis. The second chapter, ‘Epidemiological Transition and Health Policies in Kerala’, is a contextual analysis of the major policies and interventions of the Government of Kerala. The third chapter, ‘Mortality Trends and its Decomposition’ analyses the changes in death rates and life expectancy, importance of various age groups as well as gender in mortality decline, improvement in life expectancy and also the actual contribution. The fourth chapter on ‘Pattern of Causes of Death Structure’ mainly analyses the changes in causes of deaths, and the potential and actual contribution to life expectancy improvement. The fifth chapter, ‘Regional Disparities in Mortality and its Causes’, scrutinises the pattern of mortality and cause of deaths across the districts in the state.

The sixth chapter is ‘Pattern of Morbidity Change and Quality of Life’. It explores the changes in morbidity among different sub-population groups at various points of time as well as the quality of life and its determinants through a combined index of mortality-morbidity, namely Disability Free Life Expectancy. The seventh chapter; i.e., ‘Epidemiological Transition and State Health Expenditure’, deals with the pattern and trends of state expenditure on health at various levels of government (princely states of Travancore and Cochin and also Madras Presidency of British government (pre-independence) as well as Centre, State and LSG (post-independence) and causal impact of such expenditure on epidemiological transition. The final chapter is the ‘Summary and Conclusion’ that contains the findings of all the analytical chapters and major insights. It also mentions the policy implication of the study, and the limitations and scope for further research.