CHAPTER – 2

SURVEY OF LITERATURE

2.1 Introduction

Under-five mortality is considered as the most sensitive index of the living standards, extent of public health activities and cultural development. As such it is responsive for both the improvement and deterioration in the environment in which children live. Infant and early childhood mortality is influenced by a set of endogenous socio-economic and cultural factors. The effects of social, economic, cultural and geographic variables operate through different endogenous biomedical factors to exert an impact on mortality. There are both theoretical and empirical literatures on these issues. To keep the volume of this chapter within sizable limit, only empirical aspects of the study are considered. This is consistent, given the fact that the present thesis is concerned with the empirical issues of the under-five mortality. Based on our objectives of the study, we have divided the review of literature into five aspects.

(i) Studies related with levels, trends and differentials of under-five mortality and its components.
(ii) Utilisation of health care services and their impacts on maternal and child health.
(iii) Inequality on infant and under-five mortality and determinants of inequality.
(iv) Projection of under-five mortality in the context of Millennium Development Goals.
(v) Efficiency of health care systems under different geographical, socio-economic and demographic setup.
As the present study is mainly concentrating on India and its states, the review of literature will be confined to the studies related with the Indian infant and child mortality experiences. However, important studies in other parts of the world are also mentioned here to formulate our ideas and expressions. The format of the present chapter is as follows.

In section 2.2, we discuss the issues of levels, trends and differentials of under-five mortality. Section 2.3 deals with the issues relating to utilization of maternal and child health services. The studies relating to inequality on infant and under-five mortality are presented in section 2.4. Section 2.5 is concerned with the projection of under-five mortality components with respect to Millennium Development Goals. The studies dealing with the efficiency of health care systems are presented in section 2.6. The section 2.7 is concerned with the connection of the problems that is being considered in the present thesis with the existing literature.

2.2 Issues of levels, trends and determinants of under-five mortality and its components

Many researchers have undertaken a number of studies over the years regarding the idea and knowledge about the levels, trends and differentials of infant and child mortality. For example, Wringley (1977) classified the determinants of infant and child mortality as intrinsic and extrinsic. These two factors refer to endogenous or biological or bio-demographic characteristics like, sex, maternal age, number of previous births, birth interval, birth order, birth weight and breast feeding and exogenous or environmental characteristics such as residence, mother’s and father’s education, occupation, and health facilities available respectively. According to him, endogenous infant mortality caused by factors is equivalent to neonatal death and it is more likely to implicate prenatal causes linked to maternal health while exogenous infant mortality encompasses extrinsic causes.
Mosley and Chen (1984) argued in their influential and widely cited article that, research efforts to identify the most cost-effective uses for health sector resources were hampered by the lack of clear conceptual models for the study of child health. They observed a disparity between social science and medical science research. The social science research largely focused on the roles of socio-economic and cultural factors which work behind the child deaths. But medical science research, highlights on specific disease processes and used morbidity as the most common outcome variable. The objective of their research was to develop an analytic framework that would integrate the two research methodologies, and determine a single outcome variable that combined both mortality and morbidity. According to them, all background (socio-economic and cultural) variables have to operate through a limited set of proximate determinants that directly influence the risk of disease and the outcome of disease processes.

Mahadevan et al. (1986) argue that the bio-familial factors are the predominant causes of infant mortality and familio-environmental factors are the important causes of child mortality in India. There are substitutive and complementary relationships between community and individual/household characteristics. Although the availability of health, sanitation and other social services is important for reducing child mortality, their interactions with individual and household characteristics determine the actual outcomes (Mosley and Chen, 1984). Visaria (1986) mentioned about the infant and child mortality situation of India over the years starting from the beginning of the last century. Her study covered the levels and differentials of mortality situations of infant and children across the states by sex and place of residence. Bhuiya and Streatfield (1991) have investigated about the positive effect of mother’s education on child survival using hazard analysis. Maternal education has been identified as one of the most important socioeconomic determinants of infant and child mortality. Studies show that the higher the level of maternal education the lower the infant and child mortality (Caldwell, 1981). The study by Caldwell (1979) about Nigeria, Hobcraft (1993) in the context of sub-Saharan Africa
described mother education as the major factor for preventing child mortality, even after controlling for income and other household variables.

Sandhya (1991) opined in Indian perspective that socio-cultural factors like caste, type of family, education and occupation of parents, socio-economic status of the family, child birth practices, pre-natal care and the type of medical attention at the time of birth influence and determine the level of infant mortality. Considerable evidence indicates the harmful consequences for child survival of childbearing at younger and older maternal ages (Hobcraft, McDonald, and Rutstein, 1985). Teenage mothers generally experience considerable excess risks when they give birth a child. Order of the child birth has been used as an explanatory variable by many researchers (Choe et. al, 1995; Bhalotra, 2004). Few studies observed that health care during delivery would be higher for first order births and is expected to decline as order of birth increases (Elo, 1992; Bhatia and Cleland, 1995).

Mortality is generally higher for first-born children, especially during the first year of life. Studies show that child mortality increases with the increase in parity after the second birth. The higher is the parity, shorter the birth interval and shorter the birth interval, higher is the risk of dying for a child. The risk of dying is considerably higher for a child who has a sibling born within the preceding two years (Hobcraft et. al., 1983). Kanitkar and Murthy (1984) found in the Indian context the typical U shaped relationship between birth order and mortality rate during infancy, neonatal, post-neonatal periods. Short birth interval has indirect effects through such factors as mother’s depletion, premature birth and limited family resources. However, maternal age and birth order effects have been shown to be weaker than the effect of child spacing (Hobcraft, et al., 1985).

Study on gender differentials shows, girls are less likely to receive treatment than boys (Filmer et. al., 1998), and a study conducted in Punjab showed that during the first two years of life (important years for child mortality), expenditure on health care was 2.3 times higher for sons than for daughters (Das Gupta, 1987). In the absence of discriminatory allocation of resources and care, Dyson (1982) revealed that male
children experience higher mortality than female children. However, in large areas of Western South Asia, stretching across Pakistan, Bangladesh and northern states of India, early age death rates are often very much higher for females, especially in rural areas. Another study shows that, excess neonatal mortality among girls constitutes about one third of the perinatal mortality rate and may be linked to a preference for sons (Nielsen et al., 1997).

Pandey et al (1998) reported about the determinants of infant and child mortality for India and for individual states. Bhattacharya (1999) discussed about the socio-economic factors influencing child survival in less developed countries, which include the proximate determinants, like infection, food intake, nutritional status, disease control, maternal factors and injury. The study by Mariam Claeson et al. (2000) show that, non-income factors, such as maternal and child health interventions, have played a significant role in lowering both infant mortality and under-five mortality rates in India, although the data do not permit directly attributing the mortality decline to programme efforts. Bharati et. al. (1998, 2004) estimated IMR and identified determinants behind child mortality in the district level of West Bengal. The substantial effects of socio-economic background and demographic characteristics and mother’s health care behaviour are estimated. Malnutrition is a factor which has been identified as one of the major determinants of infant mortality in India. The study by Som and others (Som et. al., 2006) identified socioeconomic differentials in nutritional status of children in two eastern Indian states with similar climates, namely West Bengal and Assam. According to this study nutritional status depends on birth order, preceding birth interval, parent’s educational status, working status of the mother, mother’s age at delivery of the children, source of drinking water, toilet facilities and standard of living of the household. An interesting work that examines the mechanism that transmits the malnutrition and their impacts is presented by Scrimshaw (1996). Nutrition and other factors during pregnancy and infancy influence not only the health of the fetus and the infant, but also that of the individual throughout life. Iron deficiency in the mother during pregnancy increases
maternal mortality, prenatal and peri-natal infant loss. Lahiri and Ram (2004) studied about the situation of infant and early childhood mortality in different states of India. They presented the levels, trends and regional variations and analysed the socio-economic and demographic factors influencing deaths in infant and early childhood stages. Sonia Bhalotra (2004) found clear evidence of frailty (unobserved heterogeneity in mortality), fecundity (birth spacing), and causal effects of birth spacing on mortality and vice-versa. Jones observed that, exclusive breastfeeding, oral rehydration therapy, and adequate complementary feeding were among the most effective interventions to prevent child mortality in India. If these interventions would be applied universally, 57% of mortality among pre-schoolers could be prevented (Jones et. al., 2006). Singh and Srivastava (1992) investigated the association between use and knowledge of colostrums (first breast milk after birth) on child deaths. According to them, a shorter duration of breastfeeding has an indirect effect on infant mortality and thus increases the risk of death during childhood.

To understand the causes of child deaths in order to implement appropriate child survival interventions in the country, Chandrakant Lahariya and others (Lahariya et. al., 2010) presented a ‘systematic review of studies’ reporting causes of child, infant, and neonatal deaths from India for 1985 to 2008. They concluded that the structure of neonatal causes of death in India may be different from the rest of the world and that interventions to reduce neonatal deaths in first week of life may rapidly improve child survival in the country.

2.3 Issues on utilisation of maternal and child health services

Demand for reproductive and child health services is not very impressive in India. Antenatal care is one such service, and despite its importance between conception and birth, many women are not still utilizing it properly. Antenatal care is an essential safety net for healthy motherhood and childbirth, where the well being of
both the prospective mother and her offspring should be monitored (UN, 2008). There are many studies undertaken in this regard to evaluate and estimate their impact in the country (Bhattacharya et. al., 1991; Ramachandran, 1992; Mondal, 1997; Mathews et. al., 2001).

A number of studies have stressed the role of socioeconomic and demographic factors in influencing demand for and utilization of maternal and child health services (Ray et al., 1984; Kanitkar and Sinha, 1989; Elo, 1992; Swenson et al., 1993; Abdalla, 1993; Govindasamy, 1994; Khan et al., 1994; Barlow and Diop, 1995; Ahmed and Mosley, 1997; Regmi and Manandhar, 1997). For example, increasing age of mother and birth order is negatively associated with use of antenatal and delivery care services (Salam and Siddiqui, 2006). It is well established that educated and working mothers are more likely to take advantage of modern health care services. Educated and working women are considered to have greater awareness of the existence and value of preventive health care services (Caldwell et al., 1983; Mosley and Chen, 1984; Cleland and van Ginneken, 1988; Mencher, 1988). Many studies included exposure to electronic media in their analysis since it is an important source of information regarding the beneficial impact of the preventive care for maternal and child health (Rao et al, 1998; Retherford and Mishra, 1997). Some studies have stressed the importance of access to health services as a factor affecting the utilization of services (Rao and Richard, 1984; Sarita and Tuominen, 1993; Kumar et al., 1997).

In recent years, field experience and data from both qualitative and quantitative studies have indicated that improvements in the quality of services can further increase service utilization. Programmes that maximize quality as well as access to services enhance client satisfaction, leading to greater utilization (Shelton and Davis, 1996; Levine et al., 1992). It is argued that access helps to determine whether an individual makes contact with the provider, while quality of care influences a client’s decision whether to accept and use the service or to continue using the service (Bertrand et al., 1995). Many of the above studies have stressed outreach
programmes, including home visits, mobile clinics, and community-based delivery systems, as mechanisms to increase both the quantity and quality of services. If a woman ever had a still birth in a previous pregnancy, the use of maternal care services would be higher because of known risk factor (Bhatia and Cleland, 1995). Although quality of services is often mentioned as an important factor in the utilization of health services (Dennis et al., 1995; Shrestha and Ittiravivongs, 1994; Phommasack, 1995; Visaria, 1999), many of the research on this subject refers to family planning services as an important determinant of child health (Levine et al., 1992; Koenig and Khan, 1999; Koenig et al., 1999; Khan et al., 1999; Gupte et al., 1999; Roberto, 1993; Townsend et al., 1999; Patel et al., 1999; Satia and Sokhi, 1999). Some studies have presented evidence that the effects of inadequate access to services on utilization of services are greater than the effects of socioeconomic factors (Sawhney, 1993; Elo, 1992) and that as access to public health facilities improves, the effects of socioeconomic factors on utilization of services become less important (Rosenzweig and Schultz, 1982; Govindasamy and Ramesh, 1997). Other studies argue that lack of motivation is the major factor in non-utilization of services, and that provision of services alone cannot overcome lack of motivation or demand for services (Ray et al., 1984).

Many studies have pointed out about the under utilization of the existing maternal and child health care facilities and tried to find out possible impact on maternal and child mortality. Bhardwaj and others indicated that, One of the most important cause of high post neonatal and neonatal mortality rate in developing countries is poor “Maternal Care Receptivity” (MCR), i.e., under utilization of even the existing maternal health services. The main reasons for this under utilization appear to be poverty, illiteracy, ignorance and lack of faith in modern medicine. A comparative study of knowledge, attitude, and practice of perinatal care was conducted amongst 50 untrained and 50 trained traditional birth attendants (TBAs) from two community development blocks of Rewa division in Madhya Pradesh. All the TBAs belonged to Chamar (Cobbler) community, an “impure.” However the trained TBAs differed
from the untrained ones in their knowledge and attitude regarding perinatal care and in their practices of neonatal and puerperal care. Ninety-six percent of the trained TBAs realized need for antenatal care (Mathur et. al., 1983).

2.4 Issues relating to inequality on infant and under-five mortality

India is the country with high level of regional inequality, social hierarchy and multicultural society. With high level of economic and social inequality, health and nutrition inequalities are also pervasive and persistent. In India, child malnutrition is mostly the result of high levels of exposure to infection and inappropriate infant and young child feeding and caring practices, and has its origins almost entirely during the first two to three years of life. However, the commonly held assumption is that, food insecurity is the primary or even sole cause of malnutrition (Gragnolati et. al., 2005). Poor children are consistently at a disadvantage compared with children born to better off families. Socio-economic inequities in child survival exist at each step along the path from exposure, to resistance, to care seeking and to effective treatment. As a result, poor children are more likely than their better off peers to die in childhood (Wagstaff, Bustreo et. al., 2004).

Many studies in the world used economic measures like, concentration indices and curves to measure inequality in various aspects of social life including child mortality. The concentration index (Kakwani, 1977, 1980), which is directly related to the concentration curve, does quantify the degree of socioeconomic related inequality in a health variable (Kakwani, Wagstaff, and van Doorslaer 1997; Wagstaff, van Doorslaer, and Paci 1989). It has been used, for example, to measure and to compare the degree of socioeconomic-related inequality in infant and under-five mortality (Wagstaff, 2000), child immunization (Gwatkin et al., 2003), and child malnutrition (Wagstaff, van Doorslaer, and Watanabe, 2003).

In Indian context there are few studies which mainly devoted to wealth-based inequalities but are limited to anthropometric measures (Smith et. al., 2003),
considered only few states, and the particular period. It is worthwhile to be mentioned here about the study which analyses socioeconomic inequalities in several health outcomes (including child mortality) but the results are derived only on all India basis and no regional or state level estimates are determined (Gwatkin et. al., 2000). Another interesting study which analysed DHS (Demographic and Health Survey) data, estimated the proportion of deaths that would be prevented by improving equity, indicated that if every child in India had the same mortality level as the richest 20% quintile, the overall under-five death rate would be halved (Victoria et. al., 2003). The authors argued that the damaging efforts of poverty on child health could be reduced by Well-designed policies, including improving knowledge and behavior among mothers, social marketing approaches, micro-credit programs, increased affordability of health care, and improved access to clean water and sanitation.

2.5 Issues on projection of infant and under-five mortality against Millennium Development Goals

The Millennium Declaration of the United Nations set 2015 as the time for achieving the Millennium Development Goals (MDGs), which provide quantitative targets for eradication of extreme poverty, hunger, illiteracy, mortality and diseases along with the targets of achieving gender equality and empowerment of women, environmental sustainability and global partnership for development. Scientists and policy makers in different parts of the world have been trying to evaluate and estimate different MDGs in countries during last ten years to understand the gaps or short falls from their respective targets. One such report by, Wagstaff and Claeson (2004) focuses on the health and nutrition MDGs, assesses their progress to date, and analyzes the prospects of achieving these goals. They pointed out that, additional resources, while necessary, will not alone be sufficient in reaching the MDGs. Policies and institutions need to be improved in many countries, and government health spending should be more targeted.
Another study presented the report of the “Child Survival Countdown,” a worldwide effort to monitor coverage of key child survival interventions in the 60 countries that have the world’s highest number or rates of child mortality. Each country was categorized by their progress (as measured by defined indicators of intervention coverage) into one of three groups: “on track,” “watch and act,” and “high alert”. Their findings were that only seven countries are on track to meet MDG No.4. Thirty nine countries are making progress; although they need to accelerate the speed and fourteen countries are cause for serious concern. Although some countries have made substantial improvements, coverage of the key child survival interventions remains critically low, and there are still significant health disparities among different socioeconomic groups (Bryce et. al., 2006). Among the India’s neighboring countries, Bangladesh has evaluated by the World Bank to observe the actual position of different targets (MDGs) over there. The study shows that except maternal mortality, Bangladesh made substantial progress in most of the MDGs and probably will be able to reach the desired targets. For example, the study projected that, child mortality would fall by 52 to 42 per thousand live births and the MDG would be met roughly one year ahead of time (World Bank, 2005). Another successful story may be mentioned here for the country like, Sri Lanka. The infant mortality rate in 1990 in Sri Lanka was 19 deaths per 1,000 live births. Thus the MDG of reducing infant mortality by two-thirds between 1990 and 2015 would translate to an infant mortality rate of about 6 deaths per 1,000 live births. By extrapolating the country’s experience between 1946 and 2000 forward to 2015, the infant mortality rate could be expected to continue to decline to a level of just about 6 deaths per 1,000 live births by 2015. This would mean that Sri Lanka would manage to meet its MD goal by 2015 (World Bank, 2005). The experiences of other countries are also available from various studies (Agénor et al., 2006; White & Blöndal, 2007; Easterly, 2009). The trend for projecting estimates for 2015 suggest India is likely to fall short of the U5MR level of 42 by about 28 percentage points. By United Nations Statistics Division (UNSD) estimates based on country adjusted data, the shortfall is
likely to be less, of the order of 12 percentage points only (MOSPI & CSO, 2009). The UNICEF, India pointed out about the IMR and U5MR pictures during 2008. According to them, IMR and U5MR were 40 and 53 respectively during 2008 and hence it would be very difficult for India to achieve the target of 27 (IMR) and 42 (U5MR) in the year 2015 (UNICEF, 2010).

2.6 Issues relating to efficiency of health care systems

India as a nation has been growing economically at a rapid pace particularly after the advent of New Economic Policy of 1991. However, this rapid economic development has not been accompanied by social development particularly health sector development. Health sector has been accorded very low priority in terms of allocation of resources. It has further witnessed decline during the post economic liberalization period. The minimum resource allocation to health sector has adversely affected both access and quality of health services. In India, healthcare is financed through general taxation and provided through the government healthcare system. However, supply side financing strategy has its own limitations in terms of efficiency and equity. Both allocative and technical inefficiency are commonly observed in supply side financing. For example, as most of the budget goes towards the payment of salaries, there is hardly any money left for purchase of drugs or maintenance of buildings and equipment. Similarly, governments being monopolistic providers, there is no competition, hardly any choice to the patients resulting in services of poor quality and leading to inefficiencies. In addition, supply side financing can result in inequalities in terms of access and utilisation of health services including health outcomes across socio-economic groups. So many researchers have evaluated the performance of health care systems to find out their correlates for inefficiency and backwardness.

Among the various methods of efficiency assessment, Data Envelopment Analysis (DEA) model has gained its importance for a long time. Perusal of the literature on
the health care efficiency suggests that DEA techniques have been utilized for the analytical purpose extensively in general area of health. For example, to assess the efficiency of the hospital sector, DEA has been utilized by Grosskopf & Valdmanis (1987), Hollingsworth & Parkin (1995), Parkin & Hollingsworth (1997), McKillop et al. (1999), Hollingsworth et al. (1999) and others. Apart from the above, DEA models have been used to assess primary health care services (Salinas-Jiménez & Smith, 1996), to measure the efficiency of health maintenance organizations (Roseman et al., 1997), to compare the provision of perinatal services across the United Kingdom (Thanassouli et al., 1995), to compare the education and health efficiency in OECD (Organisation for Economic Co-operation and Development) countries (Afonso and Aubyn, 2005) and to judge the efficiency of government expenditure in Africa (Gupta and Verhoeven, 2001). Spinks and Hollingsworth (2005) assess health efficiency for OECD countries using DEA based Malmquist Indexes.

To assess the comparative effectiveness of health production across 51 developing countries, a model has been developed using DEA approach by Alexander et al. (2003) and also investigated the factors associated with better performance for efficient countries. The study by Afonso and Aubyn (2006) divided the inputs of health production as discretionary and non-discretionary. A DEA semi-parametric model has developed to estimate health production process and output efficiency scores are compared with OECD countries. Using parametric methodology Evans et al. (2000) evaluated the efficiency of health expenditure in 191 countries. In Indian context studies are available on health care efficiency. But these studies devoted their efforts to assess the efficiency of the hospitals in different states of India (Sengupta et. al., 2009; Bhat et. al., 2001; etc.). Very few studies (Purohit, 2010; Dash et.al, 2008) related with health care efficiency are available which consider states of India as the unit of analysis.
2.7 Connection of the present thesis with the existing literature

Perusal of the empirical literature related to present study in Indian context reveals that there are significant gaps existing in the following areas.

- Most of the child survival studies before conduct of National Family Health Surveys (NFHS) related to trends and determinants were based on small samples and substantial variation was observed in design and cause assignment methods. This created difficulties in correlating these previous studies to get an idea about the past trends. Now to determine the impact of child survival programs over time, the availability of comparable data is necessary. In this respect NFHS data serve our purpose. The present study intends to fill this gap of the existing literature by considering a long series of NFHS data for three consecutive surveys like, NFHS - 1, 2 and 3 so that a meaningful trends regarding the determinants of under-five mortality and impact of child survival programme can be assessed.

- Clearly there is a need for further research based on large, representative samples that use multivariate methods to estimate the effects of various socio-economic and demographic parameters on child survival, while controlling for potentially confounding variables by holding them constant. This thesis attempts to explore that area.

- Previous studies on determinants of maternal and child health care utilization in India were either focused on specific states or regions. Little is known from these studies on the state level variations in the use of maternal health care services and correlates of health care use over time. Moreover, at the analytical level, majority of these studies did not control for the confounding effects of important covariates (e.g. childhood background variables). In this study, attempts have been made to bridge these gaps.
• The problem with the current literature is that there are very limited studies examining socioeconomic inequalities in child health in India. Among the available studies, few devoted to wealth-based inequalities but are limited to anthropometric measures, considered only limited states, and the particular period. The present study is an attempt which measures the variation of socioeconomic inequality across the regions and states of India, using different inequality measures frequently utilized by the economists and other social scientists.

• There are several earlier studies which mainly concentrated in projecting different Millennium Development goals of indicators for future attainment and their feasibilities. But most of them applied simple trend analyses for projection of different sets of indicators. However, with respect to India there are very limited studies on the subject of child mortality projection, particularly on the issue of projecting U5MR and IMR in the context of MDGs. Again, these studies are not of recent ones aiming at projection of child mortality using time series data for a substantial period. In our present study time series analysis for forecasting is carried out by applying probabilistic projection which reflects the inherent demographic uncertainty. The present study is advancement from the earlier one in a sense that superior applied econometric techniques are used in mortality forecasting.

• In Indian context there are very few studies, which put their efforts in determination of health efficiency of different states of India. There is hardly any study which compares and exhibit health care performance and efficiency over a time horizon. In the present thesis, a semi-parametric model of the health production process namely, Data Envelopment Analysis (DEA) model is used to measure health care efficiencies of the Indian states during different Five Year Plans. The DEA method provides a nonparametric measure of efficiency without any explicit specification of a criteria function. Different
empirical indicators of efficiency are determined in order to improve the performance of health care system in India.

In this thesis attempt will be made to fill up the gaps in the existing literature and also to find out appropriate policies as a commitment to equity and social justice for socio-economic development in the country like India.