CHAPTER III

RESEARCH METHODOLOGY
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“Infant mortality rate (IMR), a measure of child survival, is considered to be one of the strongest indicators of a country’s wellbeing, as it reflects social, economic and environmental conditions in which children (and others in society) live, including their health care.”


3.1. Introduction

The purpose of this chapter is to address the research foundation and methods used in this study. Items that will be addressed include the research design, population and sample, instrumentation, reliability and validity of the instrumentation, data-gathering procedures, and the method of statistical analysis and the development of the model to identify the mediating effects on infant mortality rate in Tamilnadu.

3.2. Measurement of the Infant Mortality Rate

Barometer of socioeconomic development level, infant mortality reflects changes in living conditions. The interrelatedness of infant mortality (evolution) and socioeconomic is already widely demonstrated. Level of education, unemployment rate, household conditions and ethnicity are known for playing an important part in the existence of geographical disparities in infant mortality rate (Cadwell, 1990; Rosicova et al., 2010;
Different geographic areas imply: different socioeconomic status, different access to health services, and, different infant mortality rates (Chen, Matthews & Boyce, 2002; Norman et al., 2008). In this context, spatial analysis of infant mortality variations is becoming an important tool needed to identify spatial patterns and decrypt sources of heterogeneity (Comber, Brunson & Radburn, 2011).

Education is one key determinant of health and its positive effects on health outcomes are well known (Cammu et al., 2010). Of all indicators we used to assess their contribution to infant mortality, education has been found to have the most powerful impact in Romania. Although the relationship between educational attainment and infant mortality variations in specific geographical areas can be difficult to map, as showed in the results section, similarities high percentage of population with no education high infant mortality rates, exist at district and municipality level. Education, occupational status and income combined with local factors affect the distribution of infant mortality rate at different geographic scale. Regions characterized by lower income levels, high unemployment rates and lower educational attainment, have lower development levels, tend to invest fewer resources in the health care system and infant mortality levels reflects socioeconomic conditions that are describing areas of interest. Geographic dimension of infant mortality rate implies various distribution, territorial disparities and different types of evolution (Kleinman, Feldman & Mugge,
Our research pointed out that distinctive spatial tendencies with specific pace of evolution are realities, at national, as well at sub national level. Identification and understanding of geographic inequalities of infant mortality rate becomes an important mechanism needed in any study that aims a thorough analysis of causalities. Spatial analysis is an important tool for every study that aims to detect possible sources of heterogeneity or spatial patterns. Cartographic representation opens up the possibility to assess infant mortality with respect to local factors (Rytkönen, 2004). Analysis of infant mortality evolution and interpretation of its variations at different geographical levels it is an objective that requires much attention and implies the decryption the sensitive connections that exist with local environment. Analysis conducted at national and district levels have suggested that infant mortality variation is a result of socio-demographic, economic and environmental factors; each and every one is playing a different part in the spatial disparities (Sousa, Hill & Dal Poz, 2010).

It is probable that a significant proportion of the remaining obstetric morbidity is related to the social and psychological background and lifestyle of pregnant women. These factors include socio-demographic characteristics of the woman (Dott & Fort 1975; Brennan & Lancashire 1978; Hendershot 1979; Osbourne et al. 1981; Robinson et al. 1982; Naeye & Peters 1982; Carn-Hill et al. 1983; Murphy et al. 1984; Ericson et al. 1984), her attitude to the pregnancy (Heinstein 1967; Pohlman 1969; Laukaran & van den Berg 1976).
her mental health state (Gunter 1963; Nuckolls et al. 1972; Jones 1978; Standley et al. 1979; Newton et al. 1979), and such behavioural factors as cigarette smoking (Meyer et al. 1976; Rantakallio 1979; Harlap & Shiono 1980), alcohol consumption (Jones et al. 1974; Hanson et al. 1976; Ouellette et al. 1977; Olegsard et al. 1979; Harlap & Shiono 1980; Kline et al. 1980; English & Bower 1983), analgesic use (Turner & Collins 1975) or the decision to work during pregnancy (Waldron et al. 1982; Chamberlain & Garcia 1983; Mamelle et al. 1984). The generic "stress" or "anxiety" construct was formulated from several instruments or variables: a measure of pregnancy symptoms; a stress measure which is a modification of the Life Events Inventory (Holmes and Rahe 1967), which includes items from the Hassles Scale Anxiety Scale Questionnaire (Calteli 1957); four separate subscales (Maternal Attitude to Pregnancy Instrument) (Blau et al. 1964). Self esteem was assessed by the Rosenberg instrument (Rosenberg 1965); loci of control, by the sex role attitudes were evaluated by the Cole instrument (Cole 1979).

The social and economic factors played an important role in determining child survival all over the world (Shawky, 2001). Education has an implicit effect on the health of children, where health is interpreted in its broadest sense as complete physical, psychological, social, emotional, developmental and environmental well-being. Unemployment is an important measure of the economy’s strength, in addition to GDP per capita and level of poverty
Early marriage and consanguineous marriage are considered as intermediate factors, which affect both the socioeconomic condition and infant mortality (Bildirici et al., 2009; Othman and Saadat, 2009; Weinreb, 2008). Previous research studies indicated also the high percentage of early teenage marriages among Arab countries.

Most of young mothers were illiterate, housewives and grand ‘multipara’ (Hussain, 1999). Consanguineous marriage, particularly first cousin couples, has higher rates of stillbirths and more deaths in infancy (Cherkaoui et al., 2009; Kerkeni et al., 2007). There are also other factors affecting the survival of children, such as maternal birthplace, marital status, tobacco and etc. (El-Sayed and Galea, 2009). Many studies have been performed in the Arab region emphasizing the need for continuing efforts to improve infant health and reduce infant mortality (Shawky, 2001). This study aims to identify the association of socio-economic differences and infant mortality in the Arab World and assesses the magnitude of changes which occurred during the last two decades (1990-2009).

The early marriage had a significant association with the infant mortality rate. Parents choose to marry off their daughters early for a number of reasons. Poor families may regard a young girl as an economic burden and her marriage as a necessary survival strategy for her family. They may think also that early marriage offers protection for their daughter from the dangers
of sexual assault. But, early marriage can have serious harmful consequences for girls, including deepening psychosocial and emotional consequences and denial of education. Once married, girls tend not to go to school (Shawky and Milaat, 2000; Bittles et al., 1991). Poverty was associated with an increased risk of infant death; there is an inverse relation between infant mortality and income level. Lots of research studies proved the affects of economic factors on infant mortality (Jahan, 2008; Schell et al., 2007; Kiryskos, 1982). Our study showed a marked variation in the economic situation within the Arab World. The GPD per capita and below poverty line showed a significant relationship with infant mortality during the last two decades. The unemployment rate was relatively high within the Arab region, but there was no significant relationship with infant mortality. This is probably due to the rather small differences in the unemployment rate among those countries. The unemployment does not reflect the actual condition for economic status in the Arab countries, because employment does not mean a good economic condition there. The average of salaries in Arab countries is low. So we found that a high percentage of employment was classified under below poverty. Finally, our study showed the relationship between the socioeconomic factors and infant mortality at two cut points of time 1990 to 2009. In recent years a handful of key epidemiological studies have generated discussion on the application of econometric methods to overcome its associated problems (Briscoe, Akin et

3.3. Reflective Research Formation Studies

The following table (table 3.1) conducted a comprehensive study to review 19 models of reflective research formations of service quality used till now in different studies in order to measure the service quality in different service environment. These studies showed that there is a significant association between service quality and customer satisfaction.

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Service Quality Model</th>
<th>Author</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Technical and Functional Quality Model</td>
<td>Gro’rnoos, 1984</td>
</tr>
<tr>
<td>2.</td>
<td>GAP Model</td>
<td>Parasurman et. al. 1985</td>
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<tr>
<td>3.</td>
<td>Attribute Service Quality Model</td>
<td>Haywood-Farmer, 1988</td>
</tr>
<tr>
<td>4.</td>
<td>Synthesized Model of Service Quality</td>
<td>Brogowicz et. al., 1990</td>
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<tr>
<td>5.</td>
<td>Performance Only Model (SERVPERF)</td>
<td>Cronin and Taylor, 1992</td>
</tr>
<tr>
<td>6.</td>
<td>Ideal Value Model of Service Quality</td>
<td>Mattsson, 1992</td>
</tr>
<tr>
<td>7.</td>
<td>Evaluated Performance and Normed Quality Model</td>
<td>Teas 1993</td>
</tr>
<tr>
<td>8.</td>
<td>IT Alignment Model</td>
<td>Berkley and Gupta, 1994</td>
</tr>
<tr>
<td>9.</td>
<td>Attribute and Overall Affect Model</td>
<td>Dabholkar, 1996</td>
</tr>
<tr>
<td>10.</td>
<td>Model of Perceived Service Quality and Satisfaction</td>
<td>Spreng and Mackoy 1996</td>
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<tr>
<td>11.</td>
<td>PCP Attribute Model</td>
<td>Philip and Hazlett 1997</td>
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<tr>
<td>12.</td>
<td>Retail Service Quality and Perceived Value Model</td>
<td>Sweeney et al., 1997</td>
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<tr>
<td>15.</td>
<td>Internal Service Quality Model</td>
<td>Frost and Kumar, 2000</td>
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<td>16.</td>
<td>Internal Service Quality DEA Model</td>
<td>Soteriou and Stavrinides, 2000</td>
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<td>17.</td>
<td>Internet banking model</td>
<td>Broderick and Vachirapornpuk, 2002</td>
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<td>18.</td>
<td>IT Based Model</td>
<td>Zhu, et.al. 2002</td>
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<td>19.</td>
<td>Model of service quality</td>
<td>Santos, 2003</td>
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</table>

Source: See References

The above table 3.1 shows the comprehensive study to review 19 models of reflective research formations of service quality used till now in different
studies in order to measure the service quality in different service environment. These studies showed that there is a significant association between service quality and customer satisfactions for the sustainability of market economy.

3.3.1. Formative Research Model

The conducted research is basically a survey on the Mediating Effects for Infant Mortality Rate in Tamilnadu, India. For this research, Tamilnadu state was selected. Since the research is constructed on the basis of formative research model.

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<thead>
<tr>
<th>SL.No</th>
<th>Model</th>
<th>Authors</th>
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<tbody>
<tr>
<td>5)</td>
<td>SF-Cost Model (Share Holders Funds Model)</td>
<td>Arulraj. A and Sarangarajan. V 2010</td>
</tr>
<tr>
<td>7)</td>
<td>FERTQUAL Model (Fertilizer Retail Service Quality Model)</td>
<td>Arulraj. A. and Sukumaran. A 2010</td>
</tr>
<tr>
<td>21)</td>
<td>MEDIATING CASUS FOR HIGH LEVEL OF INFANT MORTALITY RATE Model</td>
<td>Arulraj. A and Manikandan. S. 2015</td>
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Source: See Reference

## 3.4. Literature on Various Dimensions

### 3.4.1. Conceptualization of Quality within Hospitals

A number of researchers have attempted to address the problem of defining service quality within the hospital context and developing or adapting an instrument to measure specifically hospital service quality. Coddington and Moore (1987) suggest that the top five factors that define quality for healthcare providers from a consumer's perspective are (a) warmth, caring, and concern, (b) medical staff, (c) technology equipment, (d) specialization and scope of services available and (e) outcome.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) (1996) identifies nine quality dimensions for hospitals, (1)
Efficacy, (2) Appropriateness, (3) Efficiency, (4) Respect and caring, (5) Safety, (6) Continuity, (7) Effectiveness, (8) Timeliness and (9) Availability. Carman, (1990) Ford, Bach, and Fottler (1997), and others suggest that service specific dimensions would need to be added to the five SERVQUAL dimensions to completely address the patients definition of quality in the healthcare industry. Scardina (1994) evaluated SERVQUAL for use in assessing patient satisfaction with nursing care. However her sample size was limited (n = 10) and content and face validity were determined by only three experts in a single hospital. Patients were not involved in the determination of the validity of the instrument in this application. Minjoon, Peterson, and Zsidisin's (1998) focus group studies reflected the SERVQUAL dimensions along with dimensions identified by Bowers, Swan, and Kohler (1994) the limitation of their study was its scope and small sample size (n = 16), (Bemowski 1992) Reeves and Bednar identified the roots of quality as excellence, value, conformance to specifications, and meeting and/or exceeding customers’ expectations (Reeves and Bednar 1994).

3.4.2. Medical Services

In 1998, the enactment of Title VIII, Nursing Workforce Development (Health Professions Education Partnerships Act of 1998, P.L. 105-392, November 13, 1998) focused federal attention on the quality of education programs supported by this Title. As part of the implementation of this
legislation, in August 2000, the Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Division of Nursing, funded this project. The National Organization of Nurse Practitioner Faculties (NONPF) and the American Association of Colleges of Nursing (AACN) directed this project to develop national, consensus-based, nurse practitioner primary care competencies in the specialty areas of adult, family, gerontological, pediatric, and women’s health practices. The project was undertaken to lay the foundation for identification of competencies in all areas of nurse practitioner primary care practice, promoting high quality and consistency in educational programs.

In 1990, NONPF released the first set of core competencies for all nurse practitioner graduates within a framework of five domains and corresponding competencies. These competencies evolved from the work of Patricia Benner (1984), who described domains and competencies for advanced nursing practice, and the research of Karen Bryckzynski (1989), who explored the clinical practice of nurse practitioners. NONPF adapted the domains from Bryckzynski and incorporated additional nursing literature to develop and further identify nurse practitioner competencies. With input from a coalition of 14 different nursing organizations and extensive input from nurse practitioner faculty, NONPF updated the core competencies and program standards for nurse practitioner education in 1995. This work featured the addition of one domain and new competencies. Further
updated of the core competencies in 2000 by NONPF resulted in the identification of a seventh domain. The core competencies for nurse practitioner graduates build upon nursing knowledge and require graduate level education to achieve an advanced level of nursing practice. AACN outlined this graduate curriculum foundation for advanced practice nursing (AACN, 1996). As described by AACN, advanced practice nursing preparation includes graduate nursing core content (e.g., research, health policy, ethics, and more) and advanced nursing practice content (e.g., advanced health assessment, advanced physiology and path physiology, and advanced pharmacology).

Specialty content for nurse practitioner education focuses on diagnosis and management content appropriate to the population served, clinical practice, and the role of the specialty area. Several professional nurse practitioner and nursing organizations, as well as the federal government, are interested in the identification of competencies or guidelines in various specialty areas of nurse practitioner practice as a means of designating educational outcomes to promote patient safety. Until now, national, consensus based competencies for these nurse practitioner specialties did not exist. This project resulted in the first time availability of comprehensive competencies for the five primary care specialties that describe over 80 percent of all nurse practitioner graduates.
Although overall literacy has improved in the post independence period in India, the rate of increase has not been sufficient to reduce the number of illiterates over time. This is more so in female literacy. One of the reasons for failure to achieve significant reduction in infant mortality rate, despite widespread network of Maternal and Child Health (MCH) services, could be low levels of female literacy in India. Results of several micro and macro level studies point out strong influence of the low level of female education on child mortality in developing countries. Perhaps, influence of female literacy on infant mortality rate operates through use of MCH services. Several studies have shown that prenatal care is dependent on maternal education. Such studies are scarce in India, and those available examined the effect of female literacy on infant mortality rate rather than on use of MCH services. In the Indian context, it may be worthwhile to investigate the synergistic effect of male literacy because women of poor communities rarely have any decision making power.

3.4.3. Service Quality vs. Healthcare Services

Service quality which can be viewed as one of the important factors in business management has been extensively discussed and emphasized within both the academic and commercial fields (Chen and Chen, 2010; Liu and Tsai, 2010). The definition of service quality is the customer’s overall impression or assessment concerning the relative inferiority or superiority of the organization and its services (Zeithaml, 1988; Bitner and Hubbert,
It can be measured by the comparison of customers’ expectations with customers’ perceptions of actual service performance (Parasuraman et al. 1985). Customers form expectations prior to their encounter with the services. They develop perceptions during the process of service delivery, and then they compare their perceptions to their expectations in evaluating the outcome of the service encounter. Specifically, service quality means that the service delivery should fulfill customers’ requirements and expectations (Tan et al. 2010). According to aforementioned perspectives, service quality can be viewed as a measurement of how well the service level delivered conforms to customers’ expectations. In terms of healthcare, service quality can be defined as a gap between patients’ expectations and perceptions (Woodside et al. 1989). Expectations are treated as what the patients think should be offered in the medical services, and perceptions can be considered as the evaluation of patients regarding specific medical service attributes relative to their expectations. Operationally, the service quality of hospital depends upon the balance of perceptions and expectations of patients. Moreover, Lytle and Mokva (1992) proposed that service quality satisfies the needs of patients, and patients evaluate a hospital’s service quality from its service output, service process, and physical environment.

3.4.4. Measuring Quality and Satisfaction

The primary means of assessing how patients feel about the care they receive in a healthcare setting is measurement of patient satisfaction.
Measuring satisfaction also serves as an important tool for quality audit and improvement in all types of healthcare organizations. Patients sometimes (or always) have different views from the health professionals when judging the quality of care and services. It is essential to realize the needs of the patients and collect information on services delivery and operations from a patient’s perspective. The results of a patient satisfaction survey can be used to further improve care management and promote the quality of patient outcomes. Lanning (1990) also suggests that to assist purchasers in developing quality outcome measures, healthcare managers should include “patient perceptions” along with technical competence. There should also be a general philosophy that values quality. Other studies have explored the use of patient satisfaction surveys in quality improvement efforts in hospitals and health management organizations. Nelson (1990), examining the application of patient satisfaction in healthcare organizations, concluded that the attributes of patient satisfaction were still ill-defined. Specific attributes included technical competence, outcomes, continuity, patient expectation, non-systematic approaches, and weak methodologies. As a result of the ill-defined nature of healthcare attributes, these attributes tend to be ineffective for use in total quality improvement efforts. However, other studies suggest that satisfied patients are more likely to continue using medical care services when compared to unsatisfied patients (Ware et al., 1975; Thomas and Penchansky, 1984), better comply with medical orders (Dimatteo and
DiNicola, 1983), and maintain relationship with a specific provider (Marquis, 1983). The proposed models takes into account the impact performance factors (quality and cost) have on patient loyalty and consumer long term value.

3.4.5. Quality of Services

The provision of quality services requires in addition to infrastructure and human resources, proper equipment, drugs and supplies, an efficient organization of work and a high level of motivation and a consciousness about quality. It is also important to observe how affordable the services were in the public sector. And finally there is the issue of how women friendly and child friendly the hospital is, with affirmative action to ensure that there are no social barriers or processes of exclusion that are keeping out the poor and marginalized. While the States should be allowed flexibility, quality assurance should be standardized across all the States (FYP).

Quality of Care the Availability of Medicines: Expenditure on drugs and supplies increased and availability of drugs also increased but high out of pocket expenditure continues. Only Tamil Nadu and to some extent Kerala have curbed out of pocket expenditure on drugs in the public hospital significantly. Part of this is due to the procurement and logistics systems in place organized by the TNMSC. Kerala now has a similar model in place.
Maharashtra, Karnataka, Andhra Pradesh, Punjab, Delhi and West Bengal have similar systems of drug procurement in place, and this is welcome for it leads to better quality and costs of drugs purchased. But it still does not lead to reduced Out of Pockets on drugs in the public hospital and uninterrupted supplies of drugs in the facilities because the entire procurement system is not automatically responsive to the actual consumption of drugs. Tamilnadu system is logistics driven with facilities indenting from district warehouses in response to their needs such that at all times they have a buffer stock and district warehouses maintaining a three month stock of every drug on the essential drug list, with orders placed as and when a district warehouse stock falls below the threshold level. The Eleventh five year Plan period has been a period of increasing advocacy for a Tamilnadu medical service like system not only of procurement but also of drug logistics. The Twelfth five year plan must aim to ensure that this is now implemented in all states.

Quality of care Diagnostics: User fees need to be rationalized in both inpatient care and diagnostics. Exemption for the BPL, senior citizens, pregnant women and newborn should be provided both in registration fee and at the diagnostic laboratory, the range of diagnostics available need to be significantly expanded. The Twelfth five year plan must move towards reduction of out of pocket expenditure on account of drugs and diagnostics and make available a wide range of supplies in these areas.
Quality Improvement Approaches: In the eleventh five year plan period a number of measures was tried to improve quality of care. This was based on an understanding that even with available inputs, at the level of the hospital there were many management steps that could improve quality of care. Patient satisfaction often related to the dignity with which they were treated and to basic amenities in the hospitals which the untied funds were to be used for. The most widespread approach to quality in this plan period was the creation of quality assurance committees which would use a check list to monitor for quality gaps. With few exceptions, this approach did not sustain or gain the necessary importance it needed nor have measurable impacts. They were indistinguishable from routine monitoring. The major reason for this was lack of adequate professional set up of quality assurance cells at State and District level. For sustainability of quality in the service provision it is essential that States should have their own quality assurance mechanism. The quality assurance cells at State and district level needs to be strengthened in Twelfth Five Year plan The other was a number of hospitals taken up for National Accreditation Board of Hospitals (NABH) in a number of states Kerala, Gujarat, Madhya Pradesh to name a few. However except for two or three hospitals across the country, most never got accredited and the high degree of inputs needed to get NABH and to sustain such an accreditation was prohibitive. Another approach which was piloted by NHSRC approach built on the ISO system adding 24 state governments
NHSRC specified mandatory processes which were to be audited. Currently over a 100 facilities are certified and another 500 are in the pipeline.

Quality Certification: The Twelfth Plan should encourage quality certification of public hospitals. One type of certification involves certification of quality of care in terms of the input standards infrastructure, human resources, drugs and equipment and the outputs in terms of package of services available. This is certification for the achievement of Indian Public Health Standards (IPHS). Another form of certification relates to the organization of work and processes central to providing ethical, efficient and effective quality care, and such certification is relatively independent of the level of inputs. It only certifies that there is a quality management system in place which ensures the best quality of outputs for the level of inputs currently available. Quality certification should not remain limited to standards of infrastructure but it should have thrust on comprehensive in-house quality assurance for both infrastructural and service delivery. A good quality service delivery should be first certified by district and State quality assurance cells/committees before any third party certification.

Women Friendly Hospitals: There has been a greater awareness of the need to make hospitals more women friendly and baby friendly, and Common Review Missions (CRMs) show modest improvements in this dimension. Where they are put in place, Accredited Social Health Activist (ASHA) help
desks provide valuable services to the patient in guiding them through the hospital. These initiatives needs to be further strengthened. There is a role for non-governmental partnerships with activists groups and ASHAs and their support structure to provide such a facilitator service in all public hospitals.

Assured Services Building A District Road Map: The Twelfth Plan thus envisages that every district would announce as part of its five year strategic district plan, the package of services each facility would guarantee such that taken together the district health system would ensure universal access to a good quality of comprehensive Reproductive and Child Health (RCH) services, emergency care and trauma related services, infectious diseases management and chronic disease management. Such a district plan would become the instrument to be used for programme audit by the government and for social audit and community monitoring purposes.

Assured Services Balance between Preventive, Primary and Secondary Care: In each of the four health service areas RCH, emergency services, infectious disease and chronic disease the emphasis and major expenditure of the plan should be on primary prevention and then on primary healthcare and secondary prevention. This would be the most cost effective approach in a situation where the district health system has to pay for the primary, secondary and tertiary care costs. For example in emergency care,
prevention of road traffic accidents or burns is the priority but were it to happen, quick transport to facilities where trauma care is well publicized and known to be available, through an emergency response system is essential.

3.5. Some Aspects of Economic Backwardness and Its Relationship to High Level of IMR in Tamilnadu.

Access to healthcare is critical to improving health status and good health is necessary for empowerment. Rural healthcare services suffer from a shortage in public sector infrastructure. Majority of women from rural areas are working in the unorganized sector and are paid less. They are suffering from many hazardous diseases and their health status is degrading. The low priority accorded to women's health is reflected in patterns of healthcare utilization. All health services and programmes of PHC are directly or indirectly related to the women’s health. They are playing an important role to improve the health status of women. The present study is focused on Tamilnadu state, and it is given representation of the various Primary Health Centre where the medical facilities are available in 24x7 services. Even though there is affected by infant mortality in this study area. The results showed that age, education, occupation and monthly income emerged as a significant factor and had positive impact on utilization of healthcare services among the respondents. The pattern of utilization of healthcare also varies with age. Only household size had negative impact on accessing the healthcare services because in a large family if the income is less it reduced
chances of utilizing healthcare services. The rural women are suffering from various diseases like anemia diabetics, blood pressure, etc. Utilization of medical facilities has to be brought home to the rural people through the primary healthcare services. This centre plays very crucial role in protecting the rural health particularly health of women. This primary health centre helps rural pregnant women in monthly check up and other treatments.

The “HIGH INFANT MORTALITY RATE” Mediated Model includes the measurement of sub dimensions of High Infant Mortality Rate as follows:

I. Practitioner Services (PS): Medical Records (MS1), Pharmacy Services (MS2), Medical Equipment (MS3), Doctors Services (MS4), Nursing Services (MS5) and Insurance Coverage Facilities (MS6); II. Outpatients (OP): Seating (OP1), Waiting (OP2), Emergency Services (OP3), Diagnostic Services Locations (OP4), Cleanliness of Outpatients departments (OP5), Public Toilets (OP6), Wheel Chair/Stretcher (OP7) Restaurant (OP8) and Lab Facilities(OP9); III. Inpatients (IP): Room Space, Amenities and Furniture (IP1), Lighting (IP2), Wall Colour (IP3), Bath/Toilet Facility (IP4), Hot Water Facilities (IP5), Attenders (IP6), Diet Services (IP7), Housekeeping (IP8) and Lab Facilities(IP9); IV. Social Problems (SP): Child Marriage (SP1), Gender Discrimination (SP2), Less interest on Female Baby (After Scanning) (SP3), Caste (SP4), Religion (SP5), Social Structure (SP6), Cultural Norms (SP7), Value System (SP8)
Inter-Caste Marriage (SP9) and Cultural Shift (SP10); **V. Infrastructure**

Facilities (IF): Ambulance Services (IF1), Hospital Infrastructure (IF2), Poor Sanitation (IF3), Hygiene (IF4), Safe Drinking Water (IF5), Distance of Hospital Services (IF6), Distance of Hospital Location (IF7), Distance of Ambulance Services 15 km (IF8) and Lack of Transport Facilities (IF9); **VI. Psychological Discomfort (PD):** Emotion (PD1), Social Problems (PD2), Financial Problems (PD3), Husband (PD4), Mother-in-law (PD5), Relatives of Husband’s Family (PD6), Lack of Parents Support (PD7), Verbal use by others (PD8), Problems Faced At Work Place Daily (PD9), Sexual Harassment from colleagues and Higher Officials (PD10), Over Crowded Public Transport System (PD11), Lack of Time Management (PD12), Vulnerable to Working Conditions Across Diverse Occupation Informal Sectors (PD13), Varsity of Health Hazards Informal Sectors (PD14), Continually Sexual Inducement by During the Pregnancy (PD15), Continually Drank and Sexual Inducement by During the Pregnancy (PD16) and No Long Gap for Another Baby Birth (PD17); **VII. Economic Problems (EP):** Limited access to Cash and Credit (EP1), Nutrition (EP2), Shift into agrarian Changes (EP3), Migration (EP4), Low Income (EP5) and Industrialization (EP6); **VIII. High Infant Mortality Rate (IMR):** Lack of Knowledge and Skills to Care for New Born Child (IMR1), Breast Feeding Problems (IMR2), Duration of hospital stay normal birth (IMR3), Infant Care, Genital cleaning and ear cleaning (IMR4) and Do you Agree
that above are face cause for High level of Infant Mortality Rate (IMR5);

IX. Medical terms during the pregnancy period (10/10 Rules) (MT):

Eat Five or Six Well-Balanced Meals Each Day (MT1), Take A Prenatal Vitamin Each Day as Directed by Your Obstetrician Or Midwife (MT2), Drink Plenty of Fluids (MT3), Drink Alcohol (Husband) (MT4), Smoking Habits (Husband) (MT5), Exercise (Recommendation for Doctor) (MT6), Get Adequate Sleep (MT7), Wear Comfortable (MT8), Safety Belt While Riding in Motor Vehicles (MT9) and Take Over the Counter Medications or Herbal Remedies (MT10).

3.6. Hypotheses Development

Mediation refers to a process or mechanism through which one variable (i.e., exogenous) causes variation in another variable (i.e., endogenous). Studies designed to test for moderation may provide stronger tests of mediation than the partial and whole covariance approaches typically used (e.g. Baron and Kenny, 1986; Bing, Davison, LeBreton, and LeBreton, 2002; James and Brett, 1984). It is useful to distinguish between moderation and mediation. Moderation carries with it no connotation of causality, unlike mediation, which implies a causal order. Based on the arguments discussed in the previous chapters and this chapter the researcher formulated the following hypotheses.
The dimensions of High Infant Mortality Rate were influenced by the mediating factor Psychological Discomfort.

The dimensions of High Infant Mortality Rate were positively influenced by the Psychological Discomfort.

A mediator hypothesis is supported if the interaction path (PS, OP, IP, SP, IF, PD, EP, and IMR) are significant. There may also be significant main effects for the predictor (High Infant Mortality Rate) and mediator (Psychological Discomfort). Therefore, this research seeks to explore whether the relationship between High Infant Mortality Rate (IMR) and PS,
OP, IP, SP, IF and EP are fully or partially mediated by Psychological Discomfort (PD).

**Hypothesis 1:** The Psychological Discomfort (PD) is mediated through the Practitioners Services (PS) towards attainment of High Infant Mortality Rate in Tamilnadu.

**Hypothesis 2:** The Psychological Discomfort (PD) is mediated through the Outpatients (OP) towards attainment of High Infant Mortality Rate in Tamilnadu.

**Hypothesis 3:** The Psychological Discomfort (PD) is mediated through the Inpatients (IP) towards attainment of High Infant Mortality Rate in Tamilnadu.

**Hypothesis 4:** The Psychological Discomfort (PD) is mediated through the Social Problems (SP) towards attainment of High Infant Mortality Rate in Tamilnadu.

**Hypothesis 5:** The Psychological Discomfort (PD) is mediated through the Infrastructure Facilities (IF) towards attainment of High Infant Mortality Rate in Tamilnadu.

**Hypothesis 6:** The Psychological Discomfort (PD) is mediated through the Economics Problems (EP) towards attainment of High Infant Mortality Rate in Tamilnadu.
**Hypothesis 7:** The Psychological Discomfort (PD) is mediated through the Medical Terms during the Pregnancy Period (10 /10 Rules) (MT) towards attainment of High Infant Mortality Rate in Tamilnadu.

**Hypothesis 8:** The Psychological Discomfort (PD) dimension Practitioners Services (PD) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 9:** The Psychological Discomfort (PD) dimension Outpatients (OP) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 10:** The Psychological Discomfort (PD) dimension Inpatients (IP) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 11:** The Psychological Discomfort (PD) dimension Social Problems (SP) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 12:** The Psychological Discomfort (PD) dimension Infrastructure Facilities (IF) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 13:** The Psychological Discomfort (PD) dimension Social Problems (SP) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 14:** The Psychological Discomfort (PD) dimension Medical Terms during the Pregnancy Period (10 /10 Rules) (MT) positively influences the High Infant Mortality Rate in Tamilnadu.
**Hypothesis 15:** The Psychological Discomfort (PD) mediating dimension High Infant Mortality Rate (IMR) positively influences the High Infant Mortality Rate in Tamilnadu.

**Hypothesis 16:** Including the interaction between dimensions of Psychological Discomfort (PD) will explain more of the variance in High Infant Mortality Rate (IMR) than the direct influence of dimensions of High Infant Mortality Rate in Tamilnadu on their own.

### 3.7. Research Design

The research employed a cross sectional methodological approach. Methodology described as cross sectional “is one used to collect data on all relevant variables at one time” (O’Sullivan and Rassel, 1999). This approach is particularly useful for studies designed to collect information on attitudes and behaviours of large geographically diverse populations (O’Sullivan and Rassel, 1999). The survey design is regarded as the most appropriate research design to measure the perceptions of the respondents in this study. A survey is the most appropriate research design as it can enable the researcher to collect information from a large population. The information obtained from the sample can then be generalized to an entire population (Kerlinger and Lee, 2000). Survey research is usually a qualitative method that requires standardized information in order to define or describe variables or to study the relationships between variables.
Surveys generally fall into one of two categories, descriptive or relational. Descriptive surveys are designed to provide a snapshot of the current state of affairs while relational surveys are designed to empirically examine relationships among two or more constructs either in an exploratory or in a confirmatory manner. The current study is a relational survey that seeks to explore the relationship between the Medical Services (MS), Outpatients (OP), Inpatients (IP), Social Problems (SP), Infrastructure Facilities (IF), Psychological Discomfort (PD), Economic Problems (EP), High Infant Mortality Rate (IMR) and Medical Terms During the Pregnancy Period (10/10 Rules) (MT) Mediating effects on Infant Mortality Rate in Tamilnadu, India.

3.7.1. Pilot Study

Prior to beginning actual data collection with the procedure described above, the researcher utilized similar procedures to conduct a pilot study to ensure that the survey materials and procedure were clear and did not provoke any confusion or problems for participants. The draft questionnaire was eventually subjected to pilot testing with a total of Tamilnadu spread across the Six district and they were asked to comment on any perceived ambiguities, omissions or errors concerning the draft questionnaire. The feedback received was rather ambiguous thus only minor changes were made. For instance, technical jargon was rephrased to ensure clarity and simplicity. The revised questionnaire was subsequently submitted to three
experts (an academician, a researcher and a consultant) for feedback before being administered for a full-scale survey. These experts indicated that the draft questionnaire was rather lengthy, which in fact coincided with the preliminary feedback from mediating effects on infant mortality rate in Tamilnadu, India. Nevertheless, in terms of number of items in the questionnaire, the current study conforms broadly with similar research work (Cronin and Taylor, 1992; Teas, 1993a; Lassar et., al., 2000; Mehta et., al., 2000; Robledo, 2001) that attempted to compare various instruments for measuring mediating factor of Psychological Discomfort for mediating effects on infant mortality rate in Tamil Nadu, India.

3.7.2. Construct Measures and Data Collection

Data were collected by means of a structured questionnaire comprising eight dimensions namely 1) Practitioner Services (PS), 2) Outpatients (OP), 3) Inpatients (IP), 4) Social Problems (SP), 5) Infrastructure Facilities (IF), 6) Psychological Discomfort (PD), 7) Economic Problems (EP) 8) High Infant Mortality Rate (IMR) and 9) Medical Terms During the Pregnancy Period (10/10 Rules) (MT). Practitioner Services (PS) consists of Six Questions, Outpatients (OP) consists of Eight Questions, Inpatients (IP) consists of Eight Questions, Social Problems (SP) consists of Eleven Questions, Infrastructure Facilities (IF) consists of Nine Questions, Psychological Discomfort (PD) consists of Seventeen Questions, Economic Problems (EP) consists of Six Questions, High Infant Mortality Rate (IMR) consists of Five
Questions and Medical Terms During the Pregnancy Period (10 /10 Rules) (MT) consists of ten Questions. Finally in the twenty three Questions pertaining to respondents demographic profile information was given. All the dimensions were presented as statements on the questionnaire, with the same rating scale used throughout and measured on a seven point, Likert-type scale that varied from 1 highly dissatisfied to 7 highly satisfied and Strongly Disagree to Strongly Agree. For conducting an empirical study, data were collected from pregnant women households at Tamilnadu. A total of 1200 nos. of questionnaire were circulated to pregnant women households of the four region at Tamilnadu of these 1200 were collected. Hence, the sample size for the analysis is 1200. The following table (table 3.3) gives a view of the sample size across the Tamilnadu, india on High Infant Mortality Rate.

<table>
<thead>
<tr>
<th>Village Region</th>
<th>Chennai Region</th>
<th>Madurai Region</th>
<th>Trichy Region</th>
<th>Kovai Region</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>East</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>Centre</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>West</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>North</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>1200</td>
</tr>
</tbody>
</table>

Source: Primary Data

The sampling procedure used for the study was stratified random sampling. The stratification has been done based on the four region are Chennai, Madurai, Trichy and Kovai for the nature of region South, East, Centre, West and North while selecting the groups from each category, non-
probabilistic convenience and judgmental sampling technique was used. However, within such Taluk, the pregnant women households were selected by stratified random sampling. The data collected were analyzed for the entire sample.

3.7.3. Respondent’s Characteristics

The demographical characteristics of the sample of pregnant women households are presented in order to get a clear picture of the sample. Demographic variables that were measured from the pregnant women households were as follows:

1. Name
2. Age
3. Educational Qualification
4. Occupation
5. Religion
6. Annual Income
7. Community
8. Types of Family
9. Residential House
10. Types of House
11. Size of Landholding
12. Toilet Facilities
13. Recommendation of Hospital
14. Types of Hospital
15. Medical Insurance
16. Any Infant Death
3.8. Procedure for Data Analysis

The data collected were analysed for the entire sample. Data analyses were performed with Statistical Package for Social Sciences (SPSS) using techniques that included descriptive statistics, Correlation analysis and Analysis of Moment Structures (AMOS) package for Structural Equation Modeling and Bayesian estimation and testing.

3.8.1. Structural Equation Modeling

The main study used Structural Equation Modeling because of two advantages: “(1) Estimation of Multiple and Interrelated Dependence Relationships and (2) The Ability to Represent Unobserved Concepts in These Relationships and Account for Measurement Error in the Estimation Process” (Hair et al., 1998). Therefore simultaneously estimated multiple regressions; the direct and indirect effects were identified (Tate, 1998). However, a series of separate multiple regressions had to be established based on “theory, prior experience, and the research objectives to distinguish which independent variables predict each dependent variable” (Hair et al., 1998). In addition, because SEM considers a measurement error, the reliability of the predictor variable was improved. AMOS 7.0 (Arbuckle and Wothke, 2006), a computer program for formulating, fitting and testing Structural Equation Models (SEM) to observed data was used for SEM and the data preparation was conducted with SPSS 13.0.
Linear Structural Equation Models (SEMs) are widely used in sociology, econometrics, management, biology, and other sciences. A SEM (without free parameters) has two parts: a probability distribution (in the Normal case specified by a set of linear structural equations and a covariance matrix among the “error” or “disturbance” terms), and an associated path diagram corresponding to the causal relations among variables specified by the structural equations and the correlations among the error terms. It is often thought that the path diagram is nothing more than a heuristic device for illustrating the assumptions of the model. However, in this research, the researcher will show how path diagrams can be used to solve a number of important problems in structural equation modeling. Structural Equation Models with latent variables (SEM) are more and more often used to analyse relationships among variables in marketing and consumer research (see for instance Bollen, 1989; Schumacker and Lomax, 1996, or Batista-Foguet and Coenders, 2000, for an introduction and Bagozzi, 1994 for applications to marketing research). Some reasons for the widespread use of these models are their parsimony (they belong to the family of linear models), their ability to model complex systems (where simultaneous and reciprocal relationships may be present, such as the relationship between quality and satisfaction), and their ability to model relationships among non-observable variables (such as the domains in the High Level of Infant Mortality Rate Model) while taking measurement errors into account (which are usually sizeable in
questionnaire data and can result in biased estimates if ignored). As is usually recommended, a Confirmatory Factor Analysis (CFA) model is first specified to account for the measurement relationships from latent to observable variables. In our case, the latent variables are the four perception dimensions and the observed variables the 30 perception items. The relationships among latent variables cannot be tested until a well-fitting CFA model has been reached. In our case, the relationships among mediating effects on Infant Mortality Rate in Tamilnadu, the mediating impact of Psychological Discomfort (PD) with the PS, HSO, HSI, SP, IF, EP dimensions are of interest. This modeling sequence stresses the importance of the goodness of fit assessment. As a combination of regression, path and factor analyses, in SEM, each predictor is used with its associated uncontrolled error and, unlike regression analyses; predictor multi-collinearity does not affect the model results.

3.8.2. Evaluation of Model Fit

According to the usual procedures, the goodness of fit is assessed by checking the statistical and substantive validity of estimates, the convergence of the estimation procedure, the empirical identification of the model, the statistical significance of the parameters, and the goodness of fit to the covariance matrix. Since complex models are inevitably misspecified to a certain extent, the standard \( \chi^2 \) test of the hypothesis of perfect fit to the population covariance matrix is given less importance than measures of the
degree of approximation between the model and the population covariance matrix. The Root Mean Squared Error of Approximation (RMSEA) is selected as such a measure. Values equal to 0.08 or lower are generally considered to be acceptable (Senthilkumar.N and Arulraj.A, 2011; Browne and Cudeck, 1993). The sampling distribution for the RMSEA can be derived, which makes it possible to compute confidence intervals.

These intervals allow researchers to test for close fit and not only for exact fit, as the $x^2$ statistics does. If both extremes of the confidence interval are below 0.08, then the hypothesis of close fit is rejected in favour of the hypothesis of better than close fit. If both extremes of the confidence interval are above 0.08, then the hypothesis of close fit is rejected in favour of the hypothesis of bad fit. Several well-known goodness-of-fit indices were used to evaluate model fit: the chi-square, The Comparative Fit Index (CFI), The Unadjusted Goodness-of-Fit Indices (GFI), The Normal Fit Index (NFI), The Tucker-Lewis Index (TLI), The Root Mean Square Error of Approximation (RMSEA) and The Standardized Root Mean Square Error Residual (SRMR).

3.8.3. Bayesian Estimation and Testing in SEM

With modern computers and software, a Bayesian approach to structural equation modeling (SEM) is now possible. Posterior distributions over the parameters of a structural equation model can be approximated to arbitrary
precision with AMOS, even for small samples. Being able to compute the posterior over the parameters allows us to address several issues of practical interest. First, prior knowledge about the parameters may be incorporated into the modeling process in AMOS. Second, we need not rely on asymptotic theory when the sample size is small, a practice which has been shown to be misleading for inference and goodness-of-fit tests in SEM (Boomsma, 1983). Third, the class of models that can be handled is no longer restricted to just identified or over identified models. Whereas each identifying assumption must be taken as given in the classical approach, in a Bayesian approach some of these assumptions can be specified with perhaps more realistic uncertainty.

3.9. Conclusion

In this chapter the research methodology adopted for this research was explained with the research design followed by the explanation of the population and the sample, Patients’ characteristics, survey instruments and scoring procedures, data collection procedure and data analysis were briefed respectively. In the following chapter the developed hypotheses will be empirically tested.