Methodology deals with the process of obtaining information through empirical observations and logically related propositions for testing the causal relationship among the variables. It is a guiding principle or blueprint for conducting any social research and makes the study more scientific and realistic. Methodology also deals with various processes involved in conducting the survey, which are:

1. Objectives
2. Hypotheses
3. Conceptual model
4. Sample design and size
5. Preparation of interview schedule
6. Interview process
7. Data collection
8. Measurement of variables
9. Data analysis, and
10. Limitations of the study
OBJECTIVES

The present study aims at investigating the socio-cultural and health determinants of infant mortality among Sugalis (a tribe) in Anantapur district of Andhra Pradesh. Several major related and relevant objectives for the population under the study have been considered on the following lines:

1. To examine the influence of socio-economic factors on prevalence of infant mortality.
2. To investigate the inter-relationship between demographic factors and infant mortality.
3. To understand the effect of cultural factors on prevalence of infant mortality.
4. To analyse the impact of health factors on survival of the infants.
5. To explore the relationship between nutritional and breast feeding practices and prevalence of infant mortality.
6. To assess the level of infant mortality among Sugali tribe in the study area.
7. To identify the major causes of mortality among the infants.
HYPOTHESES

In accordance with the above objectives, findings of the earlier studies, theoretical framework, and also in consultation with the experts in the field, the following hypotheses are generated for empirical validation in the present study:

a. The level of education of mothers has a negative relationship with infant mortality.

b. The prevalence of infant mortality is expected to be higher among agricultural and non-agricultural labourers as compared to cultivators and others engaged in trade/business.

c. Higher household income or better socio-economic status of the family will be associated with lower risk of infant mortality.

d. Manifestation of higher social status of women in the family is associated with greater survival of infants.

e. Age at marriage/child birth may exhibit a negative relationship with the prevalence of infant mortality i.e., higher the age at marriage/child birth, lower will be the infant mortality.

f. Shorter the duration of birth interval (between the two successive births), greater will be the risk for the survival of infants.

First and the higher order of birth (beyond four) have higher risk of infant mortality.
h. Higher the prevalence of infant mortality, higher will be the desire of the parents to replace the infant deaths with additional live births.

i. Infant mortality will be higher for the mothers who had deliveries at their own homes and attended to by indigenous dais or unqualified personnel as compared to whose deliveries were held at health centres or hospitals and conducted by the qualified personnel.

j. Timely and continuous ante-natal and post-natal care of mothers may promote the chances for survival of infants.

k. Generally those who choose home-remedies, indigenous treatment or superstitious methods of treatment during illness of infants will have higher infant mortality, rather than those who adopt scientific method of medicine i.e, proper utilization of modern medical services.

l. Delayed initiation of breast feeding, unhealthy practices with regard to the introduction of pre-lacteal and supplementary foods will be adversely effected on the survival chances of infants.

m. Longer duration of breast feeding reduces the risk of infant mortality.

n. The better the quality of overall sanitation in and around the house, the lower will be the prevalence of infant mortality.
In addition to these major hypotheses, a few more of them have been tested under different sections.

CONCEPTUAL FRAME WORK

Child survival and mortality will be influenced by several factors which have been listed out in several conceptual models by many social scientists (Preston, 1976; Mosley, 1983; Chen, 1983; Ruzicka, 1983; and Mahadevan, 1984). Out of these conceptual models the one by Mahadevan (1984) has covered several variables that have been identified from the developed and developing countries (see Fig. 1). It has the advantage of choosing a limited number of homogeneous factors out of the twelve groups of variables that he has specifically listed out in this analytical frame work. Also, the causal relationship of all these variables and their influence on infant mortality has been described comprehensively. Hence, the present investigation focuses its attention on certain of the selected factors chosen from this analytical frame work, to examine the influence of socio-cultural, demographic, health, nutritional and breast feeding factors on infant mortality.

SAMPLE DESIGN AND SIZE

The locale of the study is Anantapur district in Rayalaseema region in the State of Andhra Pradesh in South India (see Fig. 2). The State of Andhra Pradesh was carved
Fig. 1: A Conceptual Model on Mortality: Life Affecting Variables
out of the then Madras presidency and former Hyderabad province in 1956. The Rayalaseema is one of the three distinct regions of Andhra Pradesh, the others two being Coastal Andhra and Telengana. Anantapur is one of the quartlets of Rayalaseema districts in the Southern most district of Andhra Pradesh sharing border with the States of Tamil Nadu and Karnataka. For selection of the sample, Anantapur district was purposively selected as this district has the single largest concentration of tribal population of Sugalis (54.5% of the total Sugali population) in Rayalaseema region (census of India, 1971).

The sample for the study was selected by adopting a multistage random sampling design with uniform sub-sampling at each stage. At first instance, all the revenue mandals of Anantapur district were listed, out of them two Mandals viz., KALYANADURG and BELOGUPPA (see Fig. 3) were randomly selected for the selection of sample. For the second stage of selection, all the revenue villages belonging to these two Mandals were separately listed. Based on the population size of Sugalis, the villages were classified into large, medium, and small. Out of them, 18 revenue villages (9 villages from each Mandal) were selected at random giving weightage to the proportion of large, medium, and small villages to total villages. Subsequently, their households were enumerated. From all these 18 revenue villages,
Fig. 2: Map Showing Anantapur District in Andhra Pradesh India.
respondents were selected (at random) from the enumerated list of households. From every household, an ever married woman belonged to the age group of 15-45 years (eligible couple) having at least one live birth was considered as a sample unit for the study. Because, for the study of mortality at least one live birth is necessary. From each household a woman alone was selected for the study and she constituted the respondent. Thus, the total sample consisted of 600 respondents (women) comprising an equal number of 300 each from Kalyanadurg and Beluguppa Mandals were selected for the present study.

Sample size

\[ N = 600 \]

\[ \text{Kalyanadurg (N = 300)} \quad \text{Beluguppa (N = 300)} \]

PREPARATION OF INTERVIEW SCHEDULE

An interview schedule is needed for the collection of data from the respondents. Hence, an appropriate interview schedule has been tentatively prepared and pre-tested for its validity as parameter and precision. Suitable modifications were made in the schedule of questions where ever found necessary. This restructured schedule has been used for the data collection. The schedule consisted of open-ended structured, dichotomus, trichotomus and multiple
choice questions in order to probe into various aspects of socio-cultural, demographic, health, nutritional and breastfeeding practices as well. The schedule of questions were divided into nine major parts as described below.

1. Family background

Name of the respondent, name of the village, type of house, education and occupation of the respondent, family size, age and sex composition, type of family, extent of landholding and family income are included in this section.

2. Marriage particulars

Under this section, age at marriage of the mother, remarriage, divorce or separation, reasons for remarriage, type of marital relationship, knowledge about ideal and legal age at marriage, attitude and practices of age at marriage in the community are covered.

3. Pregnancy history (Roster)

In this section, age at menarche, interval between menarche and age at marriage, duration of married life, number of conceptions, number of children born alive, number of children alive at present, number of children died, birth order, birth interval, pregnancy outcome, age and sex of the child, age of the mother at birth, infant death by age etc. are covered.
4. Pregnancy and Delivery Care

Medical and health care during pregnancy (Pre-natal) and illness of their children, utilization of medical and health services of Sub Centre/Primary Health Centre and Peripheral Health Worker (MPHWs), place of delivery, birth attendant, cutting of umbilical cord and its dressing, and immunization particulars are included in this section.

5. Infant Mortality and Morbidity

Under this section, perception of infant mortality, infant deaths during the past 5 years, births and deaths for the last one year, morbidity of preschool children (0-5 years) during the past one month are included.

6. Nutritional status

In this section, external symptoms of nutritional deficiency of the mother, intake of extra/ special food during pregnancy and lactation, avoidance of food during pregnancy and lactation, age at initiation of supplementary/ weaning food to infant, type of supplementary/weaning food given to infant, intake of nutritious food and its frequency per day etc. are covered.

7. Breast feeding

Under this section, initiation of breast feeding after the birth, type of pre-lacteal feed, and beverages given to infant, frequency of breast feeding per day, duration of breast feeding etc. are covered.
8. Cultural practices

Belief on god/goddess, belief on birth and death, kinship interaction, degree of preference for children, desire for extra/additional children, value of son, customs and habits, and social status of woman are included in this section.

9. Environmental sanitation

Under this section, environmental sanitation in and around the house like disposal of waste, animal waste, ventilation, cleanliness of the house, disposal of waste water, sources and purification of drinking water, personal hygiene etc. are included.

Thus the schedule consisted a number of independent variables related to socio-cultural, demographic, health, nutritional and breast feeding factors influencing on infant mortality. A copy of the final schedule covering all the above mentioned variables is enclosed in Appendix - I.

INTERVIEW PROCESS

The interview method is the most widely used technique for the collection of data in many social surveys. Before starting the actual collection of data, the investigator has visited the study area to establish a good rapport with the respondents through their community leaders/peripheral workers, and village teachers. Further, informal meetings
were also organised for small groups of women in different villages to explain the objectives and importance of the study. Since the health workers have a good rapport with women, the investigator approached the respondents through them. Appointments were fixed with respondents giving importance to their convenience and leisure time. This helped the investigator to gather even delicate information concerning the personal data of the respondents.

DATA COLLECTION

Data for the study were collected by the researcher himself interviewing all the respondents using the schedule. The interview technique and non-participant observation were used for data collection. The data collection was mostly confined to the woman (respondent). The information regarding the pregnancy history including abortion, pregnancy and delivery care, utilization of health services for mother and children, birth interval, infant mortality, breast feeding, post-partum amenorrhoea were ascertained from the woman only. Every care was taken to make the respondents respond to the question of different types without hesitation on their part. Further, the services of neighbours, local dai, witch-crafts and washermen (Dhobi) were also utilised for eliciting the reliable information. While, collecting data, every precaution was taken to ensure
normal conditions. No time limit was set for giving responses to each question. The data were collected in a relaxed atmosphere.

MEASUREMENT OF VARIABLES

For the present study, 'number of infants died' to the respondent during the last five years, irrespective of their parity is considered as the dependent variable. The other several relevant independent variables on the basis of objectives and hypotheses are considered to study their influence on the risk of infant mortality. Further, throughout the analysis, the present age of mother was controlled into two groups such as upto 30 years (younger mothers) and above 30 years (older mothers), to obtain better understanding of the differential influence of the various independent variables on the risk of infant mortality between these two groups of women.

Hitherto, the probability of pregnancy related complications have been high among very young mothers because of their biological immaturity. Young mothers are also being inexperienced to take proper care of their young infants, even though they receive considerable support from their kin group. The latter can be a constraint to the extent that the traditional outlook and superstitions of the older family members may not always be conducive to an infant's health and survival. In case of older mothers
(beyond the age of 30 years), the risk of pregnancy complications are apparently increase because of the increasing inflexibility of the female reproductive organs along with age.

In order to study the combined influence of certain groups of variables, the three indices were developed such as (a) socio-economic status; (b) social status of woman, and (c) environmental sanitation.

**Socio-Economic Status - An Index**

The combined effect of socio-economic variables such as type of house, education, occupation, irrigated and unirrigated land, income of family were examined by developing an index. Based on the cumulative score of the individual on these variables, the respondents were classified into three socio-economic groups. This procedure helped to make wider generalisations:

<table>
<thead>
<tr>
<th>Index</th>
<th>Score range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>6 - 13</td>
</tr>
<tr>
<td>Medium</td>
<td>14 - 21</td>
</tr>
<tr>
<td>High</td>
<td>22 - 29</td>
</tr>
</tbody>
</table>

**Social Status of Woman - An Index**

For measuring the overall social status of the respondents an index was developed. This index has covered various social aspects such as allowing the woman to do any kind of work, to choose their life partner, freedom in
decision-making, participation in community festivals, widow marriages, sharing of parents property, adoption of family planning, and finally sending their daughters for higher education and for jobs. The respondents were differentiated into three groups such as 'high', 'medium', and 'low', on the basis of total score secured by them on the above aspects. The minimum score was 9 and the maximum score was 18.

<table>
<thead>
<tr>
<th>Index</th>
<th>Score range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>9 - 12</td>
</tr>
<tr>
<td>Medium</td>
<td>13 - 15</td>
</tr>
<tr>
<td>High</td>
<td>16 - 18</td>
</tr>
</tbody>
</table>

House Sanitation Index

In order to study the degree of house sanitation an index was developed. The index was based on 8 important basic dimensions such as (a) type of house, (b) disposal of waste, (c) stagnation of waste water, (d) fly nuisance, (e) ventilation, (f) cleanliness of the house, (g) sources of drinking water, and (h) materials used for cleaning of vessels. Based on the composite score assigned to them, the respondents were classified into two groups such as poor and moderate.

<table>
<thead>
<tr>
<th>Index</th>
<th>Score range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>8 - 13</td>
</tr>
<tr>
<td>Moderate</td>
<td>14 - 19</td>
</tr>
</tbody>
</table>
DATA ANALYSIS

The analysis of data was carried out by using computer facility, besides preparing necessary and appropriate tables. Data were analysed by percentages/ratios as well as two-way and three-way cross tabulations. A step-wise multiple regression analysis technique has been adopted to understand the individual influence of each predictor (independent) variable on prevalence of infant mortality. Thus, most of the variables were subjected to one or the other statistical treatments for identifying the maximum possible variance in the dependent variable (infant mortality) with the help of predictor (independent) variables. Also, the 'Chi-square ($X^2$)' technique was employed to examine the association between the dependent variable and independent variable(s). Throughout the analysis the present age of mother was treated as control variable categorising the sample into two groups such as younger mothers ($\leq 30$ years) and older mothers ($> 30$ years). Variations in the prevalence of infant mortality in relation to the selected independent variables are examined within each of the younger and older mothers and for the sample as a whole. Graphical presentation is also provided.
LIMITATIONS OF THE STUDY

There are several limitations for the study which have to be considered in understanding the relationship derived from retrospective survey data. It is to note that the data on all family background variables relating to socio-economic and environmental factors indicate the conditions prevailed in 1989 when the data collected for the study. While the prevalence of infant mortality, data essentially consists of deaths pooled over a period of 5 years from the data of survey.

In view of the high infant mortality existing among these Sugali tribal community, a sample of 600 eligible women were selected at random. Further, to increase in the sample size invariably will be unwieldy because most of the Sugalis spread over a wide geographical area. Also, financial resources are at the disposal of the researcher was meagre and requires more number of investigators to conduct the study. Taking into account that the present study was proposed for Ph.D., thesis, a large sample of study will be unwieldy for a single researcher like me to undertake. In addition, the study is conducted to know the differentials in determinants of infant mortality and not for calculating rates and ratios. Moreover, a study of this magnitude carried out by a single investigator also facilitates accuracy and reliability of data.
The data on 'causes of death' are analysed based on the information provided by the respondents. However, the authenticity of these causes from medical point of view could not be fully verified, mainly due to lack of medical records of those infants who died. But, to conclude, the causes of death by eliciting the symptoms and referred to the same to qualified medical personnel. Hence, care was taken to ensure the reliability of statistics on the cause of death.