CHAPTER III

CONCEPTUAL FRAMEWORK, METHODOLOGY, SOURCES AND DESCRIPTION OF DATA
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3.1 INTRODUCTION

In the previous chapter, various socio-economic, demographic and programmatic factors were identified that influence reproductive and sexual health status of women and men. Besides, numerous factors directly or indirectly influence utilisation of reproductive and sexual health care services. The socio-economic conditions of the households or individuals and availability of reproductive health care facilities influence reproductive morbidity and treatment seeking behaviour. These are the issues that the present study seeks to address. In this chapter, the conceptual framework, methodology, measurement of variables and sources of data are discussed.

3.2 OBJECTIVES OF THE STUDY

The principal objective of this study is to explore reproductive morbidity and treatment seeking behaviour among women and men in Tamil Nadu.

Specifically, the objectives are:

1) To understand the awareness and perception about reproductive and sexual health problems and related treatment in Tamil Nadu.
2) To analyse influences of regional, socio-economic, demographic and programme factors on reproductive morbidity and treatment seeking behaviour in Tamil Nadu.
3) To assess the existing reproductive and sexual health care services and facilities in the public health facilities in terms of infrastructure, staff and equipment in Tamil Nadu.

3.3 HYPOTHESES OF THE STUDY

The following hypotheses are being empirically tested in the present study:

1) Reproductive morbidity varies according to socio-economic and demographic characteristics.
2) Urban residence, education, and standard of living positively influence the propensity to seek treatment for reproductive morbidity.

3) Age at marriage, experience of reproductive wastage, parity, contraceptive use and awareness of reproductive and sexual health problems have an impact on seeking treatment.

4) Those with easy access to effective and quality reproductive and sexual health services are more likely to utilise the reproductive and sexual health services.

3.4 CONCEPTUAL FRAMEWORK

Women's as well as men's reproductive and sexual health status is affected by a variety of factors. Figure 3.1 presents a conceptual framework for analysing the determinants of reproductive morbidity and utilisation of reproductive and sexual health services. Socio-economic background of respondents plays a significant role in reproductive and sexual health status of women as well as men. At the individual level, women's as well as men's own characteristics and household characteristics influence the prevalence of reproductive morbidity and treatment seeking behaviour. However, poor socio-economic status of women may directly or indirectly contribute to low use of reproductive and sexual health care services. For example, women from urban households and more wealthy background are less likely to have suffered from reproductive morbidity, but strongly inclined to care seeking for reproductive health problems. On the other hand, deprived caste households and larger households are more likely to have been affected. Lack of education and low income are possibly associated with poor utilisation of reproductive health care services. The demographic factors such as age, age at marriage, pregnancy wastage, and parity play an important role in women's reproductive health. Risk factors such as very young age at entry into sexual union and childbearing, lack of education and low income are all associated with low use of services. Various demographic factors such as age, parity, and pregnancy wastage may directly or indirectly influence use of reproductive health services. In addition, some factors may indirectly influence reproductive morbidity and treatment seeking behaviour through awareness of reproductive and sexual health problems, husband and wife's communication on reproductive health problems, use of contraceptive methods, awareness of
Treatment seeking behaviour is directly influenced by a large number of factors. Socio-economic factors especially education and exposure to mass media affect women’s decision about treatment seeking for reproductive morbidity. The cultural factors play a major role in influencing individual behaviour through social norms. The treatment seeking behaviour of women may be affected by cultural norms, values and beliefs.

Figure 3.1: A Conceptual Framework for Analysing the Determinants of Reproductive Morbidity and Utilisation of Reproductive and Sexual Health Services

Socio-Economic Factors
- Place of Residence
- Religion
- Caste
- Educational Levels
- Standard of Living

Demographic Factors
- Age
- Age at Marriage
- Reproductive Wastage *
- Parity *

Programme Factors
- Availability of Health Facility and RSH Services
- Accessibility of RSH Services
- Affordability of RSH Services

Note:
*=These are relevant only for women.
RSH= Reproductive and Sexual Health.
Programmatic factors also matter in utilising reproductive health care services. Availability of health facility and reproductive and sexual health services, accessibility of services and affordability of services would possibly influence utilisation. The perceptions of different reproductive and sexual health problems and the quality of care in services also conceivably affect utilisation. Access to health care services is often considered as a critical determinant of utilisation. For instance, an increase in distance to health facility is associated with poor utilisation of reproductive and sexual health care services. Affordability to health care services is likely to play an important role in utilisation. Poor quality of care, inadequate referral linking and high out-of-pocket costs for transportation are also likely to contribute to poor utilisation.

3.4.1 SOCIO-ECONOMIC FACTORS
Several socio-economic factors affect directly or indirectly reproductive morbidity and the utilisation of reproductive and sexual health care services. Socio-economic factors are represented by five variables here: place of residence, religion, caste, education, and household standard of living. All these factors are discussed below:

Place of Residence
Place of residence is one of the major factors that plays a key role in reproductive and sexual health. For instance, urban people are more likely to have greater awareness of reproductive and sexual health due to access to health care information and services. However, rural women or men are more likely to be at risk of reproductive and sexual health problems or symptoms. This may be due to poor knowledge of reproductive and sexual health problems, and lack of access to health care services.

Religion
Religion is also considered an important and basic social characteristic of population. Each religion has different practices of personal hygiene and food habits etc. which could indirectly affect the reproductive and sexual health through.
Caste
In India, caste signifies social class in the community. Scheduled Castes (SCs) and Scheduled Tribes (STs) are found to be most backward sections of the society, still fighting for equality, social power, basic education and health care service. The social and economic disadvantages imply low levels of awareness of reproductive health illness, high level of reproductive morbidity and low level of care seeking possibly due to social exclusion.

Education
Education is one of the important factors which plays a vital role in improving women’s as well as men’s reproductive and sexual health. Education is the principal social indicator of development. Many phenomena, such as reproductive behavior, use of contraception, health of children and pregnant women, and proper hygienic habits are issues that are affected by the education of household members. Education plays a leading role in promoting responsible reproductive and sexual behaviour.

Household Standard of Living
Economic status of household is closely linked to the ability to access nutrition and health care. Standard of living plays an important role in determining the utilisation of reproductive health care services. But measuring the economic status of the population is a major challenge. It has been observed that direct questions on income level fail to correctly capture the true economic conditions or level of economic well-being. However, as a proxy, an index of standard of living based on ownership of assets and housing conditions can be used.

3.4.2 DEMOGRAPHIC FACTORS
The demographic factors that plausibly have a bearing on women’s reproductive and sexual health are represented by four variables: age, age at marriage, reproductive wastage, and parity; the first two of these are relevant for men’s reproductive as well.

Age
Age is an important factor that determines reproductive health and fertility. This is strongly evident from the fact that adolescents or young women face higher risks at reproductive
morbidity than older women. Higher age implies greater awareness and more responsible behaviour. But it could also be argued that young women or men are more likely to accept modern health care than older women.

Age at First Marriage
Age at first marriage is a primary indicator of exposure to sexual activity. In a society like India’s where fertility is within marriage low age at marriage means early initiation of sexual activity and early childbearing. Thus, it contributes high risk to women’s reproductive health.

Reproductive Wastage
Women with reproductive wastage are generally considered at greater obstetric or gynaecological risk. The risk of Reproductive Tract Infection/Sexually Transmitted Infection (RTI/STI) increases with number of reproductive wastages. However, women with a large number of pregnancy wastages are more likely to seek health care services. It must also be noted that reproductive wastage could be a consequence of poor reproductive health.

Parity
Parity is one of the most important factors affecting the maternal or reproductive health periods. Women with high number of children are more prone to be at high risk of maternal morbidity. Reproductive morbidity generally increases with the number of births, and with shorter birth intervals.

3.4.3 PROGRAMMATIC FACTORS
Programmatic factors such as availability of health facility and reproductive and sexual health services, accessibility of health care services, and affordability of health care services are expected to influence reproductive health care.

Availability of Health Facility and Reproductive and Sexual Health Services
The availability of health facilities at a place near one’s residence or in the community may contribute to awareness of reproductive and sexual health services, which in turn influences their utilisation. In addition, the availability of doctor, midwife and modern medicines
contribute to safe delivery. Some women like to deliver at home because of lack of transport or poor economic conditions or they had previously experienced uncomplicated deliveries. Women living in villages with reproductive and sexual health services are less likely to have maternal complications and other reproductive health problems, and more likely to use reproductive and sexual health services.

**Accessibility of Reproductive and Sexual Health Services**
Reproductive health care services available within village or in the vicinity are more likely to be utilised than those outside the village or at long distances. In addition, absence of medical doctor, the lack of drugs and insensitive behaviour of health worker inhibit the access. Besides, some social groups may face obstacles in accessing public services.

**Affordability of Reproductive and Sexual Health Services**
Women or men in good economic condition are able to utilise private fee-charging reproductive and sexual health services because they can afford these. Besides, though many public services are in principle free of charges, certain costs are involved that make it necessary to incur expenditures.

### 3.4.4 INTERMEDIATE FACTORS
Numerous socio-economic and demographic factors affect reproductive and sexual health of women as well as men indirectly through a set of intermediate factors. These include awareness of reproductive and sexual health problems, use of contraceptives, husband and wife communication on reproductive and sexual health problems, awareness of reproductive and sexual health services and perceived quality of care at the public health facilities.

**Awareness of Reproductive and Sexual Health Problems**
Awareness of reproductive and sexual health problems play an important role in utilising reproductive and sexual health services. Women from poor socio-economic conditions especially those without education are less likely to be aware of reproductive and sexual health problems.
Contraceptive User
Contraception plays an important role in women's reproductive and sexual health status. Generally, couples having used family planning methods to delay or avoid pregnancies would be more aware of reproductive and sexual health issues including reproductive morbidity and sources of reproductive health care. Women who have used contraception like Intra-Uterine Device (IUD) are more likely to face reproductive health problems and also more likely to utilise reproductive health services due to prior contact with the health centres. Use of contraception may also raise reproductive morbidity due to improper use or insertion of contraceptives. Many research studies have suggested that use of contraceptives is directly associated with utilisation of reproductive and sexual health services.

Husband and Wife Communication about Reproductive and Sexual Health Problems
Communication is one of the important factors which play a major role in reproductive and sexual health issues. Improved communication between husband and wife, father and son, and mother and daughter may improve reproductive and sexual health status. Communication is a two way process, which implies that being a good messenger is as valuable as being a good listener. However, the content of sexual and reproductive health communication remains a socially sensitive issue. If there is good communication between husband and wife regarding reproductive and sexual health then it facilitates partner's utilisation of health care services and will help each to understand the other’s reproductive and sexual health issues. Couples having greater discussion on reproductive health problems are expected to seek more professional help than couples not discussing reproductive health problems.

Awareness of Reproductive and Sexual Health Services
Awareness of reproductive and sexual health services is essential for the utilisation of reproductive and sexual health services. Women or men aware of reproductive and sexual health services where these are located, and how to access these are able to utilise reproductive and sexual health services.
Perceived of Quality of Services

The availability of health facilities and services is an essential requirement to maintain important indicator of quality of life in the society. The public health facilities are providing reproductive and sexual health services at grass roots levels. The medical and paramedical staff play an important role in promoting women's as well as men's reproductive and sexual health by providing their services to the community. But mere availability of services is not adequate. If the quality of services is perceived to be high, utilisation is more likely. Quality depends on the technical competence of providers, the infrastructure, and the attitude of service providers to the users.

3.5 RESEARCH DESIGN

The research design is dictated by the conceptual framework. Various background and programmatic factors influence intermediate factors such as awareness, communication and in turn reproductive health and treatment seeking. In order to understand the linkages, information on various factors is required for large numbers of women and men. The present research involves two levels of analyses: individual level and community level. First is an individual level analysis of factors associated with reproductive morbidity of women and men and treatment seeking behaviour. This would assess the influences of socio-economic, demographic and programme factors, as well as of intermediate factors on reproductive health problems and treatment seeking behaviour. Finally, a community level analysis that examines availability of reproductive and sexual health facilities in selected public health facilities in Tamil Nadu has been carried out.

The District Level Household Survey-Reproductive and Child Health -2 (DLHS-RCH-2) carried out throughout the country has collected data on a number of relevant variables, if not all. The survey also covered Tamil Nadu and individual data both from women and men are in the public domain. This allows addressing some of the research questions that were raised. Appropriate tools of statistical analysis, discussed later in this chapter, permit an assessment of various linkages. The sample of Tamil Nadu is quite large (the details are provided in the next section) to test various hypotheses. However, it was observed that reporting of male reproductive morbidity is extremely low in the DLHS-RCH. It is possible that a large study
with many field investigators may not be suited to capture information on male reproductive health issues which are perceived to be sensitive in the society. Therefore, it was felt that personal interview by researcher be done on these aspects, that is male reproductive health and treatment seeking behaviour.

Given the resource constraints of an individual researcher, coverage of a large sample is not possible. However, since the prevalence of male reproductive morbidity, as seen from the DLHS-RCH-2 is quite low, a large sample size is required to keep the relative sampling error low in order to study differentials. Therefore, studying prevalence of male reproductive morbidity from a small sample is ruled out. Hence, instead of prevalence of male reproductive morbidity as such, the field investigation concentrated on awareness of men about reproductive health including morbidity and sources and places of treatment.

For this purpose, a district, which has prevalence of reproductive health problems among men closest to the state level, was identified. According to the first round of the DLHS-RCH, 1998-1999 survey, South Arcot district (now divided into two districts as Villupuram and Cuddalore) is closest to the state level of prevalence (10.7 percent in the state, 10.5 percent in South Arcot); at the time of initiation of this research, estimates from DLHS-RCH-2 were not available and hence the selection of the district had to be made on the basis of the DLHS-RCH-1 results. Hence, an effort is made to locate the awareness and perception about reproductive and sexual health problems and sexual behaviour among men in the Villupuram district of Tamil Nadu.

Moreover, though public health services provide reproductive and sexual health care in principle, it is necessary to see whether this is actually done and the manner in which it is done. For this purpose, a parallel study on public health facilities in the same area was done from which field investigation of male reproductive health was carried out. This allows an examination of reproductive health care in the context of the service facility.

Thus, a three pronged approach was proposed. The first is an extensive analysis of individual data of women and men from the large scale survey DLHS-RCH-2 in Tamil Nadu. The
second is field study on male reproductive health by the researcher in one district of the state. These are complemented by a detailed survey of reproductive and sexual health services in public health facilities in the areas covered for the field investigation.

3.6 DATA SOURCES
3.6.1 District Level Household Survey-Reproductive and Child Health
The secondary data used in this work are from the large scale survey, the District Level Household Survey-Reproductive and Child Health second round, 2002-2004. The main objective of the DLHS-RCH-2 survey was to provide district level estimates on reproductive and child health indicators to assist policy makers and programme administrators in decentralised planning, monitoring and evaluation. The survey focused on coverage of Ante-Natal Care (ANC) and immunisation services, extent of safe deliveries, contraceptive prevalence rate and unmet need for family planning, awareness about RTI/STI and Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) and utilisation of government health services and user's satisfaction. The survey was carried out in two phases with 593 districts of India as per the 2001 Census, 295 districts surveyed in the first phase which was carried out between March 2002 and December 2002 (except some districts of Bihar and Jharkhand where the fieldwork got extended to 2003) and the remaining 298 districts surveyed in the second phase from January 2004 to October 2004 (except some districts of Bihar and Jharkhand where the fieldwork got extended to 2005). The DLHS-RCH-2 survey covered a representative sample of about 1,000 rural and urban households from each district from 40 Primary Sampling Units (PSUs) selected with Probability Proportional to Size (PPS). In each selected PSU (28 rural PSUs and 12 urban PSUs) 28 residential households were selected with circular systematic random sampling procedure after house-listing. From selected residential households individual interviews were conducted with all currently married women age 15-44 years and husband of one currently married woman in the household. A total of 6,20,107 households in India were covered and 5,07,622 currently married women of age 15-44 years and 3,30,820 husbands were interviewed (IIPS, 2006).
The DLHS-RCH-2 survey used five types of questionnaires such as household questionnaire, women’s questionnaire, husband’s questionnaire, village questionnaire and health status questionnaire. In the household questionnaire, information relating to general characteristics, household basic amenities, economic status of household, marriages in household and general mortality and maternal mortality was collected. The woman’s questionnaires provides for currently married women of age 15-44 years general characteristics of woman and birth history, ante-natal, natal and post-natal care, immunisation and child care, contraception, assessment of quality of government health services and client satisfaction, awareness about RTI/STI and HIV/AIDS, reported symptoms of RTI/STI, treatment seeking, preventive measures and misconceptions about HIV/AIDS. The husband’s questionnaires collected information on awareness about RTI/STI and HIV/AIDS, reported symptoms of RTI/STI, treatment seeking, preventive measures and misconceptions about HIV/AIDS, knowledge about and choice of contraception. The village questionnaires contained information on availability of health, education, and other facilities in the village, and whether the facilities are accessible throughout the year. Information on weight of children 0-71 months old, and blood samples to assess the haemoglobin levels of children age 0-71 months old, adolescents 10-19 years old, and pregnant women were also collected.

The DLHS-RCH-2 survey was conducted in two phases in Tamil Nadu by the Population Research Centre (PRC), Dindugal, Tamil Nadu (IIPS, 2006); the first round was during April to July 2002 in 14 districts of the state (listed as per 2001 Census) and the second round during April to September 2004 in the remaining 16 districts of the state. The study covered 25,522 currently married women in the age group 15-44 years and 23,751 husbands from 32,685 households. The principal findings of the DLHS-RCH-2 survey have been published and these provide a large number of indicators at the district level as well as district and state reports. Further, the DLHS-RCH-2 has made the individual level data available to researchers.

Subsequently, the third round of the DLHS-RCH survey has been conducted, mostly during 2008. However, by the time of completion of this work, only some summary indicators have been released by the survey organisation. The individual data are yet to be made available.
Besides, the DLHS-RCH-3 did not include men in the survey and thus has no information on male reproductive health. At this stage, therefore, the DLHS-RCH-3 data could not be used. Hence, the analysis in this study is based on the DLHS-RCH-2 data set.

3.6.2 Field Survey on Male Reproductive and Sexual Health

The field investigation for studying male reproductive and sexual health was carried out in rural areas as the issues of access matter for these. The Villupuram district was chosen because the male reproductive morbidity in this district is closest to the state average as mentioned above. A two-stage sampling was adopted for selecting men for the survey. The District Level Household Survey - Reproductive and Child Health survey conducted by the International Institute for Population Sciences, Mumbai, in 2002-2004, 28 villages were selected in the sample with probability proportional to size (Map 3.1). Out of these, 10 villages were selected by systematic random sampling after arranging them in ascending order by distance from the village to nearest primary health centre (in kilometers). At the second stage, selection of a fixed 35 households was planned using systematic stratified sampling within each selected village so that total sample would be 350 men of age 18-54 years. Given the resources and the fact that this field investigation is in addition to the analysis of the available data from the DLHS-RCH-2, a sample of 300-400 was felt to be adequate. In order to allow for non-response at the individual levels, the target sample of individuals in the ten selected villages was increased by 15 percent, that is, 40 households were selected in each of the 10 villages. First, the households were arranged by the principal occupation (cultivation, agricultural labour and other) and a sample was selected systematically with random start. Thus there was implicit stratification by occupation. In one large village, three segments were formed and one was randomly selected for complete house-listing. Information on house-lists with the principal occupation was generally available with the school headmaster and the village health nurse. The researcher obtained house-list from school headmasters for eight selected villages. However, in two selected villages where such house-lists were not available, the researcher collected information about occupation from the Panchayat officials; this was merely for the propose of forming strata, details on occupation were later obtained during the course of this survey and these data were used in the analysis. From the selected residential households, one man in the age group of 18-54
years was interviewed. The fieldwork for the individual survey started in May 2007 and was completed in October 2007, gathering information from 343 households.

Map 3.1: Location of Study Villages in Villupuram District, Tamil Nadu

A structured questionnaire was administered among the selected men in the age group of 18-54 years. The questionnaires were developed in English and translated into Tamil and finalised after pre-testing; Tamil and English versions of the individual questionnaires are reproduced in Appendix B.3.1 and B.3.2. The individual questionnaire for men has the following sections: background characteristics, awareness about reproductive and sexual health, and communication and perception of reproductive and sexual health care. In the first part of the individual questionnaire, basic information of household is collected on the relationship of the head of household of each person listed as a household member, sex, age, marital status and education. This information is used to identify eligible respondent and also to get basic demographic data of household. Information is also collected on household characteristics such as type of house, source of drinking water, type of toilet facilities, source
of energy for cooking, availability of electricity, durable goods, separate bed room, separate room for kitchen, and ownership of agricultural land. The second part of the individual questionnaire covers awareness of reproductive and sexual health such as awareness of RTI/STI and HIV/AIDS, source of information for RTI/STI and HIV/AIDS, knowledge of mode of transmission about RTI/STI and HIV/AIDS, perception of avoidance of HIV/AIDS and knowledge of curability about RTI/STI and HIV/AIDS. In the third part of the individual questionnaire the communication and opinions on and perception of reproductive and sexual health care such as sex education, knowledge of emergency contraceptive pills, discussion about reproductive and sexual health problems and about contraception with others, knowledge of women’s reproductive and sexual health problems, knowledge of reproductive and sexual health services at public health facilities are captured.

Table 3.1: Sample Selection of Households for the Field Survey in Villupuram District, Tamil Nadu

<table>
<thead>
<tr>
<th>Village ID</th>
<th>Number of Households Listed</th>
<th>Number of Households (with at least one man of age 18-54)</th>
<th>Number of Households Selected (N=400)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>369</td>
<td>338</td>
<td>24 14 2</td>
</tr>
<tr>
<td>V2</td>
<td>463</td>
<td>439</td>
<td>33 6 1</td>
</tr>
<tr>
<td>V3</td>
<td>317</td>
<td>289</td>
<td>9 26 5</td>
</tr>
<tr>
<td>V4</td>
<td>649</td>
<td>610</td>
<td>11 28 1</td>
</tr>
<tr>
<td>V5</td>
<td>483</td>
<td>453</td>
<td>25 14 1</td>
</tr>
<tr>
<td>V6</td>
<td>571</td>
<td>537</td>
<td>29 10 1</td>
</tr>
<tr>
<td>V7</td>
<td>547</td>
<td>522</td>
<td>13 26 1</td>
</tr>
<tr>
<td>V8</td>
<td>210</td>
<td>191</td>
<td>4 34 2</td>
</tr>
<tr>
<td>V9</td>
<td>344</td>
<td>321</td>
<td>13 25 2</td>
</tr>
<tr>
<td>V10</td>
<td>205</td>
<td>173</td>
<td>19 17 4</td>
</tr>
<tr>
<td>Total</td>
<td>4,158</td>
<td>3,873</td>
<td>180 200 20</td>
</tr>
</tbody>
</table>


Table 3.1 presents a summary of the sample selection for the individual interviews. At the time of the survey, there were 4,158 households in the selected villages. In these households, 3,873 households are identified as eligible for individual interview, i.e., they had an eligible man age of 18-54 years present in the household. From these, 400 men were selected 86
percent of whom (343 individual as well as households) were successfully interviewed, 5.5 percent were out of station, 4.5 percent could not be contacted, 3.8 percent refused, and 0.5 percent were incomplete (Table 3.2).

<table>
<thead>
<tr>
<th>Result of Individual Interview</th>
<th>Cultivator</th>
<th>Agriculture Labourer</th>
<th>Other Workers</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed</td>
<td>139</td>
<td>167</td>
<td>37</td>
<td>343</td>
</tr>
<tr>
<td>Incomplete</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Refused</td>
<td>4</td>
<td>9</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Could not be contacted</td>
<td>2</td>
<td>13</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Out of station</td>
<td>1</td>
<td>16</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>147</strong></td>
<td><strong>206</strong></td>
<td><strong>47</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>


3.6.3 Field Survey on Public Facilities for Reproductive and Sexual Health

At the state level, data on health facilities are available from secondary sources including the reproductive and child health facility survey. In addition, detailed data on availability of reproductive health care facilities are obtained from the Block Primary Health Centres (BPHCs) and the Primary Health Centres (PHCs) in Villupuram district of Tamil Nadu (Table 3.3). At the time of survey, there were 22 BPHCs and 58 PHCs in Villupuram district of Tamil Nadu (Map 3.2). For the health facility survey, a two-stage sample design was adopted. The first-stage identified total number of BPHCs and total number of PHCs with distance from the district headquarters in Villupuram district of Tamil Nadu. The selection of PHCs was made by systematic random sampling after arranging the public health facilities in ascending order of distance from the district headquarters. This was done ensure that facilities near the district headquarters and those away from it get represented.

Information was collected using structured schedules (shown in appendix B.3.3) for selected public health facilities. The fieldwork for the health facility survey was conducted during February 2007 to May 2007, gathering information from six BPHCs and ten PHCs. Information was collected on the basis of personal visits, interviews of health personnel and observations at the public health facilities. The survey collected basic information on
infrastructure, availability of reproductive and sexual health services, performance of reproductive and sexual health services, and availability and adequacy of supplies etc.

Map 3.2: Location of Public Health Facilities in Villupuram District, Tamil Nadu

Table 3.3: Sample Selection of Public Health Facilities for the Survey in Villupuram District, Tamil Nadu

<table>
<thead>
<tr>
<th>Type of Public Health Facility</th>
<th>Number in the District</th>
<th>Number Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPHC</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>PHC</td>
<td>58</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

3.7 MEASUREMENT OF VARIABLES

In order to understand the linkages between various explanatory factors noted in the conceptual framework and reproductive morbidity and care, a number of measureable variables were identified. These are listed and defined here. In some cases, the definitions of variables and categorisation used for the analysis of DLHS-RCH-2 survey data differed from that for variables in the field survey, hence the lists are provided separately for each set.

3.7.1 Dependent Variables

3.7.1.1 District Level Household Survey-Reproductive and Child Health Survey Data

1) *Any complication during pregnancy*: whether the woman reported experiencing any problem such as swelling of hands and feet, paleness, visual disturbances, excessive bleeding, convulsions, weak or no movement of foetus, abnormal position of foetus, or other complication related to pregnancy for any pregnancy during three years preceding the survey (Dichotomous):
   
   0 = No  
   1 = Yes

2) *Any complication during delivery*: whether the woman reported experiencing problem such as premature labour, excessive bleeding, prolonged labour (more than 12 hours), obstructed labour, breech presentation, or other complication related to delivery for any delivery during three years preceding the survey (Dichotomous):

   0 = No  
   1 = Yes

3) *Any complication after post-delivery*: whether the woman reported high fever, lower abdominal pain, foul smelling vaginal discharge, excessive bleeding, convulsion, severe headache, or other related complication after delivery for any delivery during three years preceding the survey (Dichotomous):

   0 = No  
   1 = Yes

4) *Any obstetric or maternal complication*: whether the woman reported any complication during pregnancy, delivery and post-delivery period for any pregnancy, delivery during three years preceding the survey (Dichotomous):
5) **Treatment seeking behaviour for pregnancy complication:** whether sought treatment for any pregnancy complication and source of treatment during three years preceding the survey (Categorised):
   - 0 = No treatment
   - 1 = Treatment from public health facility
   - 2 = Treatment from private health facility

6) **Treatment seeking behaviour for post-delivery complication:** whether sought treatment for any post-delivery complication and source of treatment three years preceding the survey (Categorised):
   - 0 = No treatment
   - 1 = Treatment from public health facility
   - 2 = Treatment from private health facility

7) **Any induced abortion related complication:** whether the woman experienced excessive bleeding, high fever, foul smelling discharge, pain in lower abdomen, convulsion, severe headache, or other complication related to induced abortion during the six weeks period post-abortion for an abortion during three years preceding the survey (Dichotomous):
   - 0 = No
   - 1 = Yes

8) **Any spontaneous abortion related complication:** whether the woman experienced complication from excessive bleeding, high fever, foul smelling discharge, pain in lower abdomen, convulsion, severe headache, or other complication related to spontaneous abortion during the six weeks period post-abortion for spontaneous abortion during three years preceding the survey (Dichotomous):
   - 0 = No
   - 1 = Yes

9) **Any induced or spontaneous abortion related complication:** whether the woman reported any induced or spontaneous abortion complication during three years preceding the survey (Dichotomous):
0 = No
1 = Yes

10) **Any symptom of RTI/STI:** whether the woman reported suffering from itching over vulva, boils/ulcers/warts around the vulva, pain in lower abdomen not related to menses, low backache, pain during sexual intercourse, bleeding after sexual intercourse, swelling in the groin, frequent/painful passage of urine, fever, some mass coming out of vagina, any involuntary escape of urine while coughing or sneezing, or swelling/lump in breast during the three months period preceding the survey (Dichotomous):

0 = No
1 = Yes

11) **Any symptom of abnormal vaginal discharge:** whether the woman reported suffering from any abnormal vaginal discharge during the three months period preceding the survey (Dichotomous):

0 = No
1 = Yes

12) **Any reproductive health problems:** whether the woman reported any symptom of RTI/STI or any symptom of abnormal vaginal discharge during three months period preceding the survey (Dichotomous):

0 = No
1 = Yes

13) **Treatment seeking behaviour for abnormal vaginal discharge:** whether the woman sought treatment for any abnormal vaginal discharge and source of treatment during three months preceding the survey (Categorised):

0 = No treatment
1 = Treatment from public health facility
2 = Treatment from private health facility

14) **Any symptom of menstruation problems:** whether the woman reported suffering from no periods, painful periods, frequent or short periods, delayed periods, prolonged bleeding, excessive bleeding, continuous bleeding, scanty bleeding, or inter-menstrual bleeding during the three months period preceding the survey (Dichotomous):
15) **Treatment seeking behaviour for menstruation problems**: whether the woman sought treatment for any menstrual problems during three months preceding the survey and source of treatment (Categorised):
- 0 = No treatment
- 1 = Treatment from public health facility
- 2 = Treatment from private health facility

16) **Any health problems after female sterilisation**: whether the woman experienced weakness/inability to work, bodyache/backache, cramps, weight gain, dizziness, nausea/vomiting, breast tenderness, irregular periods, excessive bleeding, spotting, or white discharge during the three months period preceding the survey (Dichotomous):
- 0 = No
- 1 = Yes

17) **Any health problems while using IUD**: whether the woman experienced weakness/inability to work, bodyache/backache, cramps, weight gain, dizziness, nausea/vomiting, breast tenderness, irregular periods, excessive bleeding, spotting, or white discharge during the three months period preceding the survey (Dichotomous):
- 0 = No
- 1 = Yes

18) **Any health problems after using oral pills**: whether the woman experienced weakness/inability to work, bodyache/backache, cramps, weight gain, dizziness, nausea/vomiting, breast tenderness, irregular periods, excessive bleeding, spotting, or white discharge during the three months period preceding the survey (Dichotomous):
- 0 = No
- 1 = Yes

19) **Any health problems after using any modern methods**: whether the woman experienced weakness/inability to work, bodyache/backache, cramps, weight gain, dizziness, nausea/vomiting, breast tenderness, irregular periods, excessive bleeding, spotting, or white discharge during the three months period preceding the survey (Dichotomous):
0 = No
1 = Yes

20) *Treatment seeking behaviour for health problems after female sterilisation:* whether the woman who experienced any health problems sought treatment for any health problems (Dichotomous):

- 0 = No
- 1 = Yes

21) *Treatment seeking behaviour for health problems after using any modern methods:* whether the woman who experienced any health problems sought treatment for any health problems (Dichotomous):

- 0 = No
- 1 = Yes

22) *Any symptom of RTI/STI:* whether the man reported any discharge from penis, any sore/rash/redness on genital of anal area, difficulty/pain while urinating or very frequent urination, swelling of testes or in groin area (penis), or itching/irritation around genital during the three months period preceding the survey (Dichotomous):

- 0 = No
- 1 = Yes

23) *Treatment seeking behaviour for symptom of RTI/STI:* whether the man who experienced any symptom sought treatment for any reproductive health problems during the three months period preceding the survey (Dichotomous):

- 0 = No
- 1 = Yes

3.7.1.2 Field Survey on Male Reproductive and Sexual Health Data

1) *Awareness of emergency contraception:* whether the man is aware of emergency contraception (Dichotomous):

- 0 = No
- 1 = Yes

2) *Awareness that use of condom can protect from RTI/STI:* whether the man is aware that use of condom can protect from RTI/STI (Dichotomous):
0 = No
1 = Yes

3) **Awareness use of condom can protect from HIV/AIDS:** whether the man is aware that use of condom can protect from HIV/AIDS (Dichotomous):
   - 0 = No
   - 1 = Yes

4) **Sex education must at school level:** whether the man opined that sex education is must at school level (Dichotomous):
   - 0 = No
   - 1 = Yes

5) **Pre-marital sexual activity:** whether the man reported pre-marital sexual activities (Dichotomous):
   - 0 = No
   - 1 = Yes

6) **Awareness of reproductive and sexual health services available at public health facilities:** whether the man is aware of reproductive and sexual health services available at public facility (Dichotomous):
   - 0 = No
   - 1 = Yes

7) **Awareness of RTI/STI services available at public health facilities:** whether the man is aware of RTI/STI services available at public facility (Dichotomous):
   - 0 = No
   - 1 = Yes

8) **Awareness of HIV/AIDS test service available at public health facilities:** whether the man is aware of HIV/AIDS services available at public facility (Dichotomous):
   - 0 = No
   - 1 = Yes

9) **Ever discussed reproductive and sexual health problems:** whether the man ever discussed reproductive and sexual health problems with wife or with friends (Dichotomous):
   - 0 = No
1 = Yes

10) *Ever discussed contraception*: whether the man ever discussed contraception with wife or with friends (Dichotomous):
   
   0 = No
   
   1 = Yes

11) *Ever gone with wife/friend for treatment for reproductive and sexual health problems*: whether the man has ever gone with wife/friend for treatment for reproductive and sexual health problems (Dichotomous):

   0 = No
   
   1 = Yes

12) *Satisfied with public health services*: whether the man is satisfied with public health services (Dichotomous):

   0 = No
   
   1 = Yes

3.7.2 Explanatory (Independent and Intermediate) Variables

3.7.2.1 District Level Household Survey-Reproductive and Child Health Survey Data

1) **Region**: Categorised as

   1 = Southern (Dindigul, Kanniyakumari, Madurai, Ramanathapuram, Sivaganga, Theni, Tirunelveli, Tothukudi, and Virudhunagar districts)

   2 = Coastal (Ariyalur, Karur, Nagapattinam, Perambalur, Pudukkottai, Thanjavur, Thiruvarur, and Tiruchirappalli districts)

   3 = Coastal-northern (Chennai, Cuddalore, Kancheepuram, Tiruvanamalai, Thiruvallur, Vellore, and Villupuram districts)

   4 = Inland (Coimbatore, Dharmapuri, Erode, Namakkal, Salem, and The Nilgiris districts).

2) **Religion**: Categorised as

   1 = Hindu
   
   2 = Muslim
   
   3 = Others (mainly Christian)

3) **Caste**: Categorised as
1 = Other backward caste
2 = Scheduled Caste/Scheduled Tribe
3 = Others caste

4) **Educational level**: Categorised as
   1 = Non-literate
   2 = 1-5 years of schooling
   3 = 6-10 years of schooling
   4 = 11 and above years of schooling

5) **Household standard of living index**: In DLHS-RCH-2, standard of living index is calculated by adding the following scores: source of drinking water: 3 for tap (own), 2 for tap (shared), 1 for hand pump and well, and 0 for other; type of house: 4 for pucca, 2 for semi-pucca, 0 for kachcha; fuel for cooking: 2 for LPG gas/electricity, 1 for kerosene, 0 for other; toilet facility: 4 for own flush toilet, 2 for own pit toilet, 2 for shared toilet, 0 for no toilet; ownership of durables: 4 each for car and tractor, 3 each for television, telephone and motorcycle/scooter, 2 each for fan, radio/transistor, sewing machine and bicycle. The scores when totalled may vary from a lowest of 0 to a maximum of 40. On the basis of total score, households are divided into three categories: low- if the total score is less than or equal to 9, medium- if the total score is greater than 9 but less than or equal to 19 and High- if the total score is greater than 19: Categorised as
   1 = Low (score ≤ 9)
   2 = Medium (9 < score ≤ 19)
   3 = High (score > 19)

6) **Age (women and men)**: Categorised as
   1 = 15-19 years
   2 = 20-24 years
   3 = 25-29 years
   4 = 30-34 years
   5 = 35-39 years
   6 = 40-44 years
   7 = 45 or more years
7) **Age at first cohabitation of woman**: Categorised as
   1 = Less than 18 years
   2 = 18-20 years
   3 = 21 and above years

8) **Pregnancy wastage**: Categorised as
   1 = No pregnancy wastage
   2 = One pregnancy wastage
   3 = Two or more pregnancy wastages

9) **Children ever born**: Categorised as
   1 = No child ever born (no live birth)
   2 = One child ever born
   3 = Two or more children ever born

10) **Full ANC check up**: Categorised as
    1 = No ANC
    2 = Partial ANC (any one or two of at least three visits for antenatal check-ups or at least one TT injection received or at least 100 or more iron folic acid tablets or syrup).
    3 = Full ANC (At least three visits for antenatal check-ups, at least one TT injection received, and at least 100 or more iron folic acid tablets or syrup).

11) **Type of delivery**: Categorised as
    1 = Normal
    2 = Caesarean
    3 = Other (Instrument or assisted).

12) **Place of delivery**: Dichotomous as
    2 = Non institutional (at home).

13) **Assistance during home delivery**: Dichotomous as
    1 = Trained person (Doctor, ANM/Nurse/lady health visitor, trained dai).
    2 = Untrained person (Untrained dai, relatives/friends, none).
14) **ANM visited after two weeks of delivery**: Dichotomous as
   1 = No
   2 = Yes

15) **Any pregnancy complication**: Dichotomous as
   1 = No
   2 = Yes

[Note: some of the variables listed among dependent variables are used as explanatory variables in other analyses and hence are listed again with the categories as shown, these are no: 16, 17, 21, 22, 23.]

16) **Any delivery complication**: Dichotomous as
   1 = No
   2 = Yes

17) **Place of abortion**: Dichotomous as
   1 = Public health facility
   2 = Private health facility

18) **Length of gestation**: Dichotomous as
   1 = 1-3 months
   2 = 4 and above months

19) **Person who performed abortion**: Dichotomous as
   1 = Trained person (Doctor, ANM/nurse/midwife/LHV, trained dai).
   2 = Untrained person (untrained dai and other).

20) **Current use of contraceptive methods**: Categorised as
   1 = Not user
   2 = Female sterilisation
   3 = Condom/Nirodh
   3 = IUD
   4 = Oral Pill
   5 = Other

21) **Any menstrual related problems**: Dichotomous as
   1 = No
   2 = Yes
22) *Any abnormal vaginal discharge*: Dichotomous as
   1 = No
   2 = Yes

23) *Any symptoms of RTI/STI*: Dichotomous as
   1 = No
   2 = Yes

24) *Duration of abnormal vaginal discharge*: Categorised as
   1 = Less than six months
   2 = 6 - 11 months
   3 = 12 - 17 months
   4 = 18 or more months

25) *Duration of menstruation problems*: Categorised as
   1 = Less than six months
   2 = 6 - 11 months
   3 = 12 - 23 months
   4 = 24 - 35 months
   5 = 36 or more months

26) *Awareness of RTI/STI*: Dichotomous as
   1 = Not aware
   2 = Aware

27) *Awareness of HIV/AIDS*: Dichotomous as
   1 = Not aware
   2 = Aware

28) *Source of method*: Dichotomous as
   1 = Public health facility
   2 = Private health facility

29) *Contraceptive motivator*: Dichotomous as
   1 = No
   2 = Yes

30) *Service providers*: Dichotomous as
   1 = Doctor
2 = ANM/nurse/private nurse

31) **Health worker informed about side effects**: Dichotomous as
   1 = Not informed
   2 = Informed

32) **Follow-up services**: Dichotomous as
   1 = Not provided
   2 = Provided

33) **Wife experienced any symptom of RTI/STI**: Dichotomous as
   1 = No
   2 = Yes

34) **Ever discussed RTI/STI symptom with wife**: Dichotomous as
   1 = Not discussed
   2 = Discussed

35) **Health facility available for the community**: Categorised as
   1 = Rural area: No health facility in the village
   2 = Rural area: With health facility in the village (Government hospital, Government dispensary, community health centre/rural hospital, primary health centre, and health sub-centre).
   3 = Urban area

36) **Health provider in the village for the community**: Categorised as
   1 = Rural area: No health provider in the village
   2 = Rural area: With health provider in the village (private doctor, visiting doctor, Unani doctor, Ayurvedic doctor, and Homeopathic doctor).
   3 = Urban area

37) **Village connected by all weather road**: Dichotomous as
   1 = No
   2 = Yes

38) **Distance to transport facility**: Dichotomous as
   1 = Up to 2 Km.
   2 = More than 2 Km.

39) **Distance of village from district headquarters**: Dichotomous as
1 = Up to 50 Km.
2 = More than 50 Km.

3.7.2.2 Field Survey on Male Reproductive and Sexual Health Data

1) Religion: Dichotomous as
   1 = Hindu
   2 = Non-Hindu

2) Caste: Dichotomous as
   1 = OBC
   2 = SC/ST

   [In the sample covered, there were no households other than Scheduled Castes or Tribes (ST/ST) and Other Backward Castes (OBC)]

3) Education: Categorised as
   1 = Non-literate
   2 = 0-5 years of schooling
   3 = 6-10 years of schooling
   4 = 11 or more years of schooling

4) Occupation: Categorised as
   1 = Agricultural labourer
   2 = Cultivator
   3 = Other worker
   4 = Others (student, non-workers)

5) Household standard of living index: In field household survey data, standard of living index is also calculated by adding the following scores: type of house: 4 for pucca, 2 for semi-pucca, 0 for kachcha; toilet facility: 4 for own flush toilet, 2 for own pit toilet, 2 for public or shared toilet, 0 for no toilet; electrified: 2 for electricity, 1 for kerosene; source of cooking: 2 for LPG gas, 1 for kerosene, 0 each for wood, other; source of drinking water: 2 for piped water, 1 each for well, hand pump, and 0 each for surface water, others; ownership of durables: 4 each for care and tractor, 3 each for television, telephone and motorcycle or scooter, 2 each for fan, radio/transistor, sewing machine and bicycle. The scores when totalled may vary
from a lowest of 0 to a maximum of 49. On the basis of total score, households are divided into three categories: low- if the total score is less than or equal to 9, medium- if the total score is greater than 9 but less than or equal to 19 and High- if the total score is greater than 19: Categorised as

1 = Low (score ≤ 9)
2 = Medium (9 < score ≤ 19)
3 = High (score >19)

[This is fairly similar to the index described earlier for the data from DLHS-RCH-2 but there are minor differences since data on some items were not available in one or the other survey.]

6) **Age (men):** Categorised as

1 = 18-24 years
2 = 25-29 years
3 = 30-39 years
4 = 40 or more years

7) **Marital status:** Dichotomous as

1 = Ever married
2 = Never married

8) **Age at first cohabitation of men:** Categorised as

1 = < =20 years
2 = 21-23 years
3 = 24 or more years

9) **Travel from one place to other place:** Categorised as

1 = Daily
2 = Once a week
3 = Less than once a week

10) **Number of usual members in the household:** Dichotomous as

1 = 4 or less members
2 = 5 or more members

11) **Number of films seen (in month):** Dichotomous as

1 = None
2 = One or more

12) *Exposed to mass media*: Categorised as

1 = No exposure (no exposure to newspaper or radio or television)
2 = Partial exposure (exposure to at least once of newspaper or radio or television but not all)
3 = Full exposure (exposure to newspaper, radio, and television)

13) *Distance of village from district HQ (Km.)*: Categorised as

1 = up to 25 Km.
2 = 26-50 Km.
3 = 51 or more Km.

14) *Frequency of bus services*: Dichotomous as

1 = 5 or less per day
2 = 6 or more per day

15) *Availability of school facility*: Dichotomous as

1 = Up to middle school
2 = Secondary and above school

16) *Availability of health facility*: Dichotomous as

1 = No facility in the village
2 = Some facility (hospital, public health centre, health sub-centre or clinic) in the village

**3.8 METHODOLOGY**

On the basis of these data, associations between reproductive morbidity and treatment seeking behaviour and spatial, socioeconomic, demographic, and programmatic factors are examined. The present study uses statistical techniques like cross tabulations and multivariate analysis such as logistic regression and multinomial logistic regression model as appropriate for studying differentials by socio-economic and demographic characteristics and net influences of these. For those reporting reproductive morbidity, treatment seeking behaviour is studied first, using cross tabulations and the net effects using multinomial logistic regression model.
The level of reproductive morbidity as ascertained from reported morbidity in the DLHS-RCH-2 survey is first examined at the state levels. This is followed by inter-district variation in the prevalence levels in the state of Tamil Nadu on the basis of DLHS-RCH-2 survey. Maps have been used to look for spatial pattern in prevalence of reproductive morbidity and treatment seeking behaviour in India as well as within the state of Tamil Nadu. Analysis at the individual level is carried out to examine differentials in reported prevalence of reproductive morbidity and treatment seeking behaviour by selected socio-economic, demographic, and programme factors.

For the analysis at the state and district levels, and also for various socio-economic and demographic indicators, the variables have been computed as:

\[
\text{Complication Rate During Pregnancy} = \left( \frac{\text{number of women who reported swelling of hands and feet, paleness, visual disturbances, excessive bleeding, convulsions, weak or no movement of foetus, abnormal position of foetus during a pregnancy during the three years preceding the survey}}{\text{number of currently married women who had a pregnancy during the period}} \right) \times 100
\]

Rates for delivery complications, post-delivery complications, any obstetric morbidity, any induced abortion complication, any spontaneous abortion compilation, any abortion complication, and contraceptive use (sterilised women and any modern method users) complications were obtained in a similar manner.

Since the symptoms of gynaecological morbidity were enquired into for a period of three months prior to survey, the prevalence rates are actually \textit{period prevalence rates} rather than \textit{point prevalence rates}, and presented in term of percentages. Thus,

\[
\text{Period Prevalence Rates of any symptom of RTI/STI} = \left( \frac{\text{number of women who reported to have suffered from itching over vulva, boils/ulcers/warts around the vulva, pain in lower abdomen not related to menses, low backache, pain during sexual intercourse, bleeding after sexual intercourse, swelling in the groin, frequent/painful passage of urine, fever, some mass}}{\text{current married women}} \right) \times 100
\]
coming out of vagina, any involuntary escape of urine while coughing or sneezing, or swelling/lump in breast during the three months period prior to survey / (number of currently married women interviewed in the survey) / 100

Prevalence rates for any abnormal vaginal discharge, any reproductive health problems, and any menstruation problems were computed in a similar manner. The tendency to seek treatment is measured as the percent of women who sought treatment for reproductive morbidity among those who reported morbidity.

First, the gross differences are obtained and examined. The LOGISTIC REGRESSION METHOD is used in order to estimate the net effect of the each explanatory variable on the likelihood of reproductive morbidity and on the probability of seeking treatment or consultation. Because some of the dependent variables are dichotomous (reported or not and yes or no) the techniques of logistic regression has been adopted instead of multiple linear regression (Retherford and Choe, 1993).

The basic form of the logistic function is

\[ \text{logit}(P) = \ln \left[ \frac{P}{1-P} \right] = Z \] .......................... (1)

Where \( P \) = Probability of occurrence of an event (reporting of a complication or a symptom or seeking treatment)

and \( Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k \) is a vector of parameters \( \beta_0, \beta_1, \beta_2 \ldots \beta_k \)

and predictor variables \( X_1, X_2, X_3 \ldots X_k \).

If \( Y \) is the response, then \( Y=1 \): occurrence of the event, and \( P= \) Probability \( (Y=1) \).

Thus, equation (1) postulates that the probability of occurrence of the event is influenced by a set of predictor variables in the manner specified with \( \beta_0, \beta_1, \beta_2 \ldots \beta_k \) as the logistic regression coefficients.

The equation can be expressed as,

\[ P= \frac{\exp (Z)}{1+\exp (Z)} \] .......................... (2)

The quantity \( P/(1-P) \) is called the odds, hence the quantity \( \ln (P/(1-P)) \) is called the log odds or the logit of \( P \).
The coefficients are estimated using the method of maximum likelihood. The predictor variables should be numeric on a ratio scale. If a predictor variable is in a categorised form, it needs to be converted into dummy variables. Computer packages for logistic regression have a provision of doing so and it is adequate to specify a categorised variable as such and note the reference category. In such cases, the ratio term \( \exp(B_k) \) for a particular category \( K \) is the odds ratio, that is, the ratio of odds for the category \( K \) to the odds for the reference category. The SPSS 14.0 (Statistical Package of Social Sciences) package has been used for the analysis.

As the variable on treatment seeking has three categories; no treatment, treatment from public health facility, and treatment from private health facility, a multinomial model is adopted. The MULTINOMIAL LOGISTIC REGRESSION METHOD is used in order to estimate the net effect of each explanatory variable on the likelihood on the probability of seeking treatment or consultation. The equations for multinomial logistic regression in this case can be written as,

\[
\log \left( \frac{P_1}{P_3} \right) = \alpha_1 + \sum \beta_i X_i \quad (i=1, 2, \ldots, 11) \tag{3}
\]

\[
\log \left( \frac{P_2}{P_3} \right) = \alpha_2 + \sum \beta_i X_i \quad (i=1, 2, \ldots, 11) \tag{4}
\]

where

- \( P_1 \) = probability of seek treatment from public health facility,
- \( P_2 \) = probability of seek treatment from private health facility,
- \( P_3 \) = probability of no treatment, and
- \( P_1 + P_2 + P_3 = 1 \)

Here \( \{X_i\} \quad (i = 1, 2, \ldots, 11) \) are the aforesaid predictor variables, \( \alpha_i \) is the intercept and \( \beta_i \quad (i = 1, 2, \ldots, 11) \) are the regression coefficients. The multinomial logistic regressions are used to estimate adjusted effects of socio-economic, demographic and programmatic variables on treatment seeking behaviour (Retherford and Choe, 1993).

In many situations behaviour may vary not just by own characteristic but also by community characteristics. Besides, some factors such as availability of a facility, distance to a facility, vary across communities but are constant for all members within the community. In multi-stage or cluster sampling, all the respondents from a cluster (village or town) share these
characteristics. This introduces complications in using multiple linear or logistic regression analysis. Therefore, the **MULTILEVEL LOGISTIC REGRESSION ANALYSIS** is used in order to estimate community effect on the likelihood on the probability of reporting symptom of RTI/STI among men. This has been done only in a few of the analyses as the results showed that the estimates of the effects of individual factors did not change substantially after the multilevel analysis was adopted. Under multilevel multiple regression analysis, the fitted model takes the form,

\[ Y_{ij} = a + \beta_1 X_{ij} + \beta_2 Z_j + U_j + e_{ij} \] .............................. (5)

Where \( Y_{ij} \) is the individual level response variable, \( X_{ij} \) are individual level predictors vectors and \( Z_j \) are community level predictor vectors. Further, \( a \) is constant; \( \beta_1 \) and \( \beta_2 \) are vectors of fixed estimated regression coefficients; \( U_j \) and \( e_{ij} \) are random errors at community and individual levels, that is \( U_j \sim N(0, \sigma_u^2) \) and \( e_{ij} \sim N(0, \sigma_e^2) \). This model assumes that the individuals in same community are correlated which is not always true in ordinary multiple linear regression model. In the case of dichotomous dependent variable (as is the case in this analysis), instead of multiple linear regression, logistic regression is adopted. Hence, multilevel logistic regression is used in the analysis in this work. The formulations is similar to that above expect that instead of \( Y_{ij} \), logit of \( P(Y_{ij} = 1) \) is used. The details of the model as given by Snijders and Bosker, (1999) are “The logistic random intercept model expresses the log-odds, i.e., the logit of \( P_{ij} \), as a sum of a linear function of the explanatory variables and a random group-dependent deviation \( U_{oj} \):

\[
\text{logit}(P_{ij}) = \gamma_0 + \sum_{h=1}^H \gamma_h X_{hij} + U_{oj} \] .............................................. (14.15)

Thus, a unit difference between the \( X_h \) values of two individuals in the same group is associated with a difference of \( \gamma_h \) in their log-odds, or equivalently, a ratio of \( \exp(\gamma_h) \) in their odds. The deviations \( U_{oj} \) are assumed to have zero mean (given the values of all explanatory variables) and a variance of \( \tau^2_0 \). Formula (14.15) does not include a level-one residual because it is an equation for the probability \( P_{ij} \) rather than for the outcome \( Y_{ij} \)” (Snijders and Bosker, 1999: 215-216). This model is fitted using Iterative Generalized Least Squares (IGLS). This maximum likelihood estimator is identical to the generalized least squares estimator if error covariance matrix is known and the errors are normally distributed (McNay et al., 2003; Dwivedi and Rajaram, 2004; Angeles et al., 2005; Ram and Singh, 2006). The MLwiN 2.02 package has been used for the analysis.
The conceptual framework shows that many variables, socio-economic-demographic and programme, conceivably influence reproductive health directly as well as indirectly through a set of intermediate variables. This suggests a path analysis to assess strengths of influences through various paths, direct and indirect. This would have been ideal in case the variables are numeric, preferably on a ratio scale. However, most of the variables in the framework are categorised and often dichotomous, including the dependent variables. This prevents meaningful path analysis. Therefore, multiple regression (logistic) was adopted that allows assessment of direct effects of various background variables as well as of intermediate factors.

3.9 Characteristics of Respondents in Villupuram District, Tamil Nadu

The present study collected information on the socio-economic and demographic characteristics of respondents from individual questionnaire. Table 3.4 presents the distribution of respondents by socio-economic characteristics. It reveals that ninety four percent of the respondents are Hindus, 3.2 percent of respondents are Muslims, and the remaining about three percent are Christians. Over forty percent of respondents belong to Scheduled Castes, one-fourth of respondents (25.1 percent) to Most Backward Caste, about one-fourth of respondents (22.4 percent) are Backward Caste, and the remaining nearly 10 percent belong to Scheduled Tribe. Information was collected about the educational status of individual respondents in the age group of 18-54 years from selected villages. More than one-third of men are reported illiterate. About ten percent of respondents have completed 1-5 years of schooling, 38 percent of respondents of men have completed 6-10 years of schooling, and the remaining 18 percent of respondents of men have completed 11 or more years of schooling.

Table 3.4 shows that 34 percent of respondents are agricultural labourers, 32 percent of respondents are cultivators, 14 percent of respondents are other unskilled manual worker/labourers, nine percent of respondents are skilled manual workers, and six percent of respondents are in salaried job Government or private. Very few were artisan, student or unemployed. About one-third of respondents households have less than four members, nearly
half have five to six members, and the remaining about one fifth have more than six members. The mean household size is 5.2 persons per household.

Table 3.4: Percent Distribution of Respondents by Socio-Economic Characteristics, Household Field Survey in Villupuram District

<table>
<thead>
<tr>
<th>Socio-Economic Characteristics</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion</td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>93.9</td>
</tr>
<tr>
<td>Muslim</td>
<td>3.2</td>
</tr>
<tr>
<td>Christian</td>
<td>2.9</td>
</tr>
<tr>
<td>Caste</td>
<td></td>
</tr>
<tr>
<td>Scheduled caste</td>
<td>42.6</td>
</tr>
<tr>
<td>Scheduled tribe</td>
<td>9.9</td>
</tr>
<tr>
<td>Backward caste</td>
<td>22.4</td>
</tr>
<tr>
<td>Most backward caste</td>
<td>25.1</td>
</tr>
<tr>
<td>Education of respondent (Year of schooling)</td>
<td></td>
</tr>
<tr>
<td>Illiterate (No schooling)</td>
<td>35.0</td>
</tr>
<tr>
<td>1-5</td>
<td>9.3</td>
</tr>
<tr>
<td>6-10</td>
<td>37.9</td>
</tr>
<tr>
<td>11 and above</td>
<td>17.8</td>
</tr>
<tr>
<td>Occupation of respondent</td>
<td></td>
</tr>
<tr>
<td>Cultivator</td>
<td>31.5</td>
</tr>
<tr>
<td>Agriculture labourer</td>
<td>33.8</td>
</tr>
<tr>
<td>Other unskilled manual worker/labourer</td>
<td>14.0</td>
</tr>
<tr>
<td>Traditional artisan</td>
<td>0.9</td>
</tr>
<tr>
<td>Skilled manual worker</td>
<td>9.3</td>
</tr>
<tr>
<td>Salaried job govt./private</td>
<td>6.4</td>
</tr>
<tr>
<td>Student</td>
<td>2.6</td>
</tr>
<tr>
<td>Other (unemployed)</td>
<td>1.5</td>
</tr>
<tr>
<td>Number of usual members</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5.0</td>
</tr>
<tr>
<td>3</td>
<td>9.6</td>
</tr>
<tr>
<td>4</td>
<td>17.8</td>
</tr>
<tr>
<td>5</td>
<td>33.8</td>
</tr>
<tr>
<td>6</td>
<td>13.1</td>
</tr>
<tr>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td>8</td>
<td>6.1</td>
</tr>
<tr>
<td>9+</td>
<td>3.8</td>
</tr>
<tr>
<td>Mean household size: 5.2 members</td>
<td></td>
</tr>
</tbody>
</table>

About seventy two percent of sample of households have own agricultural land (Table 3.5). Among those who had agricultural land, nearly one-fifth of respondents have less than one acre and about half have 1 to 3 acres. About one-third of those who have own agricultural land have some irrigation.

The availability of consumer durables is a good indicator of household socio-economic status. Table 3.5 shows that 69 percent of respondents of households have an electric fan, 61 percent of respondents of households have a bicycle, 54 percent of respondents of households have a grinder or mixer and chair or cot or bed or table, 44 percent have telephone or mobile, 32 percent of respondents of households have radio or transistor, 25 percent of respondents of households have tape recorder, and 23 percent of respondents of households have motor cycle or scooter. But less than 10 percent of household have pressure cooker or sewing machine, and not a single household in the sample has a refrigerator.

A composite index of standard of living is constructed from household amenities. In order to measure the household's standard of living conditions, the following items were used: type of house, source of drinking water, source of energy for cooking, toilet facilities, source of lighting, and ownership of durable goods are used to construct household standard of living index. This standard of living index is calculated by adding the scores (details are given in section 3.7.2.2). As per the standard of living index, 52 percent of respondents of households can be said to have medium standard of living, 32 percent of respondents of households low standard of living, and the remaining 17 percent of respondents of households high standard of living (Table 3.5).

Table 3.6 shows the percentage distribution of respondents by demographic characteristics. More than one-third of respondents are in the age range 20 to 29 years and about 31 percent of respondents are in the range 30 to 39 years. Nearly three-fourths of respondents are currently married and most of the respondents are single. Very few are widowed/separated. About one-fourth of men got married at age of less than 21 years.
Table 3.5: Percent Distribution of Respondents by Economic Indicators, Household Field Survey in Villupuram District

<table>
<thead>
<tr>
<th>Item owned</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>71.7</td>
</tr>
<tr>
<td>No</td>
<td>28.3</td>
</tr>
<tr>
<td>Agricultural land (in Acres): (Among owners of land)</td>
<td></td>
</tr>
<tr>
<td>&lt; 0.99</td>
<td>18.7</td>
</tr>
<tr>
<td>1.00 – 1.99</td>
<td>25.6</td>
</tr>
<tr>
<td>2.00 – 2.99</td>
<td>24.8</td>
</tr>
<tr>
<td>3.00 – 3.99</td>
<td>13.0</td>
</tr>
<tr>
<td>4.00 and above</td>
<td>17.9</td>
</tr>
<tr>
<td>Mean agricultural land: 2.3 acres</td>
<td></td>
</tr>
<tr>
<td>Agricultural land with irrigation (in Acres): (Among owners of land)</td>
<td></td>
</tr>
<tr>
<td>No irrigated</td>
<td>30.5</td>
</tr>
<tr>
<td>&lt; 0.99</td>
<td>12.6</td>
</tr>
<tr>
<td>1.00 – 1.99</td>
<td>22.8</td>
</tr>
<tr>
<td>2.00 – 2.99</td>
<td>17.1</td>
</tr>
<tr>
<td>3.00 – 3.99</td>
<td>9.3</td>
</tr>
<tr>
<td>4.00 and above</td>
<td>7.7</td>
</tr>
<tr>
<td>Mean agricultural land with irrigation: 1.4 acres</td>
<td></td>
</tr>
</tbody>
</table>

Ownership of consumer durable goods
- Chair/Cot/Bed/Table: 53.6
- Radio/Transistor: 31.5
- Tape recorder: 25.1
- Television: 53.6
- Telephone/Mobile: 44.0
- Electric fan: 69.4
- Refrigerator: 1.7
- Pressure cooker: 7.9
- Mixer/Grinder: 53.9
- Sewing machine: 7.0
- Washing machine: 0.0
- Bicycle: 60.9
- Motor cycle/Scooter: 23.0
- Other: 9.0

Level of standard of living
- Low: 31.8
- Medium: 51.6
- High: 16.6

Number of Men Interviewed: 343

Table 3.6: Percent Distribution of Respondents by Demographic Characteristics, Household Field Survey in Villupuram District

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of respondent (Year)</strong></td>
<td></td>
</tr>
<tr>
<td>18-19</td>
<td>3.2</td>
</tr>
<tr>
<td>20-24</td>
<td>15.7</td>
</tr>
<tr>
<td>25-29</td>
<td>21.0</td>
</tr>
<tr>
<td>30-34</td>
<td>14.9</td>
</tr>
<tr>
<td>35-39</td>
<td>16.3</td>
</tr>
<tr>
<td>40-44</td>
<td>10.8</td>
</tr>
<tr>
<td>45-49</td>
<td>13.1</td>
</tr>
<tr>
<td>50-54</td>
<td>5.0</td>
</tr>
<tr>
<td>Median age of respondents: 32.0 years</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status of respondent</strong></td>
<td></td>
</tr>
<tr>
<td>Currently married</td>
<td>74.9</td>
</tr>
<tr>
<td>Widowed</td>
<td>1.2</td>
</tr>
<tr>
<td>Separated</td>
<td>0.3</td>
</tr>
<tr>
<td>Never married</td>
<td>23.6</td>
</tr>
<tr>
<td><strong>Age at first marriage (Year)</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 21</td>
<td>25.6</td>
</tr>
<tr>
<td>21-23</td>
<td>35.5</td>
</tr>
<tr>
<td>24-25</td>
<td>18.3</td>
</tr>
<tr>
<td>26+</td>
<td>20.6</td>
</tr>
<tr>
<td>Mean age at marriage of respondents: 22.9 years</td>
<td></td>
</tr>
</tbody>
</table>

**Number of Men Interviewed** 343


Most of the respondent’s households (93 percent) have electricity (Table 3.7). A majority get their drinking water from tap. A vast majority of respondents of households (90 percent) uses wood for cooking.

Availability of toilet facilities is an important determinant of the health status of household members, and in this aspect the situation is quite poor. Over ninety percent of respondents of households do not have any toilet facilities.

In addition to that respondents were also asked about housing conditions. Nearly half of the respondents (48 percent) are living in kachcha houses, and a fourteen in pucca houses and in
semi-pucca houses. Only 36 percent of respondents of households have separate bed room and 32 percent of respondents of households have separate kitchen.

Table 3.7: Percent of Respondents by Housing Characteristics, Household Field Survey in Villupuram District

<table>
<thead>
<tr>
<th>Housing characteristic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electricity</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>92.7</td>
</tr>
<tr>
<td>No</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Source of drinking water</strong></td>
<td></td>
</tr>
<tr>
<td>Tap</td>
<td>77.0</td>
</tr>
<tr>
<td>Well</td>
<td>8.7</td>
</tr>
<tr>
<td>Surface water (river/pond/lake)</td>
<td>0.9</td>
</tr>
<tr>
<td>Other (hand pump)</td>
<td>13.4</td>
</tr>
<tr>
<td><strong>Type of fuel for cooking</strong></td>
<td></td>
</tr>
<tr>
<td>LP gas/electricity</td>
<td>8.7</td>
</tr>
<tr>
<td>Kerosene</td>
<td>0.9</td>
</tr>
<tr>
<td>Wood</td>
<td>90.4</td>
</tr>
<tr>
<td><strong>Toilet facility</strong></td>
<td></td>
</tr>
<tr>
<td>Own toilet flush</td>
<td>1.7</td>
</tr>
<tr>
<td>Own toilet pit</td>
<td>5.2</td>
</tr>
<tr>
<td>No facility</td>
<td>93.0</td>
</tr>
<tr>
<td><strong>Type of house</strong></td>
<td></td>
</tr>
<tr>
<td>Kachha</td>
<td>48.1</td>
</tr>
<tr>
<td>Semi-pucca</td>
<td>25.7</td>
</tr>
<tr>
<td>Pucca</td>
<td>26.2</td>
</tr>
<tr>
<td><strong>Separate bed room</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>35.6</td>
</tr>
<tr>
<td>No</td>
<td>64.4</td>
</tr>
<tr>
<td><strong>Separate room for kitchen</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>31.5</td>
</tr>
<tr>
<td>No</td>
<td>68.5</td>
</tr>
<tr>
<td><strong>Number of Men Interviewed</strong></td>
<td>343</td>
</tr>
</tbody>
</table>

Accesses to a radio or television are very important for exposure to innovative ideas. The respondents were asked if they read a newspaper, listen to a radio, or watch television daily or at least once a week. Table 3.8 shows that one-third of respondents read a newspaper every day, and about thirty percent of respondents are listening to the radio daily. Overall, about half of respondents watch television every day and 20 percent once in a week.
Table 3.8: Percent of Respondents by Specific Exposure to Mass Media, Household Field Survey in Villupuram District

<table>
<thead>
<tr>
<th>Exposure to Mass Media</th>
<th>Daily</th>
<th>Once in a Week</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read newspaper</td>
<td>33.8</td>
<td>21.9</td>
<td>44.3</td>
</tr>
<tr>
<td>Listen to radio</td>
<td>29.2</td>
<td>16.0</td>
<td>54.8</td>
</tr>
<tr>
<td>Watch television</td>
<td>51.9</td>
<td>20.4</td>
<td>27.7</td>
</tr>
<tr>
<td>Number of Men Interviewed</td>
<td>343</td>
<td>343</td>
<td>343</td>
</tr>
</tbody>
</table>


The risk factors such as smoking and alcohol drinks are strongly associated with health problems of individuals as well as household members. Therefore, the survey collected information on alcohol consumption and smoking from respondents. More than half of the respondents had alcoholic drinks in the past and 42 percent of respondents had smoked in the past (Table 3.9).

Table 3.9: Percent of Respondents by Risk Factors, Household Field Survey in Villupuram District

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoked</td>
<td>42.0</td>
</tr>
<tr>
<td>Drink alcohol</td>
<td>53.6</td>
</tr>
<tr>
<td>Number of Men Interviewed</td>
<td>343</td>
</tr>
</tbody>
</table>

Note: 1. Percentages may add to more than 100.0 because of multiple responses.

3.10 SCOPE AND LIMITATIONS OF THE STUDY

For an overall assessment of reproductive morbidity, this study covers the states of India, but for more detailed analysis the scope has been restricted to the state of Tamil Nadu. Both spatial variations and influence of factors have been examined within the state of Tamil Nadu. Though our interest is in the reproductive and sexual health as such, reproductive and sexual health is a very broad concept and it would be nearly impossible to examine various aspects of it. Therefore, it was decided to restrict the scope of the study to reproductive morbidity. The present study has certain limitations that must be acknowledged here. While the DLHS-RCH covered aspects of reproductive health in details, the reporting of male reproductive morbidity was low. This could be due to the sensitive nature of this aspect.
However, even the field survey by the researcher could not overcome this problem. As a result, male reproductive morbidity as such as could not be studied satisfactorily. Hence, for male reproductive health, it become necessary to focus on awareness of issues and facilities rather than morbidity. Consequently, treatment seeking for male reproductive morbidity is not examined for respondents specifically but in a general sense for them, spouse and friends. Further, though the survey covered details of reproductive health service facilities in the study area, these could not be directly linked to the sample households in the DLHS-RCH-2 since the villages cannot be identified individually in the survey data files. Similarly, one-to-one linkage between study villages and PHCs is not done since the network of PHC is dense and men may access facilities anywhere often outside the neighborhood for the sensitive matter of RTI/STI.