CHAPTER II
CHAPTER 2

STUDY DESIGN AND METHODOLOGY

Almost 50 percent of today’s ‘third world’ population is estimated to live in conditions of extreme poverty. The severely detrimental social, psychological, and physical effects of this on children, especially in urban settings, have seldom been recognized. Poor housing, inadequate and often contaminated water supply, overcrowding, poor water disposal and poor sanitation quickly translate into malnutrition, respiratory infections, diarrhoeal diseases and other waterborne infections, accidents and retarded growth. These are largely products of the urban environment. Lack of parental supervision, child abandonment, early childhood labour and other social problems associated with poverty proliferate within the poorest areas of the cities. In order to know these aspects in detail, the profile of slums in Mumbai are discussed and then methodology.

Thus this chapter presents the detailed methodology of selection of the study areas i.e. Rafi nagar slum in Deonar on plain area and Ramabai Nagar slum in Bhandup on hilly area and then sampling procedure to select samples from these areas. This methodology is followed by descriptions of slums in Mumbai and then detailed profiles of the study area slums. This chapter also discusses fitting of models such as logistic regression for analyzing the data and also some relevant statistical distributions Z-test, and analysis of variance
(ANOVA) depending on the nature of the data, quantitative or qualitative type. This chapter ends with the methods of construction of different indices such as standard of living of index (SLI) when data on income and consumption measures is not available.

2.1 Profile of the Study Area:

According to a UNESCO document, “a slum is a building, a group of buildings, or area characterized by overcrowding, deterioration, unsanitary conditions or absence of facilities, or amenities which, because of these conditions or any of them, endanger the health, safety or morals of its inhabitants or the community (Anderson N. N., 1960). “Slums may be characterized as areas of substandard housing condition within a city. A slum is always an area. A single, neglected building even in the worst stage of deterioration does not make a slum” (Bergel E. E., 1955). Apart from these definitions, slum is an area of darkness, an area of poverty and thus poverty is the prime characteristic of slum. The urban malaise of shelterlessness and man’s efforts to solve in the most adverse circumstances of poverty and illiteracy are seen in its most concrete form in slums, shanty-towns, shack-towns and squatter’s colonies. Reduced to its basic features a slum is nothing but an area of sub-standard housing. As defined by Slum Area Improvement and Act, 1956 “slums are those areas where the buildings are in any respect unfit for human habitation and are by reason of dilapidation, overcrowding, faulty arrangements of streets, lack of ventilation facilities or any combination of
these factors, are detrimental to safety, health and morals” (Nangia et., al., 2000).

Large scale migration to the cities became a natural consequence as huge factories, aided by power-driven transport to market their goods, began to appear. The factory, the railroad and the slum-this is how Mumford delineates the elements of the new industrial city.

Slum is associated with Industrial Revolution and slowly it became a part and parcel of urban life and resulted in an influx of migrants into cities in search of livelihood. For the people who have migrated into the city, a place of living has become the necessity and finding no proper place, people started living anywhere and every where possible and this human struggle for shelter resulted in the growth of slums. Slum is a harsh reality of urban life and slum living is something painful, inevitable and makes every one cautious that though something is being done to improve it, yet much more needs to be done. Slums are generally inhabited by poor people and though not all, many of them live under poverty conditions (Ramana, 2002).

Slums are known by different terms in different places of India as - Katras, Gallis, Juggi-jhopris, Chawls, Ahatas, Bustees, Cheris, Keris, Petas, etc. They are termed as Jeales in Latin America, Filveia in Mexico, Buessosasies in Chile, etc. Sociologists have coined some terms to denote slums such as - Blight Area, Renewal Area, Deteriorated Area, Gray Area, Lower Class Neighbourhood, Low Income Areas (Yadav, 1987). They are also referred to as
Squatter Settlements, Hutment Colony or Shanty Town. The Oxford University Dictionary (1955) defines slum as 'street, alley, court, etc. situated in a crowded district of a town or city and is inhabited by people of low income classes or by very poor, a number of these streets or courts forming a thickly populated neighborhood or district of a squatted or wretched character'.

Urban slums have been studied by economists, ecologists, anthropologists, sociologists and other social scientists in all the important cities of India. These include Mumbai, Calcutta, Delhi, Madras, Poona, Bangalore, Kanpur, Chandigarh, Amritsar, Ahmedabad, Hyderabad, Secunderabad, Warangal, Vijayawada, Visakhapatnam, etc. Depending upon the nature of interest of their study, the social scientists have concentrated on different aspects of slum life. However, a majority of them have emphasized on the economy of slum life. Here, an attempt has been made to briefly review literature on slum, under three headings - (i) studies that describe slum as disorganized, (ii) studies that describe slum as organized and (iii) slums as places of poverty and poor amenities.

i) Slum as disorganized

Some scholars have pointed out that slums lack family organization, community life and are disorganized in the sense that people there live in frustration, agony and despair. In one of the earliest studies on slums by Zorbough (1929), slum is defined as a bleak area of segregation of the sediments of society, an area of extreme poverty, tenements, ramshackle
buildings of eviction and evaded rents. Slum is an area which has reached the limit of decay and is on the verge of disorganization. Clinard (1966) views slums life 'as a way of life, a subculture with a set of norms and values which is reflected in poor sanitation and health practises, deviant behaviour and characteristic attribute of apathy and social isolation'. Desai and Pillai (1972) pointed out that slum is basically 'an area of darkness, despair and poverty'. The problems marked by them are substandard incomes, relatively low rates of literacy, bad housing, insufficient medical care, inadequate sanitation, poor access to public utilities and malnutrition (Desai and Pillai, 1970). Venkatarayappa (1971) says that, 'there are some areas of noise, confusion, dirt, ill health, tension and congestion. These are areas of confusion and their problems are negative in character. Such areas of extreme negative character are called slums' (Majumdar, 1977).

ii) Slums as organise

Whyte (1943) in his work titled 'The Street Corner Society' feels that emphasis should be laid on the reorganisation of the slum rather than on the disorganizational aspects of slum life. He says that in an American slum, the behaviour of the slum dwellers was organised. Siddiqui (1968) while studying the problems of Calcutta bustees says that bustees are in all respects well integrated social units of the community. They have vital links both economic and social with their surroundings in the city. The bustees are not disorganized areas; but they are more in nature of the segregated areas of the less privileged than anything else who suffers from discrimination, rejection and
lack of integration rather than disintegration. Findings of Sandhu (1989) on the study of ‘Urban Poor in Amritsar City’ demonstrate that the slum dwellers of Amritsar had plans for the improvement of their living conditions. They aspired to get better education to their children and they wanted their children should adopt well-paid and socially respectable occupations. They were structurally marginal but not culturally. They were organized and did not live in darkness and despair. They had been ignored by the government and received little attention from the policy makers. Weibe (1975) gives a comprehensive picture of the ways in which the members of a slum in Madras city socially organize their lives and relate themselves to their environment (Woodruff 1960 and D'Souza, 1980). Rao & Rao (1984) pointed out that while physical attributes like absence of water, drainage, sewage and clearance of garbage are universal when identifying a slum area, social characteristics such as vice, ownership right of houses and legality or otherwise of the area are not the essential attributes. Slums may be organized in some respects but may also be disorganized in some other respects. This is what is observed in the study (Ramana, 2002) where Muslims have a well-knit organized social and political life. But at the same time, there are many disorganized, disintegrated families within the slum and with community effort and intervention of an external agent, the slum can transform itself into a good place of living. Stokes (1962) divides slums into four types on the difference between permanence and temporary and between necessity and opportunity. The permanent slums are the slums of despair and the temporary ones are the slums of hope. Ribeiro (1982) points out the priorities of the urban poor can be presented in the following orders: (1) food and employment opportunities, (2) basic amenities,
(3) social needs', and (4) recreational facilities. While providing these requirements - emphasis is laid upon self-help, community participation and settled urban neighbourhood. Cognizance is also being given to the role of voluntary agencies in helping the urban poor. Bapat (1983) while studying the hutments in Pune points out that the inequitable distribution of even those resources as are available to the city authorities and wrong urban and housing planning is the root cause of urban problems. It is stressed that only through community efforts and with the participation and co-operation of the people alone, the development can take place.

iii) Slums as places of poverty and poor amenities

Dandekar and Rath (1971) pointed out that poverty is endemic not only in the country side, but is also prevalent in the city and more so in urban slums. Lewis (1959) viewed slum life as part of the subculture which depicted 'culture of poverty', which is both an adaptation and a reaction of the poor to their marginal position in a class-stratified highly individualised capitalistic society. The study of Lewis is based on the field studies of the five families in Latin America, but many of the social scientists have refuted the theory of 'culture of poverty' (Valentine, 1968; Weibe, 1975; Puneet, 1982, and Rao & Rao, 1984). Writing the foreword for Mallika Pothana's (1991) study Rao points out that poverty in the absence of communal consciousness has high potential of generating social disorganization.

As regards slums as places of poor amenities, many studies have
highlighted this aspect (Ford, 1936; Bharat Sevak Samaj, 1956; Ratna Naidu, 1978; Manohar Rao, 1991 and others). In fact Bergel (1955) defines slum 'as an area of substandard housing condition within a city'.

2.1.1 Profile of the Slums in the Mumbai City

The origin of Mumbai slums can be traced to its development as an important political and economical centre of the country. Because of this fact, it naturally attracted a large number of people from rural areas. The rise in its population during the last over half century has been fairly rapid. Private enterprise constructed houses with a maximum profit motive, which gave birth to buildings, commonly known as 'chawls'. The chawls consists of a number of tenements, usually of one small room for each family and served by water-closets, washing places and water taps common to all tenements. These chawls were, most of them, 3 to 6 stories high.

In absence of any town planning and satisfactory standards laid down by the law in respect of minimum accommodation and sanitation, the general groth of the city had been haphazard and the tenements put up were mostly substandard. A great majority of the buildings in the slums being more than 50-60 years old are built to standards that are utterly obsolete. The parts of the city in which old buildings predominate soon got blighted and many of the areas lapsed in to slums of the worst type. The cheap type construction of the single storeyed corrugated iron sheet structures for residential purpose known
in common parlance as ‘patra chawls’, mainly in northern outlying areas of the
Mumbai city, during the post-First World War depression period has
contributed in no small measure to the growth of the slums. Slums can be
grouped into three: i) areas comprised of permanent and multi-storeyed
buildings which are constructed years ago when the standard for living were
much lower and the principals of sanitation were different from what they are
today. ii) properties or areas built-up with authorized, but temporary, or semi-
perminant residential structures whose deteriorations in structural and
sanitary conditions is fast and iii) slums consisting of unauthorized and in-
sanitary huts put-up by vagrants and homeless people on vacant lands not
necessarily their own. A general survey (War before 1971) of the blighted area
of the city was made by the Municipal administration and 85 localities
admeasuring in all about 330 acres were designated as slums. The survey
conducted in 1971 had revealed that not only the old slum spots had increased
in extent, but many more areas had deteriorated in to slums. The number of
present slums within the city could be placed at 144 and they were spread over
a total area of 877 acres in different wards. These 144 slums were comprised
of 8951 buildings and about 4238 huts. A very large majority, 7591 buildings
were residential and only 1360 were non-residential buildings. Huts were used
as residences except for a few shops of essential commodities. It was found
that 83451 families were housed in these structures out of which 23058
families were of industrial workers. The total population living in the slum was
found to be about 4.16 lacs. Thus this gives an idea how slums in the Mumbai
were formed. But the present scenario is quite different and is stated in the
present study.
The present study was conducted during June-August, 2005 in Mumbai of Maharashtra state of India. The state of Maharashtra situated in the western part of India, came into existence on 1st May, 1960 with the merging of territories of Bombay State, Madhya Pradesh and Andhra Pradesh. It has a land area of 307713 sq. km. which is about one-tenth of the total land area of the country, India. As per the 2001 Census of India, the total population of the state is 96.8 million, which is 9.4 percent of the total population of India.

In terms of population size, it is the second largest state of India, Next to Uttar Pradesh. The population density of Maharashtra has increased from 257 persons per sq. km. in 1991 to 314 persons per sq. km. in 2001. The state has six divisions and forty six percent of the state population is concentrated in two divisions Konkan and Pune which forms the most, industrialized part of the state including Mumbai. According to the 2001 Census, the population density within the state ranges from 208 persons per sq. km. in Nagpur division to 807 persons per sq. km. in Konkan division (Director of Census operations, Maharashtra, 2001a). According to the estimates of the Planning Commission, more than one-third of the state population (37 percent) is below the poverty line. Maharashtra has been a destination for a large influx of migrants from other parts of India. Net migration has contributed 19 percent to its population growth during the last decade. The sex ratio for Maharashtra is 922 females per 1000 males.
The city of Mumbai is originally a cluster of seven islands having an area of 603 sq. km. It has grown at a tremendous pace over the years. Between 1941 and 1961 the population grew 2.5 times and between 1961 and 1981 was of two times. Between 1981 and 2001 the population increased from 82 lacs to 120 lacs. Thus the overall population density of Greater Mumbai works out to be 19000 persons per sq. km. where as stated earlier Maharashtra’s only 314. This high density of population coupled with dearth of housing has lead to the development of degrading slums.

Mumbai being the capital of Maharashtra and also the metropolitan city, it has many features to attract people; the main attraction is the job opportunity. Many people come to Mumbai in search of job and once they get job, these people finds the solution to stay in the city where ever possible as per their earning capacity. Some of the features of Mumbai city are, it has organized industrial sectors, high literacy rate among workers, well planed transportation facility, good drinking water facility, and underground sewage system including continuous flow of electricity. Basic education is provided by Municipal corporation schools and even private schools and free education to girls is also provided by the Govt. of Maharashtra including good health services, which is remarkable. Many Anganwadies, located in slums are imparting education to the slum children and also to adults so called ‘adult education’. Therefore on the larger scale, the migration takes place from the most parts of the India to Mumbai.
Slums in Mumbai have occupied lands owned by Municipal corporation land, Government and private bodies. Geographically Mumbai have surroundings of hills and spreads over towards North East the areas like Chembur, Trombay, Mankhurd etc., towards North side, the hills are located at Kurla, Ghatkopar, Vikhroli, Powai, Kanjur Marg, Bhandup, Mulund and then it moves towards Thane districts. In the western part of Mumbai, the hills are seen from Andheri towards Jogeshwari, Borivali, Dahisar and then moves towards Vasai in Thane district. Most of the slums are on the plain area which is at the bottom of the hill and hence whenever there is shortage of the land to construct the huts, the slum dwellers starts constructing it on the terrain of the hills and even occupies entire hill.

Information of these slums is recorded in the “Directory of Slums a) Slums came in into existence prior to year 1976 in Greater Mumbai. b) Slums came in into existence between years 1976 to 1980 in Greater Mumbai” published by the office of the additional collector (ENC), Mumbai & Mumbai Sub. Dist.

According to the Census of India 2001, about 49 percent of population of Mumbai lives in the slums. About 28 percent and 21 percent of total population is male and female respectively who lives in slums. The slum sex ratio of Mumbai is 929 and slum literacy rate is 83.13 where as slum female literacy rate is 75.17 and slum male literacy rate is 89.08. This rate is above the national level. Since female sex ratio is quite low compared with male sex ratio, indicates that these slums have net in-migration dominated by male
migrants. Apart from migration, excess female mortality, a larger undercount of females than males and sex selective abortions are other major factors that are likely to result in a sex ratio unfavourable to women in the city of Mumbai (NFHS-2).

Houses in a slum, either consists of huts (zopadis) constructed largely of wooden planks, cane, bamboo and occasionally, bricks and tiles or of single-room home in concrete buildings called (chawls), each of which contains about 20 houses. The slum area is congested and has few amenities. A profile of the community suggests that two in three families reside in homes measuring 100 square feet or less; these homes usually accommodate entire families.

Water facilities are erratic and insufficient for over 90% of the slum, and clothes and utensils are washed, beside the open drains. Toilet facilities are poor, an average of one for 15-20 chawl residents and for 250 zopadi residents. Narrow pathways crisscross the slums and are lined with open drains and open garbage. There is no open space and the air is highly polluted due to the smoke emitted by nearby factories.

In Mumbai slums, the median age of household heads is 41 years. The large majority of slum dwellers are Hindu (62%) followed by Muslim (30%), Christians (4.3%), Sikhs (0.1%), Buddhist (3.6%) Jain (0.2%) and others (0.1%) (NFHS-2). The proportion of household heads belonging to any of SC (11.4 percent), ST (2.2 percent)and OBC (14 percent)and ‘Other’ (72.3 percent) and overall group percent is 28 percent in slum areas of Mumbai. The mother
tongue of residents is Marathi; other mother tongues included Telegu, Hindi and Gujarati. Slum dwellers are generally, poor and poorly educated. As many as 61% live below the poverty line; one in three (31%) is illiterate and another 30% have had no more than a lower primary education. Few women work 14 percent are employed for wages. Nuclear family households (consisting of an unmarried adult living alone or a married person or couple and their unmarried children, if any) are 54.8 percent and non-nuclear households are 45.1 percent. The average household size is 5.2 persons.

**Housing Characteristics:**

The proportion of households with electricity is 99 percent in slum areas of Mumbai. Water sources and sanitation facilities may have an important influence on the health of household members, especially children. NFHS-2 found that 59 percent of households in slums in Mumbai use piped drinking water, 41 percent uses Public tap, 0.2 percent drink water from hand pumps, and 0.3 percent drink water from wells. Most households have fairly easy access to drinking water. Ninety percent of households in slums in Mumbai have a source of drinking water in their residence/yard/plot or take less than 15 minutes to get drinking water, including the time to go to the source, get water, and come back. Even in the slum areas of Mumbai, 62 percent of households drink purified water. Fifty five percent of households strain their drinking water by cloth, 0.5 percent uses alum, 3.7 percent use a water filter, and 11 percent boil their water. 0.3 percent of households use an electronic
purifier and the same percent 0.3, uses ‘other’ method. Thirty-eight percent of households in slum areas do not purify their water before drinking.

Regarding sanitation facilities, only 8 percent of households in slum areas have their own flush toilet; 8 percent of households have a flush toilet (using either piped water or water from a bucket for flushing); 80 percent of households in slum areas use a public flush toilet; 0.1 percent have a pit toilet or latrine; and 4 percent have no toilet facility.

Regarding type of house construction, 4 percent of households in slums in Mumbai live in houses that are kachha (made with mud, thatch, or other low-quality materials), 45 percent live in semi-pucca houses (using partly low-quality and partly high-quality materials), and 51 percent live in pucca houses (made with high-quality materials throughout, including the roof, walls, and floor). Crowded housing conditions may affect health as well as the quality of life. Twenty-seven percent of households in slums in Mumbai live in houses with less than three persons per room. The proportion living in households with three or more persons per room is much higher in slum areas (73 percent). The mean number of persons per room is much higher especially in the slum areas of Mumbai (4.2 persons per room).

**Background Characteristics**

The proportion of respondents in five-year age groups increases from 6 percent in the age group 15-19 years to 22 percent in the age group 25-29 years, and then falls steadily to 6 percent in the age group 45-49 years.
The initial increase reflects the increasing share of evermarried women in these age groups. The decline after age 25-29 (an age by which most women have been married) reflects the normal pyramid shape of the population's age distribution. Slightly less than half (48 percent) of the respondents are in the early reproductive age group of 15-29. The concentration is particularly high in the high fertility age group of 20-29, which contains 42 percent of respondents. Forty-eight percent of respondents in slum areas of Mumbai are in the age group 15.29. Eighteen percent of respondents from slum areas of Mumbai are above age 40.

92 percent of respondents are currently married. 5 percent are widowed, 34 percent are illiterate women. 9 percent were literate but studied below primary level. 28 percent studied primary school, 24 percent, high school and above.

The occupational structure of the slums shows that 2.5 per cent are working in farm or business, followed by 16.4 per cent employed by some one else, 3.4 percent are self employed and 77.8 percent were not working from the last one year.

20 percent of women had age at first cohabitation in the age group 20-24 which was maximum. Total fertility rate was 2.7 percent. Mean number of children ever borne to all women age 40-49 years was 3.54.
Among demographic characteristics, the average respondent was acted 30, had 2.6 surviving children and was married at 17.1 years of age. The mean age at first pregnancy was 19.5 years.

The level of illiteracy among women is lower in slum areas of Mumbai and is 34 percent. 14 percent of women in the slum area reported that their husbands are illiterate.

Fifty percent of women in Mumbai (33 percent in slum areas) have husbands who have completed at least high school. Sixty percent of respondents in Mumbai are Hindu, they are concentrated in slum areas. The proportion of Muslim women is higher and they are more likely to live in slum areas (31 percent).

The TFR for slum areas of Mumbai is 2.69. Within Mumbai, the proportion of births of order one is 35 where as the proportion of births of order four or higher in slum areas is 18 percent. Short birth intervals may adversely affect a mother’s health and her children’s chances of survival. Past research has shown that children born too close to a previous birth are at increased risk of dying, especially if the interval between the births is less than 24 months. 14 percent of slum women had a birth interval of 12 to 17 months. Birth intervals for women in slum areas of Mumbai are 20 months. The Median age at first birth is 20. In the slum of Mumbai, the percentages who want at least one son (sex preference) is 76 percent, and the percentage who want at least one daughter is 72 percent.
Infant mortality rate in slum area is 28 i.e. 28 deaths per 1000 live births. Vaccination coverage rates are low in slum area of Mumbai.

In the slum of Mumbai, quite a less proportion of children received their vaccination from the public (78 percent) and private medical sector (20 percent). Only 56 percent of children age 12-35 months received at least one dose of vitamin A. Percentage of children who were suffering from cough accompanied by fast breathing (ARI), Fever, any diarrhea, Diarrhoea with blood was 11, 36, 22, and 0.5 respectively. Only 55 Percentage of women had knowledge about ORS packets.

79 Percentage of women had heard about AIDS and 26 Percentage of women did not know ways for avoiding AIDS. Percentage of women with any anemia was 46. 32 percentage of women started breast feeding within one hour of birth. Percentage of children with any anemia was 78.

Antenatal check-up only at home from health worker was 0.9 percent, from doctor was 89 percent, where as no antenatal check-up was 5 percent. Slum women received T.T. injections and iron and folic acid tablets or syrup were 89 percent for both. Percent of women who had delivery at public and private hospitals were 48 percent and 35 percent and 16 Percent had home delivery.

The percentage of assistance during the delivery by doctors were 74 percent and by Dai, 11 percent. The slum women reported vaginal discharge accompanied by any abnormal vaginal discharge (55 percent), Itching or
irritation (28 percent), Bad odour (8 percent), Severe lower abdominal pain
(32 percent), Fever (11 percent) and other problems (36 percent).

29 percent reported symptoms of a urinary tract infection. 62 percent had
reported any abnormal vaginal discharge or symptoms of a urinary tract
infection.

Ten percent report painful intercourse and 1 percent report bleeding after
intercourse. Women in Mumbai slums have the highest prevalence of reported
reproductive health problems of any group of women. 65 percent had reported
any reproductive health problem.

Percentage of women who had at least one home visit by a health or family
planning worker in the 12 months preceding the survey was 22 percent,
median number of visits was 3.2 and median number of months was 1.9.

Besides to these, the health services are provided by major hospitals i.e.
L.T.M.G. hospital, located at Sion, K.E.M. hospital, located at Parel and Nair
hospital, located at Bombay Central run by Brihan Mumbai Municipal
Corporation, Mumbai and government hospitals, J.J. hospitals at Byculla and
G.T. Hospital, Fort, run by Government of Maharashtra and for children, Wadia
hospital at parel. Even in each ward, Urban Health Centres with its sub-centers
are run by Municipal corporation of Mumbai. One CHV is appointed to look
after 1000 people in the respective area. The hospitals like Tata Memorial
cancer hospital, Parel, Nanavati hospital, Santasruz, Lilavati Hospital, Mahim
and Breach Candy hospital, Kemp’s Corner, Bombay Hospital, Pedder Road, Wokhard Heart hospital, Mulund etc. are also run by private trusts in the city.

2.1.2 Selection of the Sample Area

For the present investigation, two stage sampling procedure has been adopted.

a) i) In the first stage, the slums in the Greater Mumbai according to their population size were listed using the “Directory of Slums” published by office of the additional collector (ENC), Mumbai & Mumbai Sub. Dist. (see ref.).

ii) Two lists were prepared, one for plain area slums and other for hilly area slums.

iii) From each list, one slum was selected at random. Hence one slum from plain area and another slum from the hilly area were obtained.

iv) Plain area slum was Rafi Nagar slum located at Deonar and hilly area slum was Ramabai Nagar slum at Bhandup(w).

iv) The populations of these slums (study area) are 5500 and 3500 respectively.
b) i) In the second stage of sampling, from the selected two slum areas, using cluster sampling, two clusters were selected at random from each slum area.

ii) From these two clusters of Rafi Nagar slum area 433 households and from two clusters of Ramabai Nagar slum area 349 households were selected and then were interviewed using structured schedule. In all, this study covers 779 reproductive women, 3 being non response, in two slums representing slum population in Greater Mumbai.

This survey was conducted from June to August, 2005.

**NON RESPONSE**

While conducting the survey two respondents were out of station and one respondent was not available at the time of investigation. Thus such 3 cases were not included while analyzing the data.
2.1.3 Description of study Slum on the Plain Area and Hilly Area

This section describes the study areas namely, the Rafi Nagar slum on the plain area in Deonar and Ramabai Nagar slum on the Hilly area in Bhandup in detail and is as follows:

a) Description of study slum on the plain area

The densely populated slum, Rafi Nagar comes under M/East ward of Brihan Mumbai Municipal Corporation, Mumbai situated near Govandi (west) railway station, a suburb in the eastern part of Mumbai.

The slum sex ratio of M/East ward is 785 and female literacy rate is 67.49 as compared to male literacy rate of 82.9. This ward spreads over 34.38 sq. km. and has population density of 13,730 (1991 Census) population per sq. km. Deonar is at the third rank position as far as slum area’s population is concern. In Deonar out of 6.72 lacs of population, 5.22 lacs of people stay in slum area (population density - 19,546 per sq. km.), according to the Census of India, 2001, Maharashtra population data with data on slum population in urban units.

Rafi nagar which is next to the Shivaji nagar, which is one km. away from Govandi (West) railway station, is another straw ling slum on the south separated by 120 feet road. On the north of Rafinagar is BMC’s dumping
ground. On the East is Shivaji nagar BEST depot and West side it has 30 feet wide nullah.

This slum area spreads over approx 0.30 sq. km. having about 1000 zopadis (huts) and makes about 5500 residents. Most of the inhabitant are migrant from the states Uttar Pradesh, Bihar, West Bengal, some southern part of India including interior part of Maharashtra. The majority of huts are kachha, semi-pucca and very few pucca. The entrance of the slum is very narrow and full of muddy. This entrance begins with grocessory shops and other shops which are on either sides of the lane. This slum was formed in the year 1970 with tenement size of 20. Normally, 4-5 families come together and then occupy such open land so called, ‘dumping ground’ which is being used by municipal corporations for accumulating garbage. Such group of families start living on such grounds by erecting 4 bamboos on four sides separated by 6-10 feet making an area of about 60-100 sq ft, and then they cover it with plastic sheets, thus forms ‘Zopadi’ (hut) such huts are called as kachha house. This is the initial stage of how hut is constructed. Then in the latter stage the inhabitant uses tin sheet so called ‘patra’ as walls, and for roof they use asbestos sheets or tin or some times squared tile, called “kaul”, thus called ‘kaularu house’ and known as semi-pacca house. The huts made up using bricks with mud or cement for walls and tin as roof is called pacca house. Even most of the zopadi covered with plastic sheet besides to whatsoever material they use for roof. It is also seen that some of the houses had mezzanine floors within the house. When many such huts constructed adjacent to each other it becomes a congested locality. The Rafi nagar is also of the same type where
the huts are congested; have area ranging from 60 sq. ft. to 100 sq. ft. and in rare case more than 100 sq. ft. It was found that 8-10 family members including relatives or guests used to reside in a single room of house but rarely in two rooms house.

Drinking water facility was found to be very poor in this area. People used to connect the rubber water pipe at the end of lane to the main water line through which they used to accumulate water in their houses turn by turn to all huts of that particular lane or they used to bring drinking water from common tap, normally provided by the Municipal Corporation and thus this water was found to be hardly sufficient for drinking and other purposes.

Sanitation is also very poor in the study area. Slum dwellers use common toilet located in the study area or otherwise they prefer the locations of 30 ft. wide nallah. The toilet facility and drinking water through plastic pipe, facility are paid services including electricity which is shared among the residents. Many study women were using kerosene as fuel for cooking.

As there is no proper drainage system in the study area, dirty gutters formed automatically while washing utensils and clothing just out side the house. These gutters are always found in between two rows of such houses. Children also use these gutters for toilet purposes and as there is no sufficient common ground to play, children play near this gutter. Thus leads to the communicable diseases like diarrhea, cough with fever etc.
As, many people stay in the small room which has hardly ventilation with no sufficient sun light, no sufficient water even for bathing and also for toilet, many members of such family always feels like sick and thus household of the family hesitate to go to his job.

Mothers prefer to send their children to Madarsa, normally in the ‘Masjid’ which impart knowledge of holy Kuran in Arabic language. Such education is free of charge. Female child helps their mother for domestic work but doesn’t go to school, in more percentage, as observed. Even mothers send their children to near by Urdu medium schools or to the schools run by Municipal Corporation and rarely to the private schools.

The environmental conditions in the slum are very dirty, dirty smell is one of the characteristic of this area. Grossary shops are full of flyes and mosquitos. Women and Men used to do ‘embroidery work’ i.e. Jari-work, colouring to sari, shoe uppers etc. in the congested lane and used to work near to dirty gutter. Living together in a congested room with unhygienic atmosphere having contaminated drinking water may leads to the diseases like T.B., Malaria, and Asthma etc.

It was also found that the residents of this area can not afford good medical facility, hygienic food, and reasonable sanitation as they are extremely poor. For the health services they prefer near by Sub-Urban Health Centre located in the Lotus colony which is adjacent to the Shivaji nanar area and for the major ailments, they prefer to go to the Urban Health Centre.
(UHC) adopted by Nair Hospital, where full-fledged team of doctors and para-medical staff serve the community.

It was also found that, many times the slum dwellers, particularly, study women doesn't avail medical facility till the disease take its own shape. The reason is that they have to spend a small portion of money in buying the medicines as prescribed by the doctors (as she want to spend this money for their family), but she do avail the same for their children. ‘Shatapdi’ hospital, run by Municipal Corporation is generally used for delivering a child and for ANC they go to UHC but tendency of study women for regular Post Natal Check-ups was rarely seen. It was also observed that many study women prefer to deliver their child at home and for the vaccination of the child they either attend Pulse Polio Camps which regularly being held in the study area or they go to Sub-UHC or UHC. It was also observed that, quite a few number of study women avail the medical treatment either from UHC or from private hospital for their reproductive health problems. It was also observed that the respondents were found to be very frank with the investigators which were undergraduate/ graduate girls to whom full training was given and their doubts were discussed and solved with residents doctors from UHC.

b) Description of study slum on the hilly area

The densely populated slum, Ramabai Nagar comes under S ward of Brihan Mumbai Municipal corporation, Mumbai. This slum is situated on hilly area and is slightly away from Bhandup railway station, a suburb in the Central Mumbai.
The slum sex ratio of S ward is 816 and the female literacy rates of this 81.67 compared to male literacy rates of 93.02 respectively. This ward spreads over 25.22 sq. km. and has density of 22,523 (1991 Census) population per sq. km. respectively. Bhandup is at the second rank position respectively as far as slum area population is concern. In Bhandup out of 6.91 lacs of population, 5.71 lacs of people stay in slum area (population density - 27,398 per sq. km.), according to Census of India, 2001, Maharashtra population data with data on slum population in urban units.

**Pic-1 Profile of the study area**

Ramabai nagar slum was formed before 1980. This slum was constructed on the forest land. The residents are of mixed category like tribals, and many migrants. This slum has 2 parts Ramabai nagar no. 1 and 2 and spreads over 2 km of periphery. This study was conducted in Ramabai nagar slum no. 2 where the population is 3500. Many of the residents stay in semi-pucca house having roof as asbestos sheets or tin or squared tiles. Homes either consists of huts (zopadis) constructed largely of wooden planks, cane, bamboo and occasionally, brick and tiles or of single-
room flats in concrete buildings called (chawls), each of which contains about 20-25 flats. The area is congested and has few amenities.

Drinking water facility was very poor. Many of them does not have their own water taps. Normally residents get water from the common tap which is provided by the Municipal corporation. These locations are used for washing cloths and utensils and even bathing purposes also, till water is available this converts in to the open drains. Toilet facilities are poor i.e. an average of one for 25-30 chawl residents and for 300 zopadi residents. Narrow pathways crisscross the slums and are lined with open drains and open garbage. There is no open space and the air is highly polluted due to the smoke emitted by nearby factories.

Most of the inhabitant are migrant from UP, Bihar, West Bengal, and interior parts of Maharashtra. Income of these residents is quite low, hence they cannot afford to give good education to their children and even they cannot have sufficient food.

It is very difficult to get medical facilities, as they stay on hill, which takes at least 20-25 minutes to come down to the sub-urban health center. Urban health center is located just at the bottom of the hill and to go up again it takes at least 40-50 minutes. Besides to this it was found that community health volunteers perform their duties well in the area.
Generally for the delivery, the study women are sent to the govt hospital near the station and for ANC and PNC they visit this hospital. In short what is observed is the life of these residents are very hard as they stay on hilly area.

Pic-2 Environmental conditions in a slum

2.2 Methodology of Data Collection

RESPONDENTS

The present study covers women in the reproductive age group of 15-49 years staying in study area and has given at least one live birth were interviewed. The houses where in married women who have not given the birth during the last three years prior to the survey were not found, such houses were dropped.
PREPARATION FOR FIELD WORK

The maps of both the slum localities were obtained from Urban Health Center / Sub-Center of the study area.

Before collecting the data, the pilot survey was conducted in both the slums. After getting responses from the respondents, some amendments were made in the schedule and then such schedule was used for collecting data. The feedback was also given to the entire field staff (Investigators) before taking main survey.

The process of data collection was continued till the required sample size was attained.
2.2.1 Quantitative Information

Questionnaire entitled “Health Awareness and Reproductive Health Status of Women in Slums in Greater Mumbai” used for data collection has five sections: The first section is related to the Household Information, second is related to the Information of married Women in the age 11-49 years, includes antenatal care, postnatal care and child care, third is related to the health facilities and their utilization, fourth collects information on diseases contracted to the respondents in slum through water supply and the fifth is Reproductive Health and HIV/AIDS awareness, behavior and prevalence.

Five sections of questionnaires canvassed in slums were bilingual, with questions in both Marathi and English. (Questionnaire is annexed in the reference). Besides to this the investigators were given rigorous training.

The present study covers women in the reproductive age group of 15-49 years staying in slum areas and has given at least one live birth.

2.2.1.1 THE HOUSEHOLD INFORMATION SECTION

Questionnaire’s Section 1 provides the Household Information listed all usual residents in each sample households and also any visitors who stayed in the household the night before the interview. For each listed person the survey
collected basic information on age, sex, marital status, relationship to the head of the household, education, occupation and monthly income.

Household information section of questionnaire also collected information on the disease history of the household members on Asthma, T. B., and Malaria (reference period for last 3 months). Information was also collected, on the main source of drinking water, type of toilet facility, source of lighting, separate kitchen facility, type of family, religion of the household head, caste/tribe of the household head, mother tongue, type of a house, number of rooms in the house, individual income and total income from all sources. The information on age, sex, and marital status of household members were used to identify eligible respondents for the Women’s Questionnaire section.

2.2.1.2 INFORMATION OF MARRIED WOMEN IN THE AGE 11-49 YEARS SECTION

Questionnaire’s Section II was used to collect information from the eligible women listed in the household information section-I of questionnaire i.e. all currently married women age 11-49 years, who were usual residents of the sample household or visitors who stayed in the sample household the night before the interview. The questionnaire covered the following: current pregnancy, lactating, age at cohabitation, age at first menstruation and its regularity, age at first pregnancy and its’ related questions and number of children ever born and surviving.
2.2.1.2.1 ANTENATAL CARE

Questionnaire's Section II.1 was used to collect information on antenatal care i.e. whether study women has undergone for ANC check-ups during the last pregnancy, if so, when registered for ANC, frequency of ANC check-ups, Tetanus Toxid Injection and Iron Folic Acid tablets/ cyrup taken. This section also collects information on pregnancy check-ups such as weight, height and blood pressure measured, blood and urine tests done, abdomen examined, undergone for X-ray and ultra sonography. Similarly, this section also receives information on advice received from the doctor such as special diet to be taken during pregnancy, danger sign for pregnancy if any, delivery care, new born care, family planning, use of any form of tobacco and walking exercise. The last part of this questionnaire collects information of any problem experienced during the pregnancy such as night blindness, blurred vision, convulsions not from fever, swelling of the legs, body or face, excessive fatigue, anaemia, any vaginal bleeding, white discharge, abdomen pain, excessive bleeding and excessive omitting. This part ends with reasons for not availing ANC.

2.2.1.2.2 POSTNATAL CARE

Questionnaire's Section II.2 was used to collect information on postnatal care i.e. whether study women has undergone for PNC check-ups, if so, the frequency of PNC, if not, what was the reason for not availing PNC. Who had conducted delivery, whether height and weight of child was measured, if so,
whether it was normal, if not any advice was given by doctor. This part also collects information about types of abortions, spontaneous and induced. The question was also asked whether delivery took place during the last one year, if so what was the outcome, i.e. live birth or still birth, and what was the sex of the child. Similarly a question was asked, whether last child is at present alive, if not what was the age of child at death. This part also collects information on the place of delivery, who assisted during the delivery, any complications arise during the delivery, if so what type, and in that case any suggestions were given for referring to the civil hospital and then the question was asked whether study women was satisfied with the treatment she received.

2.2.1.2.3 CHILD CARE

Questionnaire’s Section II.3 was used to collect information on child care (<3 years) such as age and sex of the youngest child, whether mother of the child is currently breast-feeding and was it started immediately after delivery, if so who has motivated. Also colostrums was given to the child and if so who has advised to do so. This part also collects information whether child is vaccination card holder, if yes, the status of the child aged 12-23 months and who advised/motivated for vaccination. Similarly the questions were also asked whether BCG, DPT was given, if so, how often DPT was given, Polio vaccination was given, if yes, what was its frequency, measles injections and Vitamin-A liquid or tablet was given, if so, how many tablets were given and where most of the vaccinations were received. Next part of this part collects information, when child was 4 weeks old and child was suffering from fever, illness with
cough, illness with breath faster, had diarrhea and what was given when suffering from diarrhea, any blood was found in the stool of child and from where the treatment was taken.

2.2.1.3 HEALTH FACILITIES AND THEIR UTILIZATION

Section III of this questionnaire collect information about health facilities in the study area. The questions were any municipal, private hospital is there from the residence of respondent, whether doctor, vaidya or health care facility is there within 1 km from the residence of study women. Any doctor visits the locality, if yes how often. Any camp was held during the last three months, if yes type of camp. This section ends with question, whether study women were finding any difficulty when staying on hilly area and whether they avail medical facilities from the nearby sources such as UHC.

2.2.1.4 DISEASES IN SLUM THROUGH WATER SUPPLY

Section IV of the questionnaire collects information about the sources of drinking water, how far the it is from the residence, does the water is sufficient, which methods are used to purify the water, where does the used water is disposed off, and one was contracted water borne disease if so which disease and whether any treatment was taken.
2.2.1.5 REPRODUCTIVE HEALTH AND HIV / AIDS AWARENESS, BEHAVIOR AND PREVALENCE SECTION

Questionnaire’s Section V was used to collect information on reproductive health i.e. self reported symptoms of RTI/STI such as White Discharge, Abnormal Vaginal Discharge, Itching around Vagina, Pain in Lower Abdomen, Pain during Urination, Frequent urination, Genital Ulcer / Rash, Pain during intercourse, Low Backache, Foul smelling, Pus in Urine. The question was also asked whether these problems were delayed in reporting to the doctor and if delayed, their opinion was taken whether these problems were not serious. The source of treatment for such problems and whether study women were satisfied or not and what was the reason for not taking treatment, was also asked. Similarly the questions whether health personnel were visited respondents and what they had discussed about importance of immunization, breast feeding, personnel hygiene, small family size norms and income generating activities. This questionnaire ends with the questions on awareness of RTI and HIV / AIDS among the study women.

2.2.2 Qualitative Information

In depth interviews of some of the respondents were taken and there responses also were recorded.
2.2.3 Sources of Secondary Information

The required information regarding urban health centers, its sub-centers and health manpower, health services to the community were collected from the doctor, ANM and community volunteers from the study areas. Some information was collected from social organizations. Census of India, 2001, provisional total population and socio-cultural Tables also were used.

2.3 Data processing

All the completed questionnaires were brought to one place for data processing. The data were processed using computers. The process consisted editing of questionnaires, data entry, data cleaning and tabulation of the data. The SPSS 11.5 version was used for data processing and analysis purpose.

2.4 Data Analysis

2.4.1 Logistic Regression

Logistic regression is useful for situations in which you want to be able to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is similar to a linear regression model but is suited to models where the dependent variable is dichotomous. Logistic regression coefficients can be used to estimate odds ratios for each of the
independent variables in the model. Logistic regression is applicable to a broader range of research situations than discriminant analysis.

Logistic Regression procedure produces all predictions, residuals, influence statistics, and goodness-of-fit tests using data at the individual case level, regardless of how the data are entered and whether or not the number of covariate patterns is smaller than the total number of cases.

Logistic regression does not rely on distributional assumptions in the same sense that discriminant analysis does. However the solution may be more stable if your predictors have multivariate normal distribution. Additionally, as with other forms of regression, multicollinearity among the predictors can lead to biased estimates and inflated standard errors. The procedure is most effective when group membership is truly categorical variable; if group membership is based on values of a continuous variable, one should consider using linear regression to take advantage of the richer information offered by continuous variable itself.

**Statistics:** For each analysis: total cases, selected cases, valid cases. For each categorical variable: parameter coding. For each step: variables entered or removed, iteration history, -2 log-likelihood, goodness of fit, Hosmer-Lemeshow goodness-of-fit statistic, model chi-square, improvement chi-square, classification table, correlations between variables, observed groups and predicted probabilities chart, residual chi-square. For each variable in the equation: coefficient(B), standard error of B, Wald statistic, estimated odds
ratio (exp(B)), confidence interval for exp(B), log-likelihood if term removed from model. For each variable not in the equation: score statistic. For each case: observed group, predicted probability, predicted group, residual, standardized residual.

Data: The dependent variable should be dichotomous. Independent variables can be interval level or categorical; if categorical they should be dummy or indicator coded (there is an option in the procedure to recode categorical variables automatically).

Methods: One can estimate models using block entry of variables or any of the following stepwise methods: forward conditional, forward LR, forward Wald, backward conditional, backward LR, or backward Wald.

In the chapter 4, Logistic regression analysis was used to assess the effect of socio-economic determinant variables on the dependent variable (for ex. safe motherhood practice) controlling for other variables included in the model. For the logistic regression analysis purpose, the births born to the mothers in the last three years prior to survey were considered. The variable’s effect or variations on dependent variable (for ex. utilizing antenatal care services) are estimated as follows:
The basic form of the logistic function is

\[ P = \frac{1}{1 + \exp(-Z)} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1) \]

Where \( P \) is the estimated probability and \( Z \) is the predictor variables:

\[ Z = b_0 \cdot b_1 X_1 + b_2 X_2 + \ldots + b_k X_k \quad \ldots \quad \ldots \quad \ldots \quad (2) \]

After substituting for \( Z \) in a logistic function in (1), outcome will be:

\[ P = \frac{1}{1 + \exp(- (b_0 \cdot b_1 X_1 + b_2 X_2 + \ldots + b_k X_k)))} \quad \ldots \quad (3) \]

All the basic properties of the logistic function are preserved when this substitution is applied. The function still ranges between 0 and 1, and achieve its maximum rate of change, with respective to change in any of the \( X_i \).

Similarly, the variable's effect or variations on dependent variable are estimated.
2.4.2 Z-Test for Sample Proportion

Z test was applied to compare two populations to test whether they have the same proportion of items having a certain attributes A. Let $X_1$ and $X_2$ be the number of items possessing the attribute A in random samples of sizes $n_1$ and $n_2$ from two populations respectively. Then the sample proportions of successes are given by

$$p_1 = \frac{X_1}{n_1}, \quad p_2 = \frac{X_2}{n_2}$$

If $P_1$, $P_2$ are the proportions of successes in the two populations, and $Q_1 = 1 - P_1$, $Q_2 = 1 - P_2$, then it can be proved that,

$$Z = \frac{(p_1 - p_2) - (P_1 - P_2)}{\sqrt{(P_1Q_1/n_1) + (P_2Q_2/n_2)}}$$

Under the hypothesis that the proportions in the two populations are equal i.e. under the hypothesis $P_1 = P_2 = P$, $Q_1 = Q_2 = Q$ where $Q = 1 - P$, then

$$Z = \frac{p_1 - p_2}{\sqrt{PQ((1/n_1) + (1/n_2))}}$$

is a S.N.V.
In general, however we do not know the population proportion of successes. In that case we replace P by its best estimate p given by

\[
P = \frac{n_1p_1 + n_2p_2}{n_1 + n_2}
\]

\[
Z = \frac{p_1 - p_2}{\sqrt{pq(1/n_1) + (1/n_2)}}
\]

is a S.N.V.

2.4.3 ANOVA Test

ANOVA test was applied for knowing the degree of awareness of problems during the pregnancy is same in the different age groups of the study women. This test was also applied for knowing the degree of awareness of reproductive morbidity diseases (Reproductive tract infections (RTI) is same in the different age groups of the study women.

2.5 Index Construction

a) Measuring household standard of living

In the absence of data on income and consumption measures, household standard of living indices are often constructed using three set of information, namely source of drinking water, Toilet facility, type of house and ownership of selected consumer durables (Montgomery et al., 2000).
There are three other approaches in the construction of living of standard indices differing in the manner in which different household amenities, quality of housing materials, and assets are weighted but for the present data, construction of standard of living index (SLI) is more appropriate.

A household measure called the standard of living index (SLI), which is calculated by adding the following scores:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of House</strong></td>
<td>4 for pucca, 2 for semi-pucca, 0 for kachha;</td>
</tr>
<tr>
<td><strong>Toilet facility</strong></td>
<td>4 for own flush, 2 for public, 1 for public pit or open, 0 for no facility;</td>
</tr>
<tr>
<td><strong>Source of lighting</strong></td>
<td>2 for electricity, 1 for other, 0 for no facility;</td>
</tr>
<tr>
<td><strong>Source of drinking water</strong></td>
<td>2 for pipe, hand pump, well, 1 for public tap, hand pump, well, 0 for other water sources;</td>
</tr>
<tr>
<td><strong>Separate room for cooking</strong></td>
<td>1 for yes, 0 for no;</td>
</tr>
<tr>
<td><strong>Ownership of house</strong></td>
<td>2 for yes, 0 for no;</td>
</tr>
</tbody>
</table>

Index scores for the present study ranges from 1-6 for a low SLI to 7-9 for a medium SLI and >=10 for a high SLI (Appendix).

By this measure, 21 percent of households in Rafi Nagar have a low standard of living, 69 percent have a medium standard of living, and 11 percent have a high standard of living. Similarly, in Ramabai Nagar, 35 percent
of households in Rafi Nagar have a low standard of living, 43 percent have a
medium standard of living, and 22 percent have a high standard of living. As
seen, the proportion of households with a high standard of living is much lower
in Rafi Nagar slum area (11 percent) than in Ramabai Nagar slum area (22
percent) of Mumbai. Slightly over two-thirds of households in Rafi Nagar slum
area (69 percent) fall in the medium standard of living category where as only
about 0.56 of it is seen in Ramabai Nagar slum area (39 percent). This clearly
indicates that the study women in Rafi nagar are more poor than study women
in Ramabai Nagar slum.

In the next chapter an attempt is made to know about the socio-
-economic and demographic profile of the study area and profile of the study
women of Rafi nagar slum area and Ramabai nagar slum area.