CHILD HEALTH INDICATORS

IN URBAN SLUMS

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CERTIFICATE

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DECLARATION

I declare that this dissertation entitled "**CHILD HEALTH INDICATORS IN URBAN SLUMS"** has been conducted by me at the Institute of Child Health and Hospital for Children. It is submitted in part of fulfillment of the award of the degree of M.D (Pediatrics) for the March 2007 examination to be held under the Tamil Nadu Dr. M.G.R Medical University, Chennai. This has not been submitted previously by me for the award of any degree or diploma from any other university.

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CONTENTS

1. INTRODUCTION

In any community mothers and children constitute a priority group. In India women of the child bearing age group (15-44) years constitute 40 % and children under 15 years of age about 19 % of the total population [1]. Together they contribute to nearly 59 % of the total population of the country. Mothers and children not only form a large group, but they are also a vulnerable or special risk group. The risk is connected with child bearing in the case of women; and growth and development and survival in case of infants and children. In developing countries 50 % of all deaths are occurring among children less than 5 years of age.

Maternal and child health (MCH) services were started in the early 1950s with the aim of improving the health status of mother and children. To start with the programme concentrated on the antenatal, intra natal, and post natal care and to enhance mother and child survival.

In 1992, the programme was re launched as the Child survival and safe motherhood programme with emphasis being on regular antenatal, intranatal, postnatal care, immunization, family welfare activities, nutritional services, promotion of breast feeding and proper health education, which has brought about drastic changes in the health indicators pertaining to mother and child

Proper antenatal care including tetanus toxoid immunization, iron and folic acid supplementation combined with good intranatal and postnatal care followed by the early

introduction of breast feeding can reduce the mortality and morbidity of children. But still neonatal deaths contribute to more than fifty per cent of infant deaths raising concern over the MCH services.

Though the incidence and mortality due to ARI and AWD diseases have come down reasonably in recent years, they contribute significantly to morbidity of the children.

Regarding the nutrition aspect both ICDS and TINP services are aimed to improve the nutrition of children. But the nutritional status of children needs considerable improvement[27].

Tamilnadu enjoys a special place above the national average in many of the socioeconomic and health indicators. Various studies done at the state level showed a better prevalence of child health indicators in urban areas than rural areas[28]. Poor health indicators in rural areas have been attributed to certain factors like poverty, lack of education, overcrowding, lack of safe water and basic sanitation, and finally poor health facilities. Although the Government has taken lots of steps to improve health facilities in rural areas, lack of education and various social and cultural factors have contributed to the poor health seeking behavior in rural areas which in turn may be responsible for the poor child health indicators.

Urbanization and its consequences [2]

Living conditions have a direct impact on public health. Just 26% of the population in India lives in urban areas, but the increase in the number of people living

in urban areas has risen remarkably. One of the biggest challenges that face urban planners worldwide is the proliferation of slums in urban areas and the host of health hazards that they bring along. Maharashtra and Gujarat are the most urbanized states in the country. Urbanization has led to increased productivity and economic diversification, but also deprivation, poverty, and marginalization. Of the country's total population 20-25% live in slums, often located near factories, power stations, garbage dumps, and busy roads. The increased demand for services and infrastructure has depleted natural resources and caused other environmental problems. Environmental problems include those caused by widespread poverty and those caused by industrialization and a change in consumption patterns. The cumulative impact of these 2 causes has serious effects on urban dwellers, especially slum people. Low incomes, illiteracy, and inaccessibility to development opportunities further complicate problems. Slum dwellings have no ventilation or natural light and are vulnerable to fire. Slum dwellers suffer from dust, smoke, and noise pollution. Piles of garbage, potholes, stray animals, flies, and mosquitoes are common. Urbanization has increased disease-producing agent, e.g., toxic chemicals and car exhaust fumes. Lead emitted from car exhausts or industry causes reduced fine motor coordination, hyperactivity, lower IQs, and perceptual problems in slum children. Few slums have access to potable water and sanitation services. Children in slums are more vulnerable to diseases and deficiencies than their rural and other urban counterparts. Many people in slums are rural migrants. Urban pressures weaken traditional family ties and social control over children. Adult supervision of children is

rare. Schools are not always available. Interaction between children and parents, recreation, and cultural stimulation are all lacking. Child labor is also common.

Concept of slums

The concept of slums and its definition vary from country to country depending upon the Socio-economic conditions of society. The basic characteristics of slums are - dilapidated and infirm housing structures, poor ventilation, acute over-crowding, faulty alignment of streets,

inadequate lighting, paucity of safe drinking water, water logging during rains, absence of toilet facilities and non-availability of basic physical and social services. The living conditions in slums are usually unhygienic and contrary to all norms of planned urban growth and are an important factor in accelerating transmission of various air and water borne diseases. The legal definition however differs from State to State

Slum Population in Tamilnadu [3]

The total slum population of Tamilnadu in the selected 63 Municipal Towns as per the Census of India 2001 (provisional) is 2,838,366. This forms around 20.02 % of the total Population of the selected Towns. The largest slum population is found in the Chennai Corporation where 10, 79,414 persons are reported as slum dwellers. This forms 25.6% of the total population. Madurai Corporation (1.76 lakhs/19%), Tiruchirappalli Corporation (1.62lakhs/22%) and Salem Corporation (1.39 lakhs/20%) are the other cities having more than one lakh slum dwellers.

Tamilnadu: Proportion of Slum Population to Total Population 2001

Range	Number of Towns
40-48%	3
30-39%	9
20-29%	13
10-19%	25
< 10 %	13
Total	63

Slum Population and Sex Ratio in Chennai, 2001[3]

Chennai has a total population of 4,216,628 people of which Slum Population constitutes 1,079,414 persons. The proportion of the Slum Population in Chennai to the total population is 26%. The number of males (548,517) outnumbers the number of females (530,897) in the slums of Chennai. The ratio is higher than that returned for the City as a whole. This indicates that in general more males are migrating to the city in search of employment and otherwise.

Chennai: Sex ratio, 2001

Category	Male	Female	Total	Sex ratio
Non Slum	1613088	1523766	3136854	945

Slum	548517	530897	1079414	968
Overall	2161605	2054663	4216268	951

Literacy rate among slum population[3]

The Literacy rate for the Slum Population of Tamilnadu is 71%. Males (77%) have a higher Literacy rate than Females (65%). As far as Chennai is concerned, the Literacy rate for the Slum Population is 80.09%. Males (85.77%) have a higher Literacy rate than Females (74.21%). It is noteworthy that the male literacy rate in slums is higher than that in non-slum areas.

Type of Houses[3]

Only 64% of the houses are of a permanent nature in Slum areas. Semi Permanent and temporary houses form the rest in equal proportion. The picture in non-slum areas is in sharp contrast- almost 91% of the houses are permanent nature. Semi-Permanent houses form 5% and the rest are of a temporary kind.

Number of Dwelling Rooms [3]

The availability of living space within the house is also a vital parameter for good health. Slums in Chennai show up adversely as far as this indicator is concerned. Two-thirds of the households in slums live in one-room tenements. The cramped accommodation has its natural impact on health and hygiene. The spread of diseases is facilitated by such living conditions.

Drinking Water [3]

Access to drinking water:

The slum population in Chennai city suffers distinctly as far as access to drinking water is concerned, when compared to their non-slum counterparts. Only 26% of the Slum population has access to drinking water within their premises, while of the non-slum population is 71%. On the other hand, only 24% of the non-slum population has access to drinking water within 500m of their premises, while the proportion among the slum population is 55%. Moreover, 19% of the Slum population has to go more than 500m to access to drinking water, while of the proportion of non-slum population who had to go that far away is only 5%.

Source of Drinking Water:

Slums are considerably disadvantaged as far as sources of drinking water are concerned. Hand pumps (42%) are the main source of drinking water in slums. Tap water is available to 31% and a sizeable proportion (20%) is serviced by "other sources". In non slum areas Tap (48%) and Hand pumps (31%) are the primary sources of drinking water.

The access as well as source of drinking water has a definite impact on the incidence and spread of diseases. It is a well-documented fact that stored water is the breeding ground for a number of fresh water vectors. The incidence of Malaria in the city has been attributed in a large measure to storage of fresh water in containers within

the houses. The incidence of gastrointestinal diseases can also be traced to inadequate chlorination, contamination due to improper storage and contamination of drinking water sources on account of garbage accumulation, open defecation, inundation and pollution.

Availability of Latrines[3]

The availability of latrines is an important indicator of the state of sanitation. This in turn is reflected in the spread of several diseases especially those relating to the gastro- intestinal tract and skin etc. More than a third of the households in slums have no latrines. A significant proportion of households in non-slum areas (12%) too do not have this facility. This result in open defecation and consequently the spread of a host of diseases

Availability of Drainage Facilities[3]

The availability of disposal arrangements for liquid as well as solid wastes has a great impact on the environment and consequently on the health of the people. Nearly half of the households in slums do not have any underground drainage facility or adopt open drainage facilities. Thus, majority of the slum population is exposed to grave risk of several diseases. Provision of safe disposal facilities for wastes is thus an important priority.

A little more than one fourth of the Chennai population lives in Slums. Slums in Chennai are greatly disadvantaged as far as quality of housing and availability of basic

amenities like drinking water, electricity, latrines, drainage, non-polluting fuels and the

like. Any improvement in the standards of public health will have to start in the Slums.

2. DEFINITIONS

Slums

Slums have been defined under Section 3 of the Slum Areas (Improvement and Clearance) Act, 1956 as areas where buildings -

1. Are in any respect unfit for human habitation;

2. Are by reason of dilapidation, overcrowding, faulty arrangement and design of such buildings, narrowness or faulty arrangement of streets, lack of ventilation, light, sanitation facilities or any combination of these factors which are detrimental to safety, health and morals.

Census of India 2001 has adopted the definition of 'Slum' areas as: -

1. All areas notified as 'Slum' by State/Local Government and UT Administration under any Act;

2. All areas recognized as 'Slum' by State/Local Government and UT Administration, which have not been formally notified as slum under any Act;

3. A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

Neonatal Mortality Rate (NMR)

Neonatal deaths are deaths occurring during the neonatal period commencing at birth and ending 28 completed days after birth. It's given by the formula

$$NMR = \frac{\text{No: of deaths in children less 28 days of age in a year}}{\text{Total live births in the same year}} \times 1000$$

Post Neonatal Mortality Rate (PNMR)

Deaths occurring from 28 days of life under one year of life are called post neonatal deaths. It given by the formula

$$PNMR = \frac{\text{No: of deaths in children between 28 days and one year of age in a given year}}{\text{Total live births in the same year}} \times 1000$$

Infant Mortality Rate (IMR)

It's defined as ratio of infant (less than one year) deaths registered in a given year to the total number of live births in the same year; usually expressed as rate per 1000 live births

$$IMR = \frac{\text{Number of infant deaths in a year}}{\text{Total live births in the same year}} \times 1000$$

Under 5 Mortality Rate

1. Also known as Child Mortality Rate

2. Defined as the annual number of deaths of under 5 children expressed as rate per 1000 live births

3. UNICEF considers this as the best single indicator of social development and well being rather than GNP per capita as the former reflects income, nutrition, education, health care etc;

It is calculated by the formula

Child Mortality Rate = $\dfrac{\text{No: of deaths in children less than 5 years of age in a year}}{\text{Total live births in the same year}} \times 1000$

Still Birth

Defined as the death of a fetus which meets at least one of the following criteria

a. Weight of at least 1000 grams

b. Completed 28 weeks of gestation

The preferred criterion is birth weight

Still birth rate = $\dfrac{\text{Fetal deaths weighing more than 1000 gm at birth}}{\text{Total live + still births over 1000 gm at birth}} \times 1000$

Abortion

Abortion is theoretically defined as termination of pregnancy before the fetus becomes viable (capable of living adequately). This has been fixed administratively at 28 weeks, when the fetus weighs approximately 1000 gm

Tetanus Toxoid Immunization (TT)

a. In unimmunized pregnant women 2 doses of TT should be given, the 1st as early as possible during pregnancy and the 2nd at least a month later and at least 3 weeks before delivery

b. According to the National Immunization schedule, these doses may be given

between 16-36 weeks of pregnancy, allowing an interval of 1-2 months between the two doses.

c. In previously immunized pregnant women, a booster dose is considered significant. There is no need for a booster dose at every consecutive pregnancy, because of the risk of hyper immunization and side effects.

d. No single pregnant women should be denied even one dose of TT even if she is seen late in pregnancy.

Iron and Folic acid Supplementation

a. Previous surveys in different parts of India indicate about 50-60 % of women belonging to low socio-economic groups are anemic in the last trimester of pregnancy, the major reasons being iron and folic acid deficiency.

b. Iron and folic acid tablets containing 100 mg of elemental iron and 500 microgram of folic acid are given to pregnant women irrespective of whether they are anemic or not

Non anemic women -- 100 tablets divided as 30, 30, and 40 during the

7th, 8th and 9th month respectively

Anemic women -- 200 tablets divided as 60, 60, and 80 during the

7th, 8th and 9th month respectively

As per WHO expert group criteria a Hemoglobin value of less than 11 g per dl is considered as anemia in pregnant women

Colostrum

1. Colostrum is the initial milk which is bright lemony yellow in color whose secretion continues during the 2nd week of lactation

2. Daily secretion ranges from 2-20 ml / feed or 30-100 ml / day

3. Provides 1st defense against infections by providing 30-80 times higher concentration of WBCs, antibodies, and lysosomes

4. Prevents allergies in later life and contains anti-oxidants

5. Clears bilirubin from gut by its laxative effect

6. Rich in growth factor and vitamins

7. Cholesterol helps brain growth and growth of bifidus flora in the gut

Exclusive breastfeeding

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. A recent review of evidence has shown that, on a population basis, exclusive breastfeeding for 6 months is the optimal way of feeding infants. Thereafter infants should receive complementary foods with continued breastfeeding up to 2 years of age or beyond.

To enable mothers to establish and sustain exclusive breastfeeding for 6 months, WHO and UNICEF recommend:

1. Initiation of breastfeeding within the first hour of life

2. **Exclusive breastfeeding – that is the infant only receives breast milk without any additional food or drink, not even water**

3. Breastfeeding on demand – that is as often as the child wants, day and night and no use of bottles, teats or pacifiers

Nutritional Status

IAP grading of malnutrition (1972)

Nutritional Status *	Weight for age (% of expected)
Normal	> 80
Grade 1	71-80
Grade 2	61-70
Grade 3	51-60
Grade 4	< 50

* If the child has edema of nutritional origin the letter K is placed along with the grade of PEM to denote kwashiorkor.

Applicable to children in the age group of 1-5 years

Minor Illness

Any illness for which the child is taken to a health care facility either Government or Private and given out patient care

Major Illness

Any illness which requires the child be given in patient care after hospitalization in either Government or Private sector

3. REVIEW OF LITERATURE

Rao S, et al [4] in their study investigated changes in nutritional status and morbidity over time among pre-school slum children in Pune. Measurement of weight and height, morbidity (in last 7 days) and clinical assessment was undertaken once every four months. Morbidity was generally higher in rainy season and was associated with wasting but not stunting. Gastrointestinal illness and fever contributed 50% of total

morbidity days. They observed that peak prevalence of malnutrition was observed around 18 months and shorter period (3.5 months) of exclusive breastfeeding was probably responsible.

Tada Y, et al [9] studied the nutritional status of the preschool children aged 1-5 years of the Klong Toey slum, Bangkok. The prevalence of malnutrition among the study sample was 25.4% by weight-for age, 18.1% by height-for-age, and 6.9% by weight-for-height. The results showed that family income, maternal housewifery or unemployment, food practice, and a maternal educational level lower than primary school were associated with the nutritional status of children.

A cross sectional study of under nutrition in 0-5 yrs. age group in an urban community was done by Ray SK, et al[11] in an urban Muslim slum community in India in 1986. The sample included 103 families and 88 children 0-5 years old. 57.95% of the children were undernourished: 40.91% at Grade I, 14.77% at Grade II, and 2.27% at Grade III. 75% of infants were undernourished.

Wray JD, et al[12] in their study on Child health interventions in urban slums studied the importance of nutrition on health of slum children. They observed that, because nutrition indicators for city populations have improved, there is a feeling that malnutrition is no longer a problem in urban areas. However; it is likely that the figures hide disparities through aggregation, and studies in slums rather than cities as a whole give a much less encouraging picture. Poverty is at the root of many of the nutritional and associated health problems. Through the promotion of breast feeding, education,

growth monitoring and food supplementation, necessary help can be targeted at this vulnerable population.

Reyes H, et al[13] did a study to ascertain whether family-related factors are determinants of stunting in young Mexican children living in extreme poverty, and whether these factors differ between rural or urban contexts. Cases comprised stunted children aged between 6 and 23 months. Controls were well-nourished children. In the rural area, a greater risk of stunting was associated with father's occupation as farmer and the presence of family networks for child care. The greatest protective effect was found in children cared for exclusively by their mothers.

In a cross-sectional study in Bhopal, India, 1000 randomly selected slum children were clinically examined, to detect nutritional deficiency diseases by Dwivedi SN, et al[14]. The prevalence of various nutritional deficiency diseases comprised: protein calorie malnutrition (63.4%), vitamin A deficiency (23.4%), vitamin B deficiency (16.2%), vitamin C deficiency (2.6%), vitamin D deficiency (9.4%), fluorine deficiency (2.9%), and anemia (7.2%). The prevalence of malnutrition was 65.0% among females compared to 61.9% in males. The prevalence of malnutrition was significantly higher among those children whose fathers were illiterate and had a positive association with children's family size.

Bhatia Vikas, et al[15] assessed the immunization status among 796 children in the age group of 12-23 months in UT, Chandigarh. Evaluation recorded fully immunized children as 72.23%, partially immunized as 22.99% and unimmunized as 4.64%. Only

58.66% children in urban slums were fully immunized. The overall coverage for various vaccines was BCG: 93.09%, DPT1/OPV1: 93.97%, DPT2/OPV2: 90.57%, DPT3/OPV3: 85.92% and measles: 76%. He concluded that efforts must be made to strengthen routine immunization programme especially in the underprivileged groups and areas such as slum in cities.

Mathew JL, et al[16] studied reasons for non-immunization of children in an urban, low income group in North India. Only 25% were found to have received complete primary immunization. The reasons for non-immunization of the children were: migration to a native village (26.4%); domestic problems (9.6%); the immunization centre was located far from their home (9.6%); and the child was unwell when the vaccination was due (9%).

Independent Commission on Health in India[17] observed that levels of urban poverty in India are increasing, while rural poverty is decreasing and stressed the need of providing primary health care to slum dwellers

Nair MK, et al[18] suggested feasible intervention strategies through community owned early child care and development facilities, utilizing existing programs like ICDS, Urban Basic Services and by initiating services like Development Friendly Well Baby Clinics, Community Extension services, Child Development Referral Units at district hospitals and involving trained manpower like anganwadi/crèche workers, public health nurses and developmental therapists.

Gupta RK, et al[19] assessed maternal care among slum dwellers in Delhi. He

observed that   83% of mothers had presented for antenatal care, primarily to a government facility, and 77% of pregnant women received 2 tetanus toxoid injections. 46% of deliveries occurred at home, 34% were in government hospitals or clinics, and 15% occurred in private facilities. Doctors attended all deliveries at hospitals and 24% of those at health centers. In 36% of home deliveries, only family members were present.

D'souza RM, et al[20] analyzed the determinants of childhood mortality in slums of Karachi, Pakistan. The use of traditional healers, poor nutritional status, incomplete or no immunization, the quick change of healers, inappropriate child care arrangements, mother's literacy, who decides about outside treatment, short birth interval, bottle feeding, and nuclear family structure were identified as determinants. He suggested maternal autonomy, appropriate health-seeking behavior, and child-rearing processes for improvement.

Awasthi S, et al[21] studied the reasons for under five mortality in a slum in lucknow. They observed that "high fever" that could not be classified into any other disease, was the most common symptom associated with death, seen in 21.1% cases followed by pneumonia in 19.7%, diarrhea in 18.3% and measles in 11.4%.

Hussain A, et al[22] in their study on a slum population in Dhaka found that more girls than boys died in infancy. The most frequent reported causes of deaths were tetanus and diarrhea in infancy. Vaccination coverage (DPT, polio, measles and BCG) was 73%. The gender difference in mortality may have been influenced by the patterns of

treatment received during sickness and the choice of treatment was determined by the financial ability.

Shanti ghosh, et al[23] pointed out that the nutritional status of slum children is worst amongst all urban groups and is even poorer than the rural average. Urban migration has added to their poverty and undernutrition. Another distressing feature is the lack of any significant improvement over the years. Most common causes of malnutrition include faulty infant feeding practices, impaired utilization of nutrients due to infections and parasites, inadequate food and health security, poor environmental conditions and lack of proper child care practices. High prevalence of malnutrition in children is also due to lack of awareness and knowledge regarding their food requirements and absence of a responsible adult care giver. With increasing urban migration in the years ahead, the problem of malnutrition in urban slums will also acquire increasing dimension unless special efforts are initiated to mitigate the health and nutrition problems of the urban poor.

4. RATIONALE OF THE STUDY

Health indicators are better in urban areas than rural areas

Hence urban health services and infrastructure hasn't received much importance

Of late it has been recognized that urban slums are worse off than rural areas in terms of health infrastructure, indicators and services

The health needs of the urban slum has been masked by the larger non slum population

who has better health indicators

Slums have unique characteristics like location, duration of existence at that particular site and other population characteristics which may have significant impact on health of children

5. OBJECTIVES OF THE STUDY

1. To document the characteristics of urban slums

2. To document the characteristics of the family

3. Assess child health indicators

4. Evaluate the utilization of health services

5. To analyze correlation between slum characteristics and child health indicators

6. STUDY METHODOLOGY

Study Design

This is a **Cross sectional study** to evaluate health indicators in urban slums in the Corporation of Chennai

Study Period

Total duration of the study was 21 months starting from January 2005. Protocol was prepared for 3 months. Study was conducted for 15 months followed by analysis for 3 months.

Study Place

Ten randomly selected slums one from each of the ten zones of the Corporation of Chennai

Study Population

Family is the unit of sampling and analysis

Sampling technique

Cluster sampling technique was used for the study. The vital events survey of Tamilnadu 2002 has given an Infant mortality rate of 64 and 32 per 1000 live births for rural and urban areas respectively. The hypothesis is that urban slums are worse off than rural areas with respect to child health indicators and health care facilities. However the over all IMR of 44 per 1000 live births was used to calculate the sample size. For an Alpha error of 0.05% and precision of 1% for the estimated IMR, sample size was calculated as 1626 families. Applying a Design effect of 1.5% as a cluster sampling

technique is being used the Sample size of 2440 families was obtained which was equally divided among 10 zones. 244 families were required to be studied in each zone.

Inclusion Criteria

Families with at least one child less than five years

Exclusion Criteria

Families with no child less than five years

Maneuver

Chennai Corporation is divided into ten zones. Each zone consists of both slum and non slum population. There are 10 health posts in each zone accounting to a total of 100 health posts all over the city. One health post was selected purposefully for the study from each zone. Within the health post one slum containing more than 250 families was selected. Families with at least one living child less than 5 years were included in the study. Families with no child less than 5 years were excluded from the study. First 250 eligible families were enrolled. After explaining to the family members regarding the details of the study, information was collected from them with the help of the proforma enclosed in the annexure. Then height and weight were taken for the children

Estimation of weight

It was measured using the bathroom scale in children more than 1 year. The same weighing scale was used throughout the study. Precaution is taken to ensure that the child is not in contact with any object, the scale is kept on a firm horizontal surface and

the pointer is set to zero. Child is made to stand on the scale with minimal clothing and without shoes. New error was checked after each measurement.

Double weighing was done in case of restless and non co-operative children. First the mother is weighed alone and then along with the child. For children less than 1 year Infant weighing scale was used with accuracy to the nearest 500 grams.

Estimation of Height

An infantometer was used in children less than 2 years. Shoes are removed and the child is placed on the back on a flat surface. One person maintains the top of the child's head against the fixed vertical board with the eyes directed upwards. The other person firmly presses the knees together and down so that they touch the horizontal surface and then moves the mobile foot board so that it touches the heels when the feet are at right angle.

For children more than 2 years stadiometer was used. Child is made to stand bare footed, heels, buttocks, shoulder and occiput touching the rod and looking straight ahead. The chin should be straight (Frankfurt plane). Measurements were read after directly lowering the cursor, hair completely flattened. Height was recorded with accuracy to the nearest 0.5 cm.

Nutritional grading of children was assessed after calculating expected weight for age using IAP classification of malnutrition.

7. RESULTS

A total of 2440 families from 10 slums were included in the study. The results are presented in the following order

1. **Characteristics of slums**

   a. Type of houses

   b. Water facilities

   c. Toilet and drainage facilities

2. **Characteristics of family**

   a. Education of father and mother

b. Occupation of father and mother

3. **Estimation of Child Health Indicators**

   a. Nutritional status

   b. Under five, Infant and Neonatal mortality rates

4. **Assessment of Health Services utilization**

   a. Antenatal care and delivery practices

   b. Breast feeding and Immunization

   c. Minor and Major illnesses

5. **Correlation between slum characteristics and health indicators**

1. CHARACTERISTICS OF SLUMS

Characteristics of the 10 slums studied from the 10 zones are given below. All the slums are recognized by the Slum clearance board as such and are in existence for more than 30 years.

Profile of each slum area studied:

1. Indra Nagar

It is located in the New Washermanpet health post of the RK Nagar zone. The total population is 2412 and the numbers of families are 364. Both thatched and tiled houses are present in the slum. Most of the toilets are of the shared toilet type and a hand pump is available. Both underground and open drainage exist in the slum. There is no

health facility within the slum and the nearest one is the corporation health post about one km away.

2. **Nehru Nagar**

This slum belongs to the Sanjeevarayanpet zone and its corresponding health post is Government RSRM. The total population is 2159 and the numbers of families are 457. Both thatched and tiled houses are present in the slum. Most of the toilets are of the shared toilet type. Both underground and open drainage exist in the slum. Hand pump and tap water are the sources of water available in the slum. There is no health facility within the slum and the nearest one is the corporation health post about half km away.

3. **Rajiv Gandhi Nagar**

This slum is within the limits of Pulianthope zone and TVK Nagar health post. It contains a population of 1893 with 424 families. Thatched and tiled houses are present. A public toilet is present and the drainage system is of open type. A hand pump is available as the source of water. There is no health facility within the slum and the nearest one is the corporation health post about half km away.

4. **KC garden**

This slum belongs to the Ayanavaram zone and its corresponding health post is Agaram north. The total population is 4605 and the numbers of families are 1246. Both tiled and RC roof houses are present in the slum. Most of the toilets are of the shared toilet type. Some of the families have an individual toilet. An underground drainage system is present. Hand pump is the source of water available in the slum. There is no

health facility in the slum and the nearest one is the corporation health post about half km away.

5. **TP Chatram**

This is located in the Shenoy Nagar zone. The health post for the slum is KMCH. The total population is 2426 and the numbers of families are 422. Thatched houses are present in the slum. A public toilet is present. An open drainage system is present. Hand pump is the source of water available in the slum. There is no health facility in the slum and the nearest one is the corporation health post about half km away.

6. **LG Hut**

This slum belongs to the Pudupet health post of the Mirsahibpet zone. It contains a population of 2128 with 320 families. Thatched houses are present. A public toilet is present and the drainage system is of open type. Hand pump is the source of water. There is no health facility in the slum and the nearest one is the corporation health post about 200 meters away.

7. **Pushpa Nagar**

This slum is within the limits of Pushpa Nagar health post and Perumalpet zone. The total population is 4954 and the numbers of families are 986. RC roof houses are present in the slum. Most of the toilets are of the public toilet type. An underground drainage system is present. Hand pump is the source of water available in the slum. There is no health facility in the slum and the nearest one is the corporation health post about half km away.

8. **Kamaraj Colony**

This slum belongs to the Vadapalani zone and its corresponding health post is Vadapalani. The total population is 4974 and the numbers of families are 1024. Both tiled and RC roof houses are present in the slum. Most of the toilets are of the shared toilet type. An underground drainage system is present. Hand pump is the source of water available in the slum. There is no health facility in the slum and the nearest one is the corporation health post about half km away.

9. **MGR Nagar**

This slum is within the limits of Saidapet zone and Saidapet health post. It contains a population of 1842with 366 families. Thatched and tiled houses are present. Both shared and public toilets are present and the drainage system is of underground type. A hand pump is available as the source of water. There is no health facility in the slum and the nearest one is the corporation health post about one km away

10. **Srinivasapuram**

This slum belongs to the Santhome health post of the Santhome zone. It contains a population of 4946 with 768 families. Thatched houses are present. A public toilet is present and the drainage system is of open type. Hand pump is the available source of water. There is no health facility in the slum and the nearest one is the corporation health post about one km away

Type of Houses

Table 1: Type of Houses

Slum	Thatched		Tiled		RC roof	
	n	%	N	%	n	%
Indra Nagar (245)	148	60.4	51.0	20.8	46	18.8
Nehru Nagar (244)	135	55.3	56.0	23.0	53	21.7
Rajiv Gandhi Nagar (246)	163	66.3	64.0	26.0	19	7.3
KC garden (246)	97	39.4	71.0	28.9	78	31.7
TP Chatram (245)	153	62.4	56.0	22.9	36	14.7
LG hut (243)	141	58.0	66.0	27.2	36	14.8
Pushpa Nagar (244)	145	59.4	70.0	28.7	29	11.9
Kamaraj Colony (246)	139	56.5	57.0	23.2	50	20.3
MGR Nagar (246)	148	60.2	77.0	31.3	21	8.1
Srinivasapuram (246)	139	56.5	57.0	23.2	50	20.3
Total (2451)	1408	57.4	625.0	25.5	416	17.0

Majority of the population lived in thatched houses (57.4%). Tiled and RC roofed houses formed 25.5% and 17% respectively.

Water facilities

Table 2: Water facilities

Slum	Hand Pump		Tap Water	
	N	%	n	%
Indra Nagar (245)	185	75.5	60	24.5
Nehru Nagar (244)	163	66.8	81	33.2
Rajiv Gandhi Nagar (246)	233	94.7	13	5.3
KC garden (246)	132	53.7	114	46.3
TP Chatram (245)	183	74.7	62	25.3
LG hut (243)	186	76.5	57	23.5
Pushpa Nagar (244)	184	75.4	60	24.6
Kamaraj Colony (246)	179	72.8	67	27.2
MGR Nagar (246)	232	94.3	14	5.7
Srinivasapuram (246)	181	73.6	65	26.4
Total (2451)	1858	75.8	593	24.2

Hand pump was the most commonly used source of drinking water. 24.2% of the families utilized tap water for drinking.

Toilet facilities
Table 3: Toilet facilities

Slum	Open air defecation		Shared toilet		Public toilet		Individual toilet	
	n	%	N	%	n	%	n	%
Indra Nagar (245)	64	26.1	118	48.2	41	16.7	22	9.0

Slum								
Nehru Nagar (244)	43	17.6	120	49.2	55	22.5	26	10.7
Rajiv Gandhi Nagar (246)	99	40.2	108	43.9	39	15.9	-	-
KC garden (246)	32	13.0	127	51.6	35	14.2	52	21.1
TP Chatram (245)	60	24.5	118	48.2	51	20.8	16	6.5
LG hut (243)	55	22.6	121	49.8	53	21.8	14	5.8
Pushpa Nagar (244)	48	19.7	104	42.6	71	29.1	21	8.6
Kamaraj Colony (246)	64	26.0	131	53.3	34	13.8	17	6.9
MGR Nagar (246)		34.6	119	48.4	42	17.1	-	-
Srinivasapuram (246)	66	26.8	122	49.6	39	15.9	19	7.7
Total(2451)	616	25.1	1188	48.5	460	18.8	187	7.6

Shared toilet emerged as the most widely used one (48.5%) followed by open air defecation in 25.1% of the families. 18.8% of the families used public toilet, while 18% had toilet of their own.

Drainage facilities
Table 4: Drainage facilities

Slum	Underground drainage		Open Drainage	
	n	%	n	%
Indra Nagar (245)	156	63.7	89	36.3
Nehru Nagar (244)	179	73.4	65	26.6
Rajiv Gandhi Nagar (246)	96	39.0	150	61.0
KC garden (246)	211	85.8	35	14.2
TP Chatram (245)	158	64.5	87	35.5
LG hut (243)	163	67.1	80	32.9
Pushpa Nagar (244)	168	68.9	76	31.1
Kamaraj Colony (246)	152	61.8	94	38.2
MGR Nagar (246)	116	47.2	130	52.8
Srinivasapuram (246)	152	61.8	94	38.2
Total (2451)	1551	63.3	894	36.5

Nearly 2/3 of the population (63.3%) had underground drainage facilities. Open drainage was the mode of drainage used by the rest of the population.

Slum Characteristics

Table 5 a:

Characteristic	Percentage									
	Indra Nagar	Nehru Nagar	Rajiv Gandhi Nagar	KC garden	TP Chatram	LG hut	Pushpa Nagar	Kamaraj Colony	MGR Nagar	Srinivasapuram
Thatched house	60.4	55.3	66.3	39.4	62.4	58	59.4	56.5	60.2	56.5
Open air defecation	26.1	17.6	40.2	13	24.5	22.6	19.7	26	34.6	26.8
Hand Pump used	75.5	66.8	94.7	53.7	74.7	76.5	75.4	72.8	94.3	73.6
Open Drainage	36.3	26.6	61	14.2	35.5	32.9	31.1	38.2	52.8	38.2

Table 5 b:

Characteristic	Percentage									
	Indra Nagar	Nehru Nagar	Rajiv Gandhi Nagar	KC garden	TP Chatram	LG hut	Pushpa Nagar	Kamaraj Colony	MGR Nagar	Srinivasapuram
Tiled & RC roof	39.6	44.7	33.3	60.6	37.6	42	40.6	43.5	39.8	43.5
Toilet used	73.9	82.4	59.8	87	75.5	73.4	80.3	74	65.4	73.2
Tap water used	24.5	33.2	5.3	46.3	25.3	23.5	24.6	27.2	5.7	26.4
Under ground drainage	63.7	73.4	39	85.8	64.5	67.1	68.9	61.8	47.2	61.8

KC garden had the least percentage of undesirable characteristics like thatched houses (39.4%), open air defecation (13%), hand pump usage (53.7%) and open drainage system. On the other hand Rajiv Gandhi Nagar had the highest proportion of the above mentioned characteristics. KC garden emerged as the slum with the highest percentage of desirable characteristics like tiled and RC roofed houses (60.6%), having underground drainage (85.8%) and using toilet for defecation (87%). 46.3% of the people used tap water for drinking purposes. Rajiv Gandhi Nagar had the least number

of tiled and RC roof houses (33.3%). An underground drainage was accessible to only 39% of the families. 59.8% of the families used toilets and only 5.3% consumed drinking water from tap source.

2. CHARACTERISTICS OF FAMILY

Table 6: Education of Mother and Father

Slum	< 5th std M n	< 5th std M %	< 5th std F n	< 5th std F %	6 - 10 Std. M n	6 - 10 Std. M %	6 - 10 Std. F n	6 - 10 Std. F %	11 - 12 std. M n	11 - 12 std. M %	11 - 12 std. F n	11 - 12 std. F %	Degree / Dip M n	Degree / Dip M %	Degree / Dip F n	Degree / Dip F %	Illiterate M n	Illiterate M %	Illiterate F n	Illiterate F %
Indra Nagar (245)	43	17.1	46	18.8	167	68.2	148	60.4	17	6.9	21	8.6	1	0.4	4	1.6	17	6.9	26	10.6
Nehru Nagar (244)	46	18.9	37	15.2	157	64.3	150	61.5	24	9.8	23	9.4			6	2.5	17	7.0	28	11.5
Rajiv Gandhi Nagar (246)	61	24.0	109	44.3	139	56.5	115	46.7			3	1.2					46	18.7	19	7.7
KC garden (246)	32	13.0	21	8.5	166	67.5	137	55.7	35	14.2	36	14.6			11	4.5	13	5.3	41	16.7
TP Chatram (245)	59	24.1	53	21.6	147	60.0	142	58.0	18	7.3	22	9.0			5	2.0	21	8.6	23	9.4
LG hut (243)	47	18.5	48	19.8	162	66.7	149	61.3	15	6.2	17	7.0			4	1.6	19	7.8	25	10.3
Pushpa Nagar (244)	59	23.8	48	19.7	154	63.1	156	63.9	16	6.6	12	4.9			1	0.4	15	6.1	27	11.1
Kamaraj Colony (246)	51	19.9	47	19.1	154	62.6	152	61.8	21	8.5	21	8.5	1	0.4	5	2.0	19	7.7	21	8.5
MGR Nagar (246)	72	29.3	95	38.6	106	43.1	96	39.0	15	6.1	31	12.6			1	0.4	53	21.5	23	9.3
Srinivasapuram (246)	51	19.9	47	19.1	154	62.6	152	61.8	21	8.5	21	8.5	1	0.4	5	2.0	19	7.7	21	8.5
Total (2451)	521	20.8	551	22.5	1506	61.4	1397	57.0	182	7.4	207	8.4	3	0.1	42	1.7	239	9.8	254	10.4

61.4% of mothers and 57% of fathers had studied between 6-10 standards. 20.4% of mothers and 22.5% of fathers had studied below the 5th standard.

Table 7: Occupation of Mother and Father

Slum	Laborer M n	%	F n	%	Government M n	%	F n	%	Private M n	%	F n	%	Self employed M n	%	F n	%	Unemployed M n	%	F n	%
Indra Nagar (245)	5	2.0	137	55.9							39	15.9	6	2.4	69.0	28.2	234	95.5		
Nehru Nagar (244)	6	2.5	137	56.1							48	19.7	1	0.4	59.0	24.2	237	97.1		
Rajiv Gandhi Nagar (246)	10	4.1	187	76.0			4	1.6			2	0.8	14	5.7	53.0	21.5	222	90.2		
KC garden (246)	3	1.2	101	41.1							70	28.5			75.0	30.5	243	98.8		
TP Chatram (245)	8	3.3	150	61.2							45	18.4	7	2.9	50.0	20.4	230	93.9		
LG hut (243)	8	3.3	144	59.3							41	16.9	4	1.6	58.0	23.9	231	95.1		
Pushpa Nagar (244)	14	5.7	166	68.0							40	16.4	12	4.9	38.0	15.6	218	89.3		
Kamaraj Colony (246)	3	1.2	148	60.2							37	15.0	6	2.4	61.0	24.8	237	96.3		
MGR Nagar (246)	16	6.5	177	72.0			3	1.2			8	3.3	17	6.9	55.0	22.4	213	86.6	3	1.2
Srinivasapuram (246)	3	1.2	148	60.2							37	15.0	6	2.4	61.0	24.8	237	96.3		
Total (2451)	76	3.1	1495	61.0	-	-	7	0.3	-	-	367	15.0	73	3.0	579.0	23.6	2302	93.9	3	0.1

Majority of the women were unemployed even though they may be qualified to work. 61% of fathers and 3.1% of mothers worked as daily laborers 93.9 % and 0.1% of women and men were unemployed.

3. ESTIMATION OF HEALTH INDICATORS

Nutritional Status

Table 8: Nutritional Status

Slum	Normal		Grade I		Grade II		Grade III	
	n	%	N	%	n	%	n	%
Indra Nagar (236)	130	55.0	57	24.1	48	20.5	1	0.5
Nehru Nagar (210)	130	61.7	50	24.0	26	12.6	4	1.8
Rajiv Gandhi Nagar(282)	144	50.9	98	34.8	40	14.3		-
KC garden (185)	113	61.5	59	31.6	9	4.6	4	2.3
TP Chatram (245)	132	54.0	62	25.5	47	19.1	4	1.3
LG hut (245)	127	51.7	64	26.3	51	20.7	3	1.3
Pushpa Nagar (241)	130	53.9	54	22.4	56	23.3	1	0.4
Kamaraj Colony (228)	143	63.0	40	17.5	44	19.0	1	0.5
MGR Nagar (296)	161	54.4	102	34.6	33	11.0		-
Srinivasapuram (230)	141	61.8	42	17.9	46	19.8	1	0.5
Total (2398)	1351	56.3	628	26.3	400	16.7	19	0.8

Figures in parenthesis indicate number of children in the 1-5 age groups. The prevalence of grade 1 and 2 malnutrition was 26.3% and 16.7% respectively. Grade 3 was observed in 0.8% of the children. Rest (56.3%) was of the normal nutritional status. Significantly no child was found with grade 4 malnutrition.

Childhood Mortality

Table 9: Mortality Rates

Name of the slum	Neonatal mortality rate		Infant mortality rate		Under 5 mortality rate	
	N	Rate	N	Rate	N	Rate
Indra Nagar	1	12.35	2	24.7	2	24.7
Nehru Nagar	1	11.9	2	23.81	2	23.81
Rajiv Gandhi Nagar	4	44.44	6	66.67	6	66.67
KC garden	3	33.33	5	55.56	5	55.56
TP Chatram	-	-	1	11.63	2	23.26
LG hut	2	24.7	4	49.38	4	49.38
Pushpa Nagar	1	11.36	2	22.73	2	22.73
Kamaraj Colony	4	46.51	6	69.77	6	69.77
MGR Nagar	1	13.16	1	13.16	1	13.16
Srinivasapuram	3	38.96	6	77.92	6	77.92
Total	20	23.83	35	41.72	36	42.91

Rates were calculated per 1000 live births. Total number of live births was 839. There were maximum deaths of 4 each in Rajiv Gandhi Nagar and Kamaraj Colony slums. Neonatal Mortality rate was a maximum of 46.51/ 1000 live births in Kamaraj Colony. No neonatal death was reported from TP Chatram. Infant mortality rates were the maximum in Rajiv Gandhi Nagar and Kamaraj Colony slums.

Causes of Childhood Mortality

Table 10: Causes of Under Five Deaths

S. No	Disease	n	%
1.	Respiratory infection	9	25
2.	CHD	7	19.44
3.	Seizures	3	8.33
4.	Meningo encephalitis	3	8.33
5.	Fever	3	8.33
6.	Congenital anomalies	2	5.56
7.	LBW/Preterm	6	16.67
8.	Birth asphyxia	3	8.33
	Total	36	

This includes neonatal, post neonatal and 1-5 children deaths

Table11: Causes of Infant Deaths

S. No	Disease	n	%
1.	Respiratory infection	9	25.71
2.	CHD	6	17.14
3.	Seizures	3	8.57
4.	Meningo encephalitis	3	8.57
5.	Fever	3	8.57
6.	Congenital anomalies	2	5.71
7.	LBW/Preterm	6	17.14
8.	Birth asphyxia	3	8.57
	Total	35	

This includes neonatal deaths also. The commonest cause of death was respiratory infection. CHD was the next common cause of death in both the age groups. There was only one death beyond infancy which was due to CHD. Deaths due to CHD were more common than the general population.

Table 12: Causes of Neonatal Deaths

S. No	Disease	n	%
1.	Respiratory infection	3	15
2.	CHD	3	15
3.	Seizures	1	5
4.	Meningo encephalitis	1	5
5.	Fever	1	5
6.	Congenital anomalies	2	10
7.	LBW/Preterm	6	30
8.	Birth asphyxia	3	15
	Total	20	

Low birth weight / preterm babies contributed to 6 of the total 20 neonatal deaths (30%). Even though low birth weight per se does not cause death the actual cause of death could not be obtained from the parents due to lack of documentation. Respiratory infections, congenital heart disease, birth asphyxia had their share of 15% each to the deaths.

Table 13: Causes of Deaths between 28 days and 1 year

S. No	Disease	n	%
1.	Respiratory infection	6	40
2.	CHD	3	20
3.	Seizures	2	13.33
4.	Meningo encephalitis	2	13.33
5.	Fever	2	13.33
	Total	15	

Respiratory infection was the major killer accounting for 6 out of 15 deaths (40%), followed by congenital heart disease in 20%. Seizures, Meningo encephalitis and fever contributed to 13.33% of deaths each.

4. ASSESMENT OF HEALTH SERVICES UTILISATION

1. Antenatal Care

Table14: Tetanus toxoid Immunization

Slum	TT Immunization				
	No of pregnant women	Yes		No	
		n	%	n	%
Indra Nagar	438	421	96.1	17	3.9
Nehru Nagar	422	414	98.1	8	1.9
Rajiv Gandhi Nagar	513	475	92.6	38	7.4
KC garden	395	390	98.7	5	1.3
TP Chatram	445	426	95.7	19	4.3
LG hut	442	430	97.3	12	2.7
Pushpa Nagar	445	427	96.0	18	4.0
Kamaraj Colony	461	433	93.9	28	6.1
MGR Nagar	496	458	92.3	38	7.7
Srinivasapuram	461	437	94.8	24	5.2
Total	4518	4311	95.4	207	4.6

Only 95.4% of antenatal mothers got immunized with tetanus toxoid. 4.6% of mothers were not immunized with the vaccine which was a significant proportion even though no neonatal tetanus deaths were reported.

Table 15: Iron and folic acid tablets supplementation

Slum	IFA supplementation				
	No of pregnant women	Yes		No	
		n	%	n	%
Indra Nagar	438	362	82.6	76	17.4
Nehru Nagar	422	355	84.1	67	15.9
Rajiv Gandhi Nagar	513	350	68.2	163	31.8
KC garden	395	370	93.7	25	6.3
TP Chatram	445	361	81.1	84	18.9
LG hut	442	359	81.2	83	18.8
Pushpa Nagar	445	362	81.3	83	18.7
Kamaraj Colony	461	365	79.2	96	20.8
MGR Nagar	496	335	67.5	161	32.5
Srinivasapuram	461	365	79.2	96	20.8
Total	4518	3584	79.3	934	20.7

Consumption of 100 tablets was taken as yes and less than 100 as no.

Among the antenatal mothers only 79.3% consumed Iron and folic acid tablets, whereas 20.7% did not.

Table 16: Place of Antenatal Care

Slum	N	Corporation Health Centre		Corporation Hospital		Dispensary		Tertiary Care Centre		Government Hospital		Private Clinic		Private Nursing Home	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Indra Nagar	424	257	60.6	16	3.8			102	24.1	23	5.4	17	4.0	9	2.1
Nehru Nagar	418	297	71.1	12	2.9			67	16.0	21	5.0	14	3.3	7	1.7
Rajiv Gandhi Nagar	486	281	57.8	14	2.9			184	37.9					7	1.4
KC garden	394	314	79.7	10	2.5			32	8.1	14	3.6	18	4.6	6	1.5
TP Chatram	431	277	64.3	19	4.4			92	21.3	25	5.8	15	3.5	3	0.7
LG hut	432	244	56.5	16	3.7			121	28.0	25	5.8	17	3.9	9	2.1
Pushpa Nagar	430	268	62.3	21	4.9			93	21.6	11	2.6	29	6.7	8	1.9
Kamaraj Colony	447	301	67.3	15	3.4	1	0.2	74	16.6	20	4.5	25	5.6	11	2.5
MGR Nagar	469	278	59.3	14	3.0			176	37.5					1	0.2
Srinivasapuram	444	301	67.8	13	2.9	1	0.2	84	18.9	18	4.1	17	3.8	10	2.3
Total	4375	2818	64.4	150	3.4	2	0.0	1025	23.4	157	3.6	152	3.5	71	1.6

Majority of the antenatal mothers (64.4%) attended corporation health center for antenatal checkup. The next common place was tertiary care hospitals attached to medical college hospitals which accounted for 23.4%.

2. Delivery Practices

Table 17: Place of delivery

Slum	No of deliveries	Home		Corporation hospital		Tertiary Hospital		Government Hospital		Private Sector	
		n	%	n	%	n	%	n	%	n	%
Indra Nagar	424	12	2.8	110	25.9	220	51.9	54	12.7	28	6.6
Nehru Nagar	418	14	3.3	132	31.6	181	43.3	63	15.1	28	6.7
Rajiv Gandhi Nagar	486	10	2.1	110		320	65.8	29	6.0	17	3.5
KC garden	394	8	2.0	149	37.8	138	35.0	60	15.2	39	9.9
TP Chatram	431	18	4.2	125	29.0	226	52.4	48	11.1	14	3.2
LG hut	432	12	2.8	117	27.1	236	54.6	44	10.2	23	5.3
Pushpa Nagar	430	8	1.9	111	25.8	248	57.7	45	10.5	18	4.2
Kamaraj Colony	445	10	2.2	121	27.2	221	49.7	56	12.6	37	8.3
MGR Nagar	469	10	2.1	112	23.9	301	64.2	29	6.2	17	3.6
Srinivasapuram	445	9	2.0	120	27.0	226	50.8	52	11.7	38	8.5
Total	4374	111	2.5	1207	27.6	2317	53.0	480	11.0	259	5.9

Maximum number of deliveries (53%) took place in tertiary care center. Corporation hospitals formed the next highest group. Interestingly 2.5% of the deliveries took place at home in spite of presence of health care facility within one kilometer.

3. <u>Breast feeding</u>

Table 18: Exclusive Breastfeeding

Slum	Exclusive Breastfeeding				
		Given		Not given	
	N	n	%	n	%
Indra Nagar	423	103	24.3	320	75.7
Nehru Nagar	414	92	22.2	322	77.8
Rajiv Gandhi Nagar	486	145	29.8	341	70.2
KC garden	388	50	12.9	338	87.1
TP Chatram	430	113	26.3	317	73.7
LG hut	431	91	21.1	340	78.9
Pushpa Nagar	430	136	31.6	294	68.4
Kamaraj Colony	440	106	24.1	334	75.9
MGR Nagar	469	136	29.0	333	71.0
Srinivasapuram	440	106	24.1	334	75.9
Total	4351	1078	24.8	3273	75.2

Table 19: Colostrum

Slum	Colostrum				
		Given		Not given	
	N	n	%	n	%
Indra Nagar	423	398	94.1	25	5.9
Nehru Nagar	414	392	94.7	22	5.3
Rajiv Gandhi Nagar	486	426	87.7	60	12.3
KC garden	388	380	97.9	8	2.1
TP Chatram	430	411	95.6	19	4.4
LG hut	431	405	94.0	26	6.0
Pushpa Nagar	430	409	95.1	21	4.9
Kamaraj Colony	440	404	91.8	36	8.2
MGR Nagar	469	394	84.0	75	16.0
Srinivasapuram	440	412	93.6	28	6.4
Total	4351	4031	92.6	320	7.4

Only 24.8% of the babies were exclusively breast fed. Colostrum was given to 92.6% of the new borns when compared to 7.4% who were not given.

4. Immunization

Table 20 a: Immunization status

Slum	N	BCG		OPV		DPT1		DPT2		DPT3		Measles		Hepatitis	
		n		n	%	n	%	n	%	n	%	n	%	n	%
Indra Nagar	236	236	100.0	236	100.0	232	98.3	232	98.3	232	98.3	224	94.9	142	60.2
Nehru Nagar	210	210	100.0	209	99.5	207	98.6	207	98.6	207	98.6	199	94.8	130	61.9
Rajiv Gandhi Nagar	282	282	100.0	282	100.0	282	100.0	282	100.0	282	100.0	282	100.0	149	52.8
KC garden	185	185	100.0	184	99.5	180	97.3	176	95.1	176	95.1	161	87.0	121	65.4
TP Chatram	245	245	100.0	244	99.6	241	98.4	241	98.4	241	98.4	238	97.1	142	58.0
LG hut	245	245	100.0	245	100.0	242	98.8	242	98.8	242	98.8	238	97.1	152	62.0
Pushpa Nagar	241	241	100.0	241	100.0	236	97.9	236	97.9	236	97.9	233	96.7	142	58.9
Kamaraj Colony	228	228	100.0	227	100.0	228.0	100.0	228.0	100.0	228.0	100.0	226	99.1	142	62.3
MGR Nagar	296	296	100.0	296	100.0	296	100.0	296	100.0	296	100.0	296	100.0	145	49.0
Sriniva sapuram	230	230	100.0	229	100.0	230	100.0	230	100.0	230	100.0	228	99.1	140	60.9
Total	*2398*	*2398*	100.0	2393	99.67	2374	99.0	2374	99.0	2374	100.0	2325	97.0	1405	58.6

Table 20 b: Immunization status

Slum	Immunization				
		Completely immunized		Partially immunized	
	N	N	%	n	%
Indra Nagar	236	224	94.9	12	5.1
Nehru Nagar	210	198	94.3	12	5.7
RajivGandhi Nagar	282	282	100.0	-	-
KC garden	185	160	86.5	25	13.5
TP Chatram	245	237	96.7	8	3.3
LG hut	245	238	97.1	7	2.9
Pushpa Nagar	241	233	96.7	8	3.3
Kamaraj Colony	228	225	98.7	3	1.3
MGR Nagar	296	296	100.0	-	-
Srinivasapuram	230	227	98.7	3	1.3
Total	2398	2320	96.7	78	3.3

100% coverage was achieved for BCG vaccine. Coverage was lowest for Hepatitis B. 96.7% of the children were fully immunized, while 3.3% of the children were partially immunized.

5. Minor illnesses

Table 20: Respiratory Infections

Slum	N	Corporation Health Centre		Corporation Hospital		Dispensary		Tertiary Care Centre		Government Hospital		Private clinic		Private Nursing Home	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Indra Nagar	218	203	93.1			1	0.5	10	4.6			4	1.8		
Nehru Nagar	221	201	91.0			3	1.4	15	6.8			2	0.9		
Rajiv Gandhi Nagar	220	172	78.2			7	3.2	21	9.5	5	2.3	10	4.5	5	2.3
KC garden	188	157	83.5					23	12.2			8	4.3		
TP Chatram	226	207	91.6					15	6.6			4	1.8		
LG hut	226	199	88.1	3	1.3	2	0.9	15	6.6			7	3.1		
Pushpa Nagar	226	205	90.7			2	0.9	6	2.7			13	5.8		
Kamaraj Colony	241	215	89.2			1	0.4	17	7.1	1	0.4	4	1.7	3	1.2
MGR Nagar	224	193	86.2			8	3.6	17	7.6			6	2.7		
Srinivasapuram	243	218	89.7			1	0.4	20	8.2			2	0.8	2	0.8
Total	2233	1970	88.2	3	0.1	25	1.1	159	7.1	6	0.3	60	2.7	10	0.4

A sum of 7100 respiratory infections was seen in 2233 children. Corporation health post had the highest number of children seeking treatment in 88.2%. Average episode per child was 3.18.

Table 21: Diarrheal Episodes

Slum	Infections		Corporation Health Center		Tertiary Care Centre		Government Hospital		Private clinic		Private Nursing Home	
	Sum	No: of children	n	%	n	%	n	%	n	%	n	%
Indra Nagar	408	128	122	95.3	4	3.1			2	1.6		
Nehru Nagar	349	121	116	95.9	4	3.3			1	0.8		
Rajiv Gandhi Nagar	456	184	156	84.8	15	8.2	4	2.2	6	3.3	3	1.6
KC garden	295	97	85	87.6	11	11.3			1	1.0		
TP Chatram	403	141	135	95.7	5	3.5			1	0.7		
LG hut	420	138	129	93.5	5	3.6			4	2.9		
Pushpa Nagar	366	136	126	92.6	4	2.9			6	4.4		
Kamaraj Colony	448	152	135	88.8	13	8.6	1	0.7	1	0.7	2	1.3
MGR Nagar	477	185	170	91.9	12	6.5			3	1.6		
Srinivasapuram	438	154	134	87.0	15	9.7			4	2.6	1	0.6
Total	4060	1436	1308	91.1	88	6.1	5	0.3	29	2.0	6	0.4

A total number of 4060 diarrheal episodes were observed in 1436 children averaging 2.83 episodes per child. 91.1% children attended corporation health post for treatment.

Table 22: Skin Lesions

Slum	Infections		Corporation Health Center		Tertiary Care Centre		Private clinic		Private Nursing Home	
	Sum	No: of children	n	%	n	%	n	%	n	%
Indra Nagar	85	52	49	94.2	1	1.9	2	3.8	-	-
Nehru Nagar	78	44	43	97.7	-	-	1	2.3	-	-
Rajiv Gandhi Nagar	140	74	67	90.5	3	4.1	4	5.4	-	-
KC garden	40	30	30	100.0	-	-	-	-	-	-
TP Chatram	83	51	48	94.1	-	-	3	5.9	-	-
LG hut	73	46	42	91.3	1	2.2	3	6.5	-	-
Pushpa Nagar	81	43	38	88.4	1	2.3	4	9.3	-	-
Kamaraj Colony	128	69	62	89.9	5	7.2	2	2.9	-	-
MGR Nagar	151	82	76	92.7	3	3.7	3	3.7	-	-
Srinivasapuram	125	73	67	91.8	2	2.7	3	4.1	1	1.4
Total	984	564	522	92.6	16	2.8	25	4.4	1	0.2

564 children had skin lesions accounting to a total of 984 episodes of infection. Average episode per child was 1.74. 92.6% of the children were taken to corporation health post for treatment. All the children (100%) from KC garden went to the corporation health post for the ailment.

Table 23: Exanthematous Illness

Slum	Sum
Indra Nagar	2
Nehru Nagar	4
Rajiv Gandhi Nagar	16
KC garden	3
TP Chatram	4
LG hut	3
Pushpa Nagar	3
Kamaraj Colony	13
MGR Nagar	19
Srinivasapuram	13
Total	80

Exanthematous illness was observed in 80 children from all the 10 slums with maximum cases in MGR Nagar (19). Local terminology (ammai) was used to identify exanthematous illness. Any cause of fever with rash including cases of chicken pox and measles were included. A significant observation was that none of the children were taken to any health facility for treatment.

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Table 24: Other Illness

Slum	No: of children	%	Corporation Health Center	
			n	%
Indra Nagar	2	11.8	2	100.0
Nehru Nagar	7	41.2	7	100.0
Rajiv Gandhi Nagar	-	-	-	-
KC garden	4	23.5	4	100.0
TP Chatram	1	5.9	1	100.0
LG hut	1	5.9	1	100.0
Pushpa Nagar	-	-	-	-
Kamaraj Colony	1	5.9	1	100.0
MGR Nagar	-	-	-	-
Srinivasapuram	1	5.9	1	100.0
Total	17	100.0	17	100.0

The above table gives the details of the 80 episodes of other illnesses in 17 children. All the children attended corporation health post for treatment. Other illnesses included minor injuries, feeding problems, dog bites, insect bites, unknown bites, worm infestation, ear discharge etc;

6. **Major illnesses**

Table 25a: Disease wise Hospitalization

S. No	Disease	n	%
1.	Respiratory infection	81	44.5
2.	Acute watery diarrhea	35	19.23
3.	CHD	17	9.34
4.	Seizures	24	13.18
5.	Meningo encephalitis	5	2.75
6.	Jaundice	1	0.55
7.	Fever	14	7.69
8.	Sepsis	5	2.75
	Total	182	

Table 25b: Places of Hospitalization zone wise

S. No	Name of the slum	Tertiary care center	Government hospital	Private nursing home
1.	Indra Nagar	15	2	2
2.	Nehru Nagar	22	2	7
3.	Rajiv Gandhi Nagar	13	-	-
4.	KC garden	14	2	4
5.	TP Chatram	7	5	-
6.	LG hut	13	5	4
7.	Pushpa Nagar	13	-	4
8.	Kamaraj Colony	11	3	2
9.	MGR Nagar	15	-	-
10.	Srinivasapuram	12	2	3
11.	Total	135	21	26

Table 25c: Places of Hospitalization overall

S. No	Place of hospitalization	N	%
1.	Tertiary care center	135	74
2.	Government hospital	21	12
3.	Private nursing home	26	14

The commonest cause for which children got hospitalized was

respiratory infection in 44.5%. The number of admissions to Tertiary care center, Government hospitals and private nursing homes were 74%, 12 and 14% respectively.

5. CORRELATION BETWEEN SLUM CHARACTERISTICS AND CHILD HEALTH INDICATORS

Table26: Slum characteristics and neonatal mortality

Characteristic			Death under 28 days		
	N	%	n	%	p-value
Type of house					0.1
Thatched	1408	57.4	9.0	0.6	
Tiled	625	25.5	4.0	0.6	
Ceiling	418	17.1	7.0	1.7	
Toilet					0.14
Open air defecation	616	25.1	8	1.3	
Common toilet	1188	48.5	11	0.9	
Public toilet	460	18.8	1	0.2	
Own toilet	187	7.6	-	-	
Water Source					0.29
Hand pump	1858	75.8	13	0.7	
Tap water	593	24.2	7	1.2	
Drainage					0.82
Under ground	1551	63.3	12	0.8	
Open drainage	900	36.7	8	0.9	

The above table shows that there was no correlation between Slum characteristics and neonatal mortality

Table27: Family characteristics and neonatal mortality

Characteristic			Death under 28 days		
	N	%	n	%	p-value
Education of Father					0.1
<5 Std.	551	22.5	9.0	1.6	
6 - 10 Std.	1397	57	10.0	0.7	
11 - 12 Std.	207	8.4	1.0	0.5	
Degree/Diploma	42.0	1.7	-	-	
Illiterate	254	10.4	-	-	
Education of Mother					0.35
<5 Std.	521	24.3	6	1.2	
6 - 10 Std.	1506	61.4	14	0.9	
11 - 12 Std.	182.0	7.4	-	-	
Degree/Diploma	3.0	0.1	-	-	
Illiterate	239	9.8	-	-	
Occupation of Father					**0.001**
Laborer	1495	61	7	0.5	
Government	7	0.3	-	-	
Private	367	15	-	-	
Business	579	23.6	13	2.2	
Unemployed	3	0.1	-	-	
Occupation of Mother					0.52
Laborer	76	3.1			
Business	73	3			
Unemployed	2302	93.9	20	0.9	

A significant correlation (P value < 0.05) was observed between the occupations of the fathers and the neonatal mortality. Occupation of the father has its impact on the financial status of the family. Rest of the characteristics had no significant correlation to the neonatal deaths.

Table28: Slum characteristics and infant mortality

Characteristic			Infant Mortality		
	N	%	n	%	p-value
Type of house					0.160
Thatched	1408	57.4	24	1.7	
Tiled	625	25.5	4	0.6	
Ceiling	418	17.1	7	1.7	
Toilet					**0.017**
Open air defecation	616	25.1	12	1.9	
Common toilet	1188	48.5	22	1.9	
Public toilet	460	18.8	1	0.2	
Own toilet	187	7.6			
Water Source					**0.000**
Hand pump	1858	75.8	17	0.9	
Tap water	593	24.2	18	3.0	
Drainage					0.6
Under ground	1551	63.3	24	1.5	
Open drainage	900	36.7	11	1.2	

There was a significant correlation between toilet facilities and water source and infant deaths. Both these factors play a significant role in the spread of infectious diseases.

Table29: Family characteristics and infant mortality

Characteristic			Infant Mortality		
	N	%	n	%	p-value
Education of Father					0.230
<5 Std.	551	22.5	9	1.6	
6 - 10 Std.	1397	57	24	1.7	
11 - 12 Std.	207	8.4	2	1.0	
Degree/Diploma	42.0	1.7			
Illiterate	254	10.4			
Education of Mother					**0.001**
<5 Std.	521	24.3	17	3.3	
6 - 10 Std.	1506	61.4	18	1.2	
11 - 12 Std.	182.0	7.4			
Degree/Diploma	3.0	0.1			
Illiterate	239	9.8			
Occupation of Father					**0.000**
Laborer	1495	61	7	0.5	
Government	7	0.3			
Private	367	15	11	3.0	
Business	579	23.6	17	2.9	
Unemployed	3	0.1			
Occupation of Mother					0.576
Laborer	76	3.1	1	1.3	
Business	73	3			
Unemployed	2302	93.9	34	1.5	

A significant correlation (P value < 0.05) was observed between the educational status of the mother and occupation of the father. Education of mothers plays a significant role in hygienic practices, health care seeking behavior and child rearing.

8. DISCUSSION

The large and continuous increase in India's urban population and the concomitant growth of the population residing in slums has resulted in overstraining

of infrastructure and deterioration in public health[26]. The link between urbanization, a degraded environment, inaccessibility to healthcare and a deteriorating quality of life is significant. An urban slum poses special health problems due to poverty, overcrowding, unhygienic surroundings and lack of an organized health infrastructure[24]. They lack basic amenities including safe water supply and proper sewage disposal.

Siddarth, et al[25] stressed the fact that disparities among slums exist due to various factors. This has led to varying degrees of health burden on children. Child health conditions in slums with inadequate services are worse in comparison to relatively better served slums. They focused on the importance of locating missed out slums and focusing on the neediest slums.

As per Awasthi, et al[26] most of the inhabitants of slums are migrants from rural areas and exposed to new environmental dynamics of poor housing, water supply and sanitation with poor access to health care. Determinants specific to childhood mortality in urban slums include maternal employment and in sanitary and unhygienic conditions. Addressing the inequalities in the distribution and access to basic amenities and health services with a focus on enhanced service coverage, improved sanitation and water supplies was proposed by Awasthi et al.

Armida, et al[24] suggested that although urban mortality statistics are comparatively better than the rural, there is a wide disparity between the urban rich and the urban poor and hence the existing urban statistics do not give a true representation of urban slums. Another major problem in urban slums is that unlike its rural counterpart there is no envisaged Primary Health Center with its planned network. In urban slum, multiple health authorities administer health services. Unfortunately, these services are not effectively organized, resulting in duplication of services in some areas and non- existence of health services in other areas.

Hence this study was conducted in the slums of Chennai, to find out whether any differences existed in the characteristics of slums, child health indicators and also to assess the pattern of health services utilization. 2440 families were included in the study conducted in the ten zones of Chennai.

In this study the various characteristics like type of houses, toilet, and drainage and drinking water facilities were analyzed slum-wise.

Among the slums, KC garden emerged as the slum with the highest percentage of desirable characteristics like tiled and RC roofed houses (60.6%), having underground drainage (85.8%) and using toilet for defecation (87%). 46.3% of the people used tap water for drinking purposes. It also had the least percentage of undesirable characteristics like thatched houses (39.4%), open air defecation (13%), hand pump

usage (53.7%) and open drainage system (14.2%). On the other hand Rajiv Gandhi Nagar had the highest proportion of the above mentioned undesirable characteristics. An underground drainage was accessible to only 39% of the families. 59.8% of the families used toilets and only 5.3% consumed drinking water from tap source in that slum. The characteristics differed considerably in other slums too. Over all only 74.9% of the people used toilet facilities. An underground drainage was accessible to 63.3% of the families.

Ray SK, et al[11] observed that 57.95% of the children were undernourished: 40.91% at Grade I, 14.77% at Grade II, and 2.27% at Grade III. 75% of infants were undernourished. In this study 56.3% of the children were found to have normal nutritional status. Total number of children in grades 1, 2 and 3 malnutrition were 26.3%, 16.7% and 0.8% respectively. No child was found to have grade 4 malnutrition.

Awasthi S, et al [21] studied the reasons for under five mortality in a slum in lucknow. They observed that "high fever" that could not be classified into any other disease, was the most common symptom associated with death, seen in 21.1% cases followed by pneumonia in 19.7%, diarrhea in 18.3% and measles in 11.4%. Kapoor, et al.[5] in their study in the urban slums of Lucknow reported sepsis as a cause of death in 12.3% of cases. Asphyxia and prematurity accounted for 42% and 14%of the deaths respectively. In another study carried out by Bhandari,

et al.[6] sepsis contributed to 45% of neonatal mortality, asphyxia to 25% and prematurity 20% of the mortality. Despite national efforts of antenatal immunization of mothers with tetanus toxoids, Awasthi, et al.[7] reported tetanus as the cause of neonatal deaths in 36.4% cases.

The present study showed that 57% of the infant deaths were during the neonatal period. Irrespective of the primary cause of death over two third of deaths occur in low birth weight infants weighing less than 2500 grams. In this study too, LBW and preterm category contributed to maximum neonatal deaths, whereas respiratory infections was the commonest cause of death beyond neonatal period in infancy. Beyond infancy there was only one death. Significantly there were no neonatal deaths due to sepsis.

Gulati, et al[10] reported that 96% of deliveries were conducted at home in urban slums of Ludhiana. Nutrition of the mother before pregnancy can influence the weight of the neonate. Macro and micro deficiencies, infections, addictions in urban slums predispose mothers to adverse pregnancy outcomes and low-birth weight. Nearly 51.7 % of the women had moderate anemia. Of these mothers 41.4% delivered low birth weight babies [8]. In our population 95.4% of the mothers were immunized with tetanus toxoid. Only 79.3% of the mothers consumed iron and folicacid

tablets, which might have had its share of producing low birth weight babies. Regarding antenatal care only 5.1% of the mothers attended private hospitals while the rest attended government health care facilities. Institutional deliveries were 97.5% of the total, the rest being at home. As per Bhandari, et al.[6] the first preference for medical advice is the private practitioners

This study also revealed that only 24.8% of the children were exclusively breast fed and 92.6% of newborns received colostrum. Exclusive breast feeding including colostrum is important as it protects against infectious diseases especially respiratory infection and diarrhea. In our population 65% and 42% of the children had atleast one episode of respiratory infection and diarrhea respectively. Majority of the children attended corporation hospital for treatment.

Bhatia Vikas, [15] et al assessed the immunization status among children in the age group of 12-23 months in UT, Chandigarh. Evaluation recorded fully immunized children as 72.23%, partially immunized as 22.99% and unimmunized as 4.64%. Only 58.66% children in urban slums were fully immunized. The overall coverage for various vaccines was BCG: 93.09%, DPT1/OPV1: 93.97%, DPT2/OPV2: 90.57%, DPT3/

OPV3: 85.92% and measles: 76%.

The present study shows that 100% coverage was achieved only for BCG. DPT and measles coverage were 99% and 97% respectively. Hepatitis B coverage was the lowest at 58.6% which might be due to the fact that hepatitis B was included as part of the routine schedule only in 2003. 96.7% of the children were completely immunized and 3.3% were partially immunized.

The major causes for which children were hospitalized included respiratory infection and diarrhea. 74% of the children were admitted to tertiary hospitals for care. The numbers of admissions to Government and private hospitals were 12% and 14 % respectively.

Finally analyzing the correlation between slum and family characteristics and mortality it was evident that the occupation of the father alone had a significant impact on the neonatal mortality. Occupation of the father has its impact on the financial status of the family. On the other hand educational status of the mother, occupation of the father and practicing open air defecation were associated with infant mortality. Education of mothers plays a significant role in hygienic practices, health care seeking behavior and child rearing.

Summarizing the observations, it was found out that neonatal deaths were less when compared to the general population though IMR (41.72) is higher than the state's urban IMR (32). Coverage for TT

immunization and Iron and folic acid supplementation were only 95.4% and 79.3% respectively. Only 96.7% of the children were completely immunized. Exclusive breast feeding was also low at 24.8%. Although many slums have a health facility either Government or Private within a kilometer, immunization of both mothers and children and iron and folic acid consumption were not satisfactory. In addition home deliveries were also recorded in spite of a health facility located nearby. It is the lack of awareness among people which is a problem rather than the access and availability. Efforts are needed to create awareness among people. Lots of work needs to be done in this regard.

9. CONCLUSION

1. Creating awareness among people so that universal utilization of health services is achieved

2. Educating mothers about the importance of colostrum and exclusive breast feeding may help to bring down neonatal and infant mortality and morbidity

3. Measures to increase the iron and folic acid consumption of antenatal mothers and reduction in the number of home deliveries to reduce neonatal mortality and morbidity

4. Improvement in drainage and toilet facilities needed

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11. ANNEXURE

DATA ENTRY FORM

1. **PROFILE OF THE SLUM**

1.1 Name of the zone:

1.2 Name of the slum:

1.3 Recognized slum or not: 1. Yes 2. No

1.4 Total Population:

1.5 Total families:

1.6 Type of houses: 1.Thatched 2. Tiled 3. RC roof

**1.7 Toilet facilities: 1. Open-air defecation 2. Common toilet   **

3. Public toilet 4. Individual toilet

1.8 Nature of water source: 1. Well 2. Hand pump 3. Tap water

1.9 Drainage: 1. Underground 2. Open drainage

1.10 Any health Programmes in the slum: 1.Government   specify

2.   Private   specify

1.11 Any health facility inside the slum: 1. Yes 2. No

 1.12 Nearest health facility: 1. Government   2. Private

1.13 Type of health facility:

Government

1. **Corporation Health Center**
2. **Corporation Hospital**
3. **Dispensary**
4. **Tertiary Care Center**
5. **ESI**
6. **CGHS**
7. **Government hospital**

Private

8. **Clinic**
9. **Nursing Home**

2. FAMILY DETAILS

2.1. Family no:

2.2 Name of head of family:

	Father	**Mother**

2.3 Education:

2.4 Occupation:

2.5 Duration of stay in this house:

2.6 Duration of stay in the slum:

2.7 Type of house: 1. Thatched 2. Tiled

        3. RC roof

2.8 Toilet facilities: 1. Open-air defecation 2. Common toilet

        3. Public toilet 4. Individual toilet

2.9 Nature of water source: 1. Well

        2. Hand pump

        3. Tap water

2.10 Nature of other water sources available if any:

2.11 Drainage: 1. Underground

        2. Open drainage

2.12 Nearest health facility: 1. Government

        2. Private

2.13 Distance from home: 1. Government

        2. Private

2.14 Type of health facility:

Government

1. **Corporation Health Center**
2. **Corporation Hospital**
3. **Dispensary**
4. **Tertiary Care Center**
5. **ESI**
6. **CGHS**
7. **Government hospital**

Private

8. **Clinic**
9. **Nursing Home**

2.15 Mode of transport to health facility:

2.16 Time taken:

2.17 Total no of children in the family: Male   Female

2.18 No of children less than 5 years:

2.19 Any adult death in the last 5 years: Age   Sex

2.20 Any death less than 28 days of life: Y /N

If yes, cause

2.21 Any death less than 1 year of age: Y / N

If yes cause

2.22 Any death less than 5 years of age: Y /N

If yes, cause

2.23 Any stillbirths: Y/ N

3. ANTENATAL CARE

	Pregnancy 1	Pregnancy 2	Pregnancy 3	Pregnancy 4
Total antenatal visits				
TT immunization **1. Yes 2. No**				
IFA consumption **1. Y 2. N**				
Place of ANC				

Outcome of pregnancy
    1. LB   2. SB
    3. Abortion				

Place of delivery
    1. Home
    2. Urban Health Centre
    3. Tertiary hospital
    4. Gov Hospital
    5. Private sector
 Mode of delivery
    6. Normal
    7. Assisted
    8. Caesarean				

Time of initiation Of breast feeding				
Whether colostrum **Given 1. Y 2. N**				
Exclusive breast Feeding **1. Y 2. N**				

4. IMMUNISATION

	CHILD 1	CHILD 2	CHILD 3	CHILD 4
Immunization status				
BCG				
OPV 0				
DPT& OPV 1				
DPT& OPV 2				
DPT& OPV 3				
Measles				
Hepatitis B				

5. Nutritional status (as per IAP guidelines)

	Child 1	Child 2	Child 3	Child 4
Age				
Height				
Weight				
Grading				

6. Minor illness

Minor illness	Child 1	Place of treatment	Child 2	Place of treatment	Child 3	Place of treatment	Child 4	Place of treatment
1. **Respiratory infection**								
2. **Diarrhea**								
3. **Skin lesions**								
4. **Exanthematous illness**								

5. Other illness								

7. Major illness

Major illness	Child 1	Place of treatment	Child 2	Place of treatment	Child 3	Place of treatment	Child 4	Place of treatment
1. Respiratory infection								
2. Diarrhea								
3. CHD								
4. Seizures								
5. Meningo encephalitis								
6. Jaundice								
7. Fever								
8. Congenital anomalies								
9. LBW/ Preterm								
10. Asphyxia								