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[Study on the Immunization Status of the Children of the Kottayam Municipality]

A pre-campaign *action* study to identify the current level of immunization with regard to the immunization of the 0-5 year old children in the Kottyam Municipality

preface

Government of India is committed to ensure that all the children born in this country are completely safe from the seven vaccine preventable diseases. To ensure this the GOI has formulated a National Immunization schedule for the universal immunization of children in accordance with the framework developed by the World Health Organization.

Government of Kerala has ensured strict compliance with the National Immunization Schedule in the State. Consequently the immunization coverage in the State has stood one of the highest in the Country ever since the implementation of the universal immunization programme. Department of Health Services of the Government of Kerala with its vast network of resources; medical, and para medical staff and of late the ASHA workers have ensured that many of the seven killer diseases are almost extinct from the State. This is indeed a great achievement.

However we cannot be complacent of the achievements the State has made in this regard. This Study seeks to answer some key questions such as: Are the children in our urban areas equally safe as their rural counter parts? What are the immunization levels of the urban areas across different communities, or different regions in the same urban area? Are the children receiving all the dozes sufficiently?

The Study, in fact an Action Research, has been carried out in the selected five wards of the Kottyam Municipality in the Month of December 2010. Efforts were already made as part of the Study to immunize all the children found partially immunized. It was organized by the District Medical Office of Health, and District Arogyakeralam (National Rural Health Mission). We hope the Study Report will provide the reader some clues on what is happening in the urban areas in the immunization front.

Funds from the Behavior Change Communication Component of the National Rural Health Mission Project Implementation Plan (PIP) 2010-11 have been utilized for conducting the Study.

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acknowledgements

National and international evidences indicate that strengthening of immunization will directly result in the promotion of child health and the development of physically healthy children in the society.
Although Kerala prides over its high immunization rates, lot of experts raise questions on the actual coverage versus reported coverage in the urban areas mainly due to the weak human and physical infrastructure in the urban areas of the State. It was in this context that as a forerunner of a Behaviour change communication campaign of the National Rural Health Mission 2010-11, the Action Study was included.

The Study would not have been possible without the active interest and encouragement provided by Dr. P.K. Jameela, Addl. Director (Family Welfare), Directorate of Health Services, Dr. V.V. Venus, District Medical Officer of Health, Dr. CR. Mohandas, District Programme Manager, National Rural Health Mission, and Mr. Premjith, Sr. Consultant, Behavior Change Communication, NRHM.

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Finally I also thank mothers/ respondents in the five selected wards who spent their valuable time for giving the information required for the Study.

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I. Introduction and Background

National Rural Health Mission, Kottayam District and District Mass Education Media Wing, District Medical Office of Health of the Kottayam district jointly chalked out a communication campaign for strengthening the immunization status of Kottayam municipality in 2010-11. This has been included as a strategy in the National Rural Health Mission District BCC action plan for improving child health. The plan was to implement the communication campaign in 15 wards out of the 38wards (prior to delimitation 2010) of the Municipality. It was also decided to undertake a pre-campaign action study to identify the current level of immunization with regard to the immunization of the 0-5 year old children in the Kottyam Municipality. The Study was carried out from December 21 to 23, 2010 in 5 wards of the Municipality. Funds from the Behavior Change Communication Component of the National Rural Health Mission Project Implementation Plan (PIP) has been used for conducting the Study.

II. Statement of the Problem:

Immunization is recognized to be one the best strategies for ensuring child health. A child from zero age is given various vaccines; many of the vaccines provide life long protection from the killer diseases. The Government of India implements National Programme for protecting the children residing in the country against seven killer diseases i.e., Tuberculosis, Polio, Diphtheria, Purtusis, Tetanus, Hepatitis B, and Measles. The vaccines are given to the children as per the immunization schedule approved by the GOI.

Over the years, Kerala stood at the top with immunization rates well above 90 percent. As a result, the prevalence of the vaccine preventable diseases in the State has drastically come down. In the rural areas, the machinery of the Health Department worked like a well oiled machine to cover almost all the children in the specified age group with quality immunization services. With the increase in population, the staff strength of the department became insufficient to visit the houses and meet the ANC, and mothers regularly. The services of the Accredited Social Health Activists of NRHM has filled this gap effectively and the ASHA ensures that all the children in her area are immunized.

On the other hand the health service delivery in general and immunization in particular in the urban areas is a weakling; the main reason being that the responsibility of demand generation in majority of the municipal wards is with the Municipal Health wing. The Municipal health staff, which are too less in number to cover the population, are also involved in various other services. Immunization is a low priority for the Municipal health wing. In effect, the immunization coverage in most of the urban areas of the State is relatively lower.

In fact, reliable data on the immunization coverage of the urban areas is also not available with the administration. It is in this context that the District Health Administration has proposed an action plan to launch a Behaviour change communication campaign to improve the immunization status of Kottayam, the biggest Municipality in the district.

A pre campaign assessment of the immunization status of the Municipality is essential to know the current status of the coverage. This will be a vital data that can be used for planning strategies in other municipalities also.

III. Objectives

1. To assess the current of level routine immunization coverage among the 0 – 5 year population in the 5 wards of the Kottayam Municipality. The Study will also include in its preview level of immunization with regard to some major optional vaccines
2. To immunize the children identified in the Study as unimmunized or partially immunized.
3. To understand the socioeconomic factors contributing to vaccination.
4. To suggest strategies for improving the immunization coverage.

IV. Methodology

1. Sampling Design

It was not possible to take a census study of the immunization coverage in the whole municipality due to resource and time constraints. Five Municipal wards with representative nature were selected. The randomization was done among five major clusters (regions) of the Municipality.
The Wards hence selected were:
Table 1.1. Showing the ward wise details of the respondents of the study

Ward No.	Number of children 0-5 years	Ward Name	Cluster Number
4	61	Old Seminary	1
15	51	Manganam	2
25	54	Thekkumgopuram	3
35	85	Parappadom	4
38	92	Thazhathangadi	5
Total	343		

All the households in the five selected wards with the children of the 0 – 5 age group were surveyed. The sampling unit was a household/ family with child in the specified age group.
There were 343 children in the five wards selected.

2. Data Collection Design

Principal method of data collection was interview with the help of a structured interview schedule. (See annexure3) The mother or the female care taker of the child was the respondent as they were thought to be the best person to give the details of the child's immunization. Immunization cards kept at the houses were verified to the extent of availability. Wherever they were not available the data given by the mother was recorded. ASHA of the locality were assigned as enumerators. They were given one day training for administering the interview schedule. As the ASHA knew the locality better, could visit the houses in a flexible time frame, talk to the household with ease and could understand the details of immunization easier, they were the best option. Data collection was completed in three days from December 21 to 23, 2010.

3. Analysis Design

Data was processed with the help of a computer database. The immunization status was assessed in three categories – Fully immunized, partially immunized, and Un-immunized. They were analyzed on the bases of economic status, gender, and education.

4. Pretest

The tool (interview schedule) was pre-tested among 10 households prior to finalizing the tool.

5. Training

The enumerators were given one day training on various aspects of Immunization, immunization schedule, interview skills and administration of the schedule. Ten ASHA workers of the selected wards were assigned for data collection.

Chapter 2

Review of Literature and Locale of the Study

Introduction

This chapter covers the basic literature on the theory of immunization, history of routine immunization programme in India, details of major vaccine preventable diseases, and the immunization schedule in India. This section is intended to introduce to the reader the broader theoretical background of the Study and major concepts involved.

I. Immunization: Theoretical Background[1]:

Immunization, or **immunization**, is the process by which an individual's immune system becomes fortified against an agent (known as the immunogen).

When this system is exposed to molecules that are foreign to the body (*non-self*), it will orchestrate an immune response, but it can also develop the ability to quickly respond to a subsequent encounter (through immunological memory). This is a function of the adaptive immune system. Therefore, by exposing an animal to an immunogen in a controlled way, its body can learn to protect itself: this is called active immunization.

The most important elements of the immune system that are improved by immunization are the B cells (and the antibodies they produce) and T cells. Memory B cell and memory T cells are responsible for a swift response to a second encounter with a foreign molecule. Passive immunization is when these elements are introduced directly into the body, instead of when the body itself has to make these elements.

Immunization should be done through various techniques, most commonly vaccination. Vaccines against microorganisms that cause diseases can prepare the body's immune system, thus helping to fight or prevent an infection. The fact that mutations can cause cancer cells to produce proteins or other molecules that are unknown to the body forms the theoretical basis for therapeutic cancer vaccines. Other molecules can be used for immunization as well, for example in experimental vaccines against nicotine (NicVAX) or the hormone ghrelin (in experiments to create an obesity vaccine).

Active immunization

Active immunization entails the introduction of a foreign molecule into the body, which causes the body itself to generate immunity against the target. This immunity comes from the T cells and the B cells with their antibodies.

Active immunization can occur naturally when a person comes in contact with, for example, a microbe. If the person has not yet come into contact with the microbe and has no pre-made antibodies for defense (like in passive immunization), the person becomes immunized. The immune system will eventually create antibodies and other defenses against the microbe. The next time, the immune response against this microbe can be very efficient; this is the case in many of the childhood infections that a person only contracts once, but then is immune.

Artificial active immunization is where the microbe, or parts of it, are injected into the person before they are able to take it in naturally. If whole microbes are used, they are pre-treated, Attenuated vaccine.

Passive immunization

Passive immunization is where pre-synthesized elements of the immune system are transferred to a person so that the body does not need to produce these elements itself. Currently, antibodies can be used for passive immunization. This method of immunization begins to work very quickly, but it is short lasting, because the antibodies are naturally broken down, and if there are no B cells to produce more antibodies, they will disappear.

Passive immunization occurs physiologically, when antibodies are transferred from mother to fetus during pregnancy, to protect the fetus before and shortly after birth.

Artificial passive immunization is normally administered by injection and is used if there has been a recent outbreak of a particular disease or as an emergency treatment for toxicity (for example, for tetanus). The antibodies can be produced in animals ("serum therapy") although there is a high chance of anaphylactic shock because of immunity against animal serum itself. Thus, humanized antibodies produced *in vitro* by cell culture are used instead if available.

II. Routine Immunization in India[2] : Historical Background

Delivering effective and safe vaccines through an efficient delivery system is one of the most cost effective public health interventions. Immunization programmes aim to reduce mortality and morbidity due to vaccine preventable diseases (VPDs).

Following the successful global eradication of smallpox in 1975 through effective vaccination programmes and strengthened surveillance, the Expanded Programme on Immunization (EPI) was launched in India in 1978 to control other VPDs. Initially, six diseases were selected: diphtheria, pertussis, tetanus, poliomyelitis, typhoid and childhood tuberculosis. The aim was to cover 80% of all infants. Subsequently, the programme was universalized and renamed as Universal Immunization Programme (UIP) in 1985. Measles vaccine was included in the programme and typhoid vaccine was discontinued. The UIP was introduced in a phased manner from 1985 to cover all districts in the country by 1990, targeting all infants with the primary immunization schedule and all pregnant women with Tetanus Toxoid immunization (see schedule below).

The UIP envisages achieving and sustaining universal immunization coverage in infants with three doses of DPT and OPV and one dose each of measles vaccine and BCG, and, in pregnant women, with two primary doses or one booster dose of TT. The UIP also requires a reliable cold chain system for storing and transporting vaccines, and attaining self-sufficiency in the production of all required vaccines.

In 1992, the UIP became a part of the Child Survival and Safe Motherhood Programme (CSSM), and in 1997, it became an important component of the Reproductive and Child Health Programme (RCH). The Cold-chain system was strengthened and training programmes were launched extensively throughout the country. Intensified polio eradication activities were started in 1995-96 under the Polio Eradication programme, beginning with National Immunization Days (NIDs) and active surveillance for acute flaccid paralysis (AFP). The Polio Eradication Programme was set up with the assistance of the National Polio Surveillance Project.

Routine Immunization Monitoring Systems (RIMS)

India's Immunization Program is one of the largest in the world in terms of quantities of vaccines used, numbers of beneficiaries, and the numbers of immunization sessions organized, the geographical spread and diversity of areas covered. Under the immunization program, six vaccines are used to protect children and pregnant mothers against Tuberculosis, Diphtheria, Pertussis, Polio, Measles and Tetanus. Hepatitis B vaccine has been included in UIP in 2007.

For a complex and extensive programme like immunization an efficient management information system is necessary to get timely reports at State and National level. It is also equally important to provide feedback to the States and Districts for undertaking management interventions. At present the programme has to depend upon routine reports received as part of the reporting under the Reproductive and Child Health (RCH) programme. This system provides feedback on coverage data only. Important information regarding the vaccines and cold chain logistics which are high cost areas does not get captured in the present system and a lot of effort and time is required in getting the critical data on these issues for planning and forecasting requirements and monitoring the status of vaccine supply and availability. To address these issues now and to collect data from District/PHC level a computer based monitoring system (RIMS software) was developed for implementation throughout the country.

III. Vaccine Preventable Diseases[3]

This section presents details of the seven vaccine preventable diseases; Tuberculosis, Polio, Diphtheria, Pertussis, Tetanus, Measles, and Hepatitis.

1. Polio is a disease that has caused paralysis in millions of children worldwide over the years. Polio is caused by a virus that lives in the throat and intestinal tract. It is spread mainly through contact with the feces of an infected person (for instance, by changing diapers).

Some children who get polio don't feel ill at all. Others have the symptoms of a common cold, sometimes accompanied by pain and stiffness in the neck, back and legs. But some children get severe muscle pain, and within a week can be paralyzed — in other words, loose the use of their muscles. Usually paralysis affects a child's legs, but it can also affect other muscles, including those that control breathing.

Depending on the sites of paralysis, polio can be classified as spinal, bulbar, or spino-bulbar disease. Progression to maximum paralysis is rapid (2–4 days), is usually associated with fever and muscle pain, and rarely continues after the patient's temperature has returned to normal.
Spinal paralysis is typically asymmetric and more severe proximally than distally. Deep tendon reflexes are absent or diminished. Bulbarparalysis can compromise respiration and swallowing.
Paralytic polio is fatal in 2%–10% of cases. After the acute episode, many patients recover at least some muscle function and prognosis for recovery can usually be established within 6 months after onset of paralytic manifestations.

There is no treatment for polio, and some children die from it. The incubation period for poliomyelitis is commonly 6 to 20 days with a range of 3 to 35 days.

2. Tuberculosis is a contagious bacterial disease caused by the bacillus Mycobacterium tuberculosis. With 8 million new cases each year, tuberculosis is the second leading cause of death from infectious diseases throughout the world, after acquired immune deficiency syndrome (AIDS).

SYMPTOMS

• Following infection, usually through the airborne route, the bacteria grow within the pulmonary alveoli and macrophages. When bacterial multiplication can no longer be contained by the immune system (in 5 to 10% of patients), the active disease develops.

• The most common form of active tuberculosis is the pulmonary form. Symptoms include chronic cough, moderate fever, night time sweats, fatigue, decreased appetite and weight loss.

• Miliary (diffuse impairment of lungs, spleen, liver, and bone marrow) and meningeal tuberculosis are the most severe forms of the disease.

• Treatment relies on the administration of anti-tuberculosis drugs for many months.

3. Diphtheria is an acute, toxin-mediated disease caused by bacteria called Corynebacterium Diphtheriae. It lives in the mouth, throat and nose of an infected person and can be spread to others by coughing or sneezing. A child with diphtheria can infect others for 2 to 4 weeks. The incubation period of diphtheria is 2–5 days (range, 1–10 days). Depending on the site of disease Diphtheria is of following type;

- Anterior Nasal Diphtheria
- Pharyngeal and Tonsillar Diphtheria
- Laryngeal Diphtheria
- Cutaneous (Skin) Diphtheria

Diphtheria can initially cause a sore throat, fever and chills. But if it is not properly diagnosed and treated it produces a toxin (poison) that can cause serious complications such as heart failure or paralysis. About 1 person out of 10 who get diphtheria dies from it.

4. Pertussis (Whooping Cough) is an acute infectious disease caused by bacteria called Bordetella Pertussis. If you have ever seen a child with pertussis you won't forget it. The child coughs violently and rapidly, over and over, until the air is gone from her lungs and the child is forced to inhale with the loud "whooping" sound that gives the disease its nickname, whooping cough.It is spread from person to person through personal contact, coughing and sneezing.

The incubation period of Pertussis is commonly 7–10 days, with a range of 4–21 days, and rarely may be as long as 42 days. At first Pertussis resembles a common cold, with sneezing, running nose, fever and a mild cough. But after 1 or 2 weeks the severe coughing spells begin. During such an attack, the patient may become cyanotic (turn blue). Children and young infants, especially, appear very ill and distressed. Vomiting and exhaustion commonly follow the episode. The person does not appear to be ill between attacks. Paroxysmal attacks occur more frequently at night, with an average of 15 attacks per 24 hours. During the first 1 or 2 weeks of this stage, the attacks increase in frequency, remain at the same level for 2 to 3 weeks, and then gradually decrease.

Pertussis is most severe in infants less than 1 year old. More than half of these infants who get the disease must be hospitalized. Older children and adults can get pertussis too, but it is usually not as serious. Many infants who get pertussis catch it from their older brothers and sisters, or from their parents who might not even know they have the disease. Immunity following B. Pertussisinfection does not appear to be permanent, therefore immunization is must.

About 1 child in 10 who get pertussis also gets pneumonia, and about 1 in 50 will have convulsions. The brain is affected in about 1 person out of 250 (this is called encephalopathy). Adolescents and adults may also develop complications of Pertussis, such as difficulty sleeping, urinary incontinence, pneumonia, and rib fracture.

Tetanus (lockjaw) is an acute, often fatal, disease caused by an exotoxin produced by the bacteria Clostridium tetani. It is characterized by generalized rigidity and convulsive spasms of skeletal muscles. The muscle stiffness usually involves the jaw (lockjaw) and neck and then becomes generalized.

5. Tetanus (lockjaw) differs from other vaccine-preventable diseases in that it is not contagious. It does not spread from person to person. The organism is sensitive to heat and cannot survive in the presence of oxygen. The spores, in contrast, are very resistant to heat and the usual antiseptics. The spores of Clostridium tetani bacteria are usually found in soil, intestines and feces of horses, sheep, cattle, dogs, cats, rats, guinea pigs, and chickens, dust, and manure, and they enter the body through breaks in the skin. Children usually become infected through deep puncture wounds or cuts, like those made by nails or knives. But the bacteria can enter through even a tiny pinprick or scratch. Children can also get tetanus following severe burns, ear infections, tooth infections, or animal bites.

When tetanus gets into the body it can take up to 3 weeks for the first symptoms to appear. These are usually a headache, crankiness, and spasms of the jaw muscles. The bacteria produce a toxin (poison), which spreads throughout the body, causing painful muscle spasms in the neck, arms, legs, and stomach. These can be strong enough to break a child's bones. Children with tetanus might have to spend several weeks in the hospital under intensive care.

6. Hepatitis B is a liver disease. It is caused by the hepatitis B virus. It is spread through contact with the blood, or other body fluids, of an infected person. Adolescents and adults can be infected through sharing drug needles or through unprotected sex, and health-care and public safety workers are often exposed to blood in the course of their jobs. Pregnant women can infect their newborn babies. People infected with hepatitis B might not feel sick, or might suffer loss of appetite or tiredness, muscle or stomach pains, diarrhea or vomiting, or yellow skin or eyes (jaundice).

People usually recover from hepatitis B after several weeks, but others become "chronically infected." They might not feel sick themselves, but they continue to carry the virus and can infect other people. A baby who is born to a chronically infected mother has a 70%–90% chance of being infected at birth. Many people who are chronically infected will suffer from serious problems such as cirrhosis (scarring of the liver) or liver cancer.

7. Haemophilus Influenzae Type b. Not long ago Hib disease (Haemophilus Influenzae type b) was the leading cause of bacterial meningitis in children less than 5 years old. As recently as the mid-1980s it struck one child out of every 200 in that age group. Nearly all Hib infections occurred among children younger than 5 years of age, and approximately two-thirds of all cases occurred among children younger than 18 months of age. About 1 in 4 of these children suffered permanent brain damage, and about 1 in 20 died.

Hib disease is spread through the air by coughing, sneezing, and even breathing. If the bacteria stay in a child's nose and throat, the child will probably not get sick. But if they spread to the lungs or bloodstream, the child can get meningitis (inflammation of the covering of the brain), pneumonia, epiglottitis (inflammation in the throat), arthritis, or other problems. A child who is infected can spread the disease to others for as long as the bacteria remain in the body. Antibiotics can stop spread in 2 to 4 days.

8. Measles is an acute viral illness caused by paramyxovirus, genus Morbillivirus. This virus causes a rash all over the body. It also causes fever, runny nose and cough. About 1 out of 10 children with measles also get an ear infection, and up to 1 out of 20 get pneumonia. About 1 out of 1,000 get encephalitis, and 1 or 2 out of 1,000 die. Measles can also make a pregnant woman have a miscarriage or give birth prematurely.

Measles spreads through the air by breathing, coughing or sneezing. The incubation period of measles, from exposure to prodrome averages 10–12 days. From exposure to rash onset averages 14 days (range, 7–18 days). It is so contagious that any child who is exposed to it and is not immune will probably get the disease. Before measles vaccine, nearly all children got measles by the time they were 15. Each year about 450 people died because of measles, 48,000 were hospitalized, 7,000 had seizures, and about 1,000 suffered permanent brain damage or deafness.

9. Mumps is an acute viral illness caused by the mumps virus, (paramyxovirus) which is spread from person to person through airborne transmission or by direct contact with infected droplet nuclei or saliva. Before a vaccine was available mumps was a very common childhood illness. The incubation period of mumps is 14–18 days (range, 14–25 days). Mumps is best known for the swelling of the cheeks and jaw that it causes, a result of inflammation of the salivary glands. Mumps also causes a fever and headache. It is usually a mild disease, but it leads to meningitis in about 1 child in 10 who get the disease. It can occasionally cause encephalitis, deafness (about 1 in 20,000 cases), or even death (about 1 in 10,000 cases).

SYMPTOMS

• After a incubation period of 14 to 18 days, mumps begins with general malaise and fever, followed by the swelling of the parotid (salivary) glands. Recovery is usually complete within approximately a week.

• Complications such as aseptic meningitis, deafness, orchitis (inflammation of the testis), and pancreatitis may appear, especially among adults.

• No specific treatment is currently available.

10. Rubella (German Measles) is sometime called German Measles or 3-day Measles. It is a generally mild disease caused by the rubella virus. Rubella virus is classified as a togavirus, genus Rubivirus. It usually strikes in the winter and spring, and causes a slight fever, a rash on the face and neck, and (when teenagers or adults get the disease) swollen glands in the back of the neck and arthritis-like symptoms in the joints. It is spread from person to person through the air, by coughing, sneezing or breathing. The incubation period of rubella is 14 days, with a range of 12–23 days.

The greatest danger from rubella is to unborn babies. If a woman gets rubella in the early months of her pregnancy, there is an 80% chance that her baby will be born deaf or blind, with a damaged heart or small brain, or mentally retarded. This is called Congenital Rubella Syndrome, or CRS. Miscarriages are also common among women who get rubella while they are pregnant. The virus may affect all organs and cause a variety of congenital defects. Infection may lead to fetal death, spontaneous abortion, or premature delivery.

SYMPTOMS

• The mean incubation period is 14 days. In its typical clinical form, the disease is characterized by a transient erythematous rash with moderate fever, conjunctivitis, coryza, and sub-occipital adenopathy (swelling of neck lymph nodes).

• In the case of CRS, infants develop ophthalmic, auditory, cardiac, and craniofacial malformations, which are more severe when transmission occurs early during pregnancy. (25)

IV. Vaccination Schedule[4]

A **vaccination schedule** is a series of vaccinations, including the timing of all doses, which may be either recommended or compulsory, depending on the country of residence.

A vaccine is an antigenic preparation used to produce active immunity to a disease, in order to prevent or reduce the effects of infection by any natural or 'wild' pathogen. Many vaccines require multiple doses for maximum effectiveness, either to produce sufficient initial immune response or to boost response that fades over time. For example, tetanus vaccine boosters are often recommended every 10 years. Vaccine schedules are developed by governmental agencies or physicians groups to achieve maximum effectiveness using required and recommended vaccines for a locality while minimizing the number of health care system interactions. Over the past two decades, the recommended vaccination schedule has grown rapidly and become more complicated as many new vaccines have been developed.

Some vaccines are recommended only in certain areas (countries, sub-national areas or at-risk populations) where a disease is common. For instance, yellow fever vaccination is on the routine vaccine schedule of French Guiana, is recommended in certain regions of Brazil but in the United States is only given to travelers heading to countries with a history of the disease.[4] In developing countries, vaccine recommendations also take into account the level of health care access, the cost of vaccines and issues with vaccine availability and storage. Sample vaccinations schedules discussed by the World Health Organization show a developed country using a schedule which extends over the first five years of a child's life and uses vaccines which cost over $700 including administration costs while a developing country uses a schedule providing vaccines in the first 9 months of life and costing only $25. This difference is due to the lower cost of health care, the lower cost of many vaccines provided to developing nations, and that more expensive vaccines, often for less common diseases, are not utilized.

In 1900, the smallpox vaccine was the only one administered to children. By the early 1950s, children routinely received four vaccines, for protection against (diphtheria, pertussis, tetanus, polio,

and smallpox), and as many as five shots by two years of age. Since the mid-1980s, many vaccines have been added to the schedule.

Immunization schedule for children

Immunization forms one of the most important and cost effective strategies for the prevention of childhood sicknesses and disabilities and is thus a basic need for all children. The following schedule has been recommended by the Ministry of Health, Govt. of India and is one of the most widely followed by the child health care providers.

NATIONAL IMMUNIZATION SCHEDULE[5]

Table 2.1. Showing the Immunization Schedule

BENEFICIARY	AGE	VACCINE
Infants	Birth	BCG* and OPV**
	6 weeks	DPT&OPV
	10weeks	DPT&OPV
	14 weeks	DPT&OPV
	9 months	Measles vaccine
	18 months	DPT&OPV(Booster dose)
Children	5 years	DT vaccine
	10years	Tetanus toxoid
	16years	Tetanus toxoid

*At birth or at the time of DPT/OPV ;
** dose called as Zero dose and can be given till 14 days of age ,if missed early.

ABBREVIATIONS: BCG=Bacillus calmittee Guerin;
DPT=Diphtheria,Pertussis & Tetanus;
OPV =Oral Polio Vaccine;
DT= Diphtheria & Tetanus vaccine.

Note: Hepatitis B has been included in the immunization Schedule since 2007, It is given along with DPT, OPV during 6, 10 and 14 weeks. Of late since November 2010, Second Doze of Measles Vaccination has also been added to the schedule. It is given from 15 to 18 months of age.

THE INDIAN ACADEMY OF PEDIATRICS

The largest professional organization of pediatricians in our country fully endorses and supports the national schedule. It supplements the above schedule further, with 1 additional vaccine namely: MMR (Measles, Mumps & Rubella vaccine) at about 15 to 18 months of age. It must be remembered that even though rubella may appear to be a mild illness, it has a serious potential to cause congenital defects in a baby, whose mother is not protected against rubella and catches the infection during early pregnancy.

The decision to use the newer vaccines such as Hepatitis A vaccine (Water borne jaundice), HIB vaccine and Varicella (chicken pox) vaccine can vary amongst child practitioners and both the parents and the doctor can discuss their usage for their child, as presently, these vaccines are not included in

the routine immunization program of our country. Their rational use should be based upon the cost, child's age, parent's concerns, exposure risks to the child and the doctor – parent decision.

Locale of the Study[6]

Positioned a little south to central Kerala, Kottayam district is bordered on the north by Ernakulam district, on the east by Idukki district and on the south by Alappuzha and Pathanamthitta districts. The Vembanad Lake forms the western boundary. Kottayam lies between latitude 9° 15' and 10° 21' and longitude 76° 22' and 77° 25'.

Kottayam is a city in the Indian state of Kerala. It is located in central Kerala and is also the administrative capital of Kottayam district. Bordered by the lofty and mighty Western Ghats on the east and the Vembanad Lake and paddy fields of Kuttanad on the west, Kottayam is a land of unique characteristics. Panoramic backwater stretches, lush paddy fields, highlands, hills and hillocks, extensive rubber plantations, places associated with many legends and a totally literate people have given Kottayam District the enviable title: The land of letters, legends, latex and lakes.

The city is an important trading center of spices and commercial crops, especially rubber. Most of India's natural rubber originates from the acres of well-kept plantations of Kottayam, also home to the Rubber Board. Kottayam is also called as "Akshara Nagari" which means the "city of letters" considering its contribution to print media and literature. Kottayam Town is the first town in India to have achieved 100% literacy (*a remarkable feat achieved as early as in 1989*). English education in South India did actually start at the Old Seminary here at Kottayam in 1813. The first printing press in Kerala was established (CMS Press) here in 1821 by Rev.Benjamin Baily. The first college in the State (CMS College) was also started here at Kottayam in 1840. Maiden printed Malayalam-English and English-Malayalam Dictionaries were published from Kottayam in 1846 and 1847 respectively. The first and only Cooperative Society of writers, authors and publishers (SPCS), for publishing books and periodicals was set up here in 1945.

Kottayam is the hometown of a vast number of books and periodicals and is the center of publishing business in the State. Kottayam is the first town in India selected by the Ministry of Environment and Forests, Government of India to be transformed as an Eco City. The Sri K R Narayanan, the former President of India hails from Kottayam District. Kottayam is the ideal take off point for visits to Peermade, Munnar, Thekkady, Ernakulam and the temple city, Madurai. It is also a gateway to the pilgrim centers of Sabarimala, Mannanam, Vaikom, Ettumanoor, Bharananganam, Erumeli, Manarcaud, and so on.

Kottyam Municipality, which has 38 wards, is one of the four Municipalities in the District. After the delimitation of 2010, the Municipality as adjoined two Panchayats viz., Kumaranalloor and Nattokom to its fold and now it has 52 wards.

Kottayam District: Profile

1.	Total area in (sq.km)	:	2208 Sq.Km
2.	Total Population	:	1952901
	Male	:	964433
	Female	:	988468
3.	Sex Ratio	:	1025
4	Density Of Population		
	National Population Density	:	324
	Population Density of District	:	885
5.	SC Population	:	150282
	ST Population	:	18340
6.	Literacy rate	:	95.9%
7.	Total Number of Panchayats	:	73
8.	Total Number of Municipalities	:	4 (Kottayam, Pala, Vaikkom and Changanacheri)
	Total Number of Corporations	:	Nil
8.	Total Number of Taluks	:	5
9.	Total Number of Villages	:	95
10.	Total Number of Households	:	839084
11.	Health Block	:	15
12.	Total Number of		
	1. Sub center	:	330
	2. PHC 'S	:	54
	3. CHC/BPHC'S	:	18
	4. THQ Hospitals	:	5
	5. General Hospital	:	1
	6. District Hospital	:	1
	7. Medical College Hospital	:	1
	8. Institute of child Health	:	1
	9. District T.B.Hospital	:	1

The Kottayam district is well known for its pioneering efforts in education and literacy, and for transforming the agricultural production with the investments in the cash crops. It has gained respectable place for the whole State in the map of nation's agricultural production.

Chapter 3
Major Finding, Conclusions and Suggestion

The major findings are presented first followed by the conclusion and suggestions

1. The level of immunization with regard to Zero Dose DPT and OPV (99.71 percent), First doze DPT and OPV (99.4 percent), Second Doze OPV and DPT 97.85 percent, Third doze OPV and DPT 99.06, Measles 98.23 percent, DPT Booster and OPV 92.17 percent, MMR 61.64 percent, DT Booster and OPV 78.79 percent. The Immunization levels of the Hepatitis B First, Second, and Third doze are 75.75 percent, 74.46 percent, and 72.01 percent respectively. The immunization level of HIB Vaccine is just 40 percent.

2. Around Ninety Eight percent children are fully immunized (received all vaccines promptly up to Measles vaccination at the age of 10 months). Two percent (5 number) children are partially immunized and one child in the sample is unimmunized. The levels of immunization with respect to the routine immunization especially up to measles vaccination are quite satisfactory. It shows the effectiveness of the arrangements for immunization under the Urban RCH Programme in the Municipality. They only need to be strengthened in terms of checking the drop outs after the age of one year.

3. 97.69 percent of the male and 98.04 percent of the female children are immunized. Three male and two female children are partially immunized. One female child is unimmunized. Immunization levels of the females are more than the males; nevertheless the differences are marginal.

4. 96.46 percent of the Hindu, 98.84 percent of the Christian, and 98.81 percent of the Muslim children are immunized. Contrary to the popular notion immunization levels of the Muslim population is the higher than the average.

5. The level of immunized are less among the Families living Below poverty Line (95.38%) compared to their counter parts in the Above Poverty Line (98.62%).

6. The level of immunization is higher among children of the more educated mothers.

7. All children save one in the sample have received the Zero dose vaccination. Considering the fact that the institutional delivery is 100 percent, this achievement is natural. But it also shows that all the private hospitals in the locality also strictly give the zero doze and BCG vaccination.

8. Out of the 334 children eligible to receive the first dose, 332 (99.4%) have received. One child each from the Ward no. 15 and 25 were found unimmunized.

9. Out of 325 children eligible to be immunized with OPV and DPT second doze 318 (97.85percent) children were immunized. Seven children found to be unimmunized.

10. Out of 318 children eligible to be immunized with OPV and DPT third doze 315 (99.06percent) children were immunized.

11. Out of 283 children eligible to be immunized with measles first doze vaccine 278 (98.23 percent) children were immunized.

12. Out of 217 children eligible to be immunized with OPV and DPT booster, 200 (92.17 percent) children were immunized.

13. Out of 33 children eligible to be immunized with OPV and DPT second doze 26 (78.79 percent) children were immunized.

14. Out of 334 children eligible to be immunized with HBV first doze, 253 (75.75 percent) children were immunized.

15. Out of 325 children eligible to be immunized with HBV second doze, 242(74.46 percent) children were immunized.

16. Out of 318 children eligible to be immunized with HBV third doze, 229 (72.01 percent) children were immunized.

17. Out of 219children eligible to be immunized with MMR Vaccine, 135 (61.64 percent) children were immunized.

Conclusion

1. The levels of immunization of the children go down after Measles vaccination. This is a drop out phenomenon. Systematic and continuous awareness generation is the key for halting it.

2. Coverage of immunization up to one year are quite satisfactory

3. Children drop out of immunization from DPT booster at the age of 18 months, and the coverage of DT immunization at the age of four and a half years is low.

4. There are no significant difference in the immunization levels of the various socio economic groups i.e., religious groups, economic classes, or sexes.

5. Levels of immunization of the children of the more educated mothers are better.

6. Coverage of vaccines not covered under the routine immunization is very low.

Suggestions

1. Campaigns and communication strategies should focus the immunization at the later ages too.

2. Efforts shall be made to strengthen immunization at the schools, in the Anganvadis, playschools, Kinder garden sections to ensure that all the children who come under the specified age group received the DPT booster and DT Booster. Institutional mechanism where the representatives of all Play Schools and KG s may be worked out in the urban areas. The people, who run such institutions, may be sensitized on the importance of immunization and their cooperation may be enlisted.

3. Campaigns shall include the community Based organizations such as Resident's Associations, Kusumbasree, etc to see that all the members are oriented regarding need for immunization and immunization schedule.

4. ASHA volunteers guided by the Jr. Public Health Nurses shall be assigned to line list the 0-5 children with respect to their immunization levels in the urban areas. ASHA workers, Jr. Public Health Nurses and Public Health Nurses, whose wards are fully immunized (all children in the 0-5 age group) may be given special incentives/ awards every year to promote the immunization levels.

5. The current strategy of giving incentives to ASHA only if they bring 5 children for immunization sessions is not sufficient enough to motivate her to see that all the children in the area are immunized. If a ASHA workers/ Jr. Public Health Nurse/ Public Health Nurse who finds a resistant

family in the ward, does not take all out measures to motivate the family, rather they find it more beneficial to motivate the rather 'easy-to-target' families and bring them for immunization. Motivating the former group is time consuming, and difficult. The strategy mentioned in the para 4 of this section will ensure that they target the resistant families too.

6. Such wards reported as completely immunized by the staff concerned may be declared so in a public function so that it is confirmed and affirmed. False reporting can be done away. The peoples representatives who cooperated with such efforts may also be given due credit, so that the health workers receive sufficient popular support.

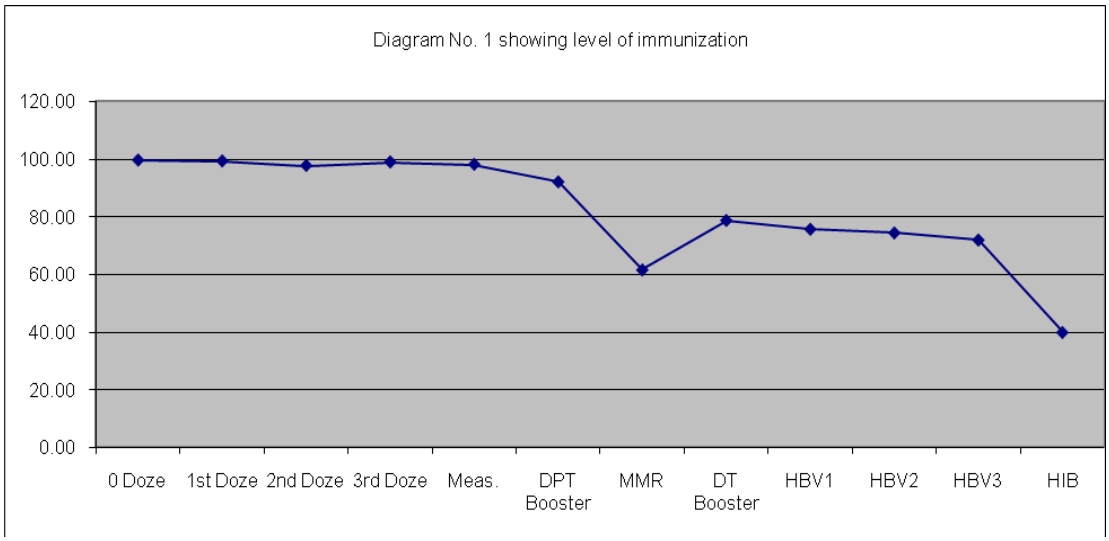
Chapter 4
Presentation of the Results and Discussion

This chapter presents the findings of the study in details. Diagrams are presented in this section along with discussion. The detailed tables with distribution of children are presented in appendix No. 1. The chapter is divided into three sub sections I. Levels of Immunization, II. Immunization levels of various vaccines covered under routine immunization, and III. Immunization levels of various optional vaccines including Hepatitis B

I. Levels of Immunization

Level of immunization is derived at by calculating the number of children who received all vaccines up to measles vaccine before completing the age of one year. A child that completed ten months is *fully immunized*, if it received all vaccines in the immunization schedule, it should have received before the age of one year. It is *Unimmunized*, if it did not receive any vaccine it should have received before the age of one year. It is *partially immunized* it received/ did not receive some vaccine specified before the age of one year.

1. The diagram given below shows that the immunization level with regard to the vaccinations covered under the study in the given population.

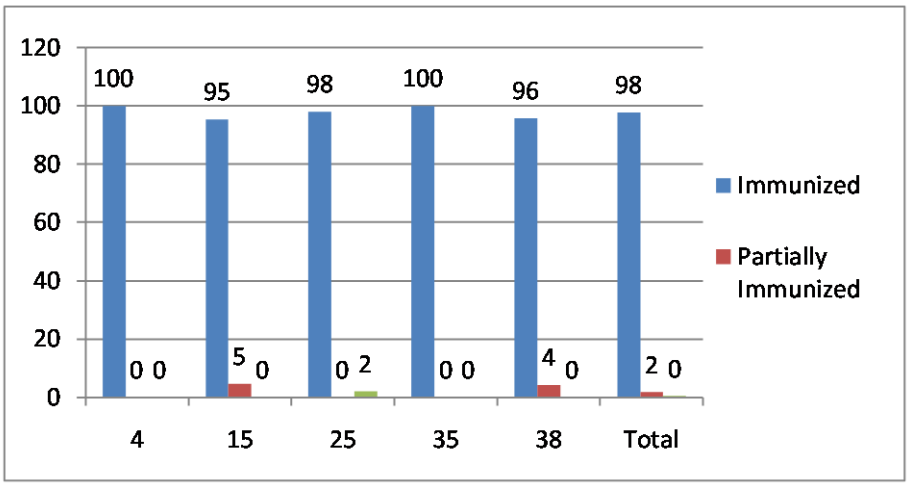


The diagram No. 1 shows that the level of immunization with regard to Zero Dose DPT and OPV (99.71 percent), First doze DPT and OPV (99.4 percent), Second Doze OPV and DPT 97.85 percent, Third doze OPV and DPT 99.06, Measles 98.23 percent, DPT Booster and OPV 92.17 percent, MMR 61.64 percent, DT Booster and OPV 78.79 percent. The Immunization levels of the Hepatitis B First, Second, and Third doze are 75.75 percent, 74.46 percent, and 72.01 percent respectively. The immunization level of HIB Vaccine is just 40 percent.
The levels of immunization with respect to the routine immunization especially up to measles vaccination is quite satisfactory. It shows the effectiveness of the arrangements for immunization under the Urban RCH Programme in the Municipality.

However, we can note a steep and systematic fall in the immunization levels after measles vaccination at the 10th month. The immunization levels of the HBV are also below 75 percent, partly because that the vaccination has been included in the immunization schedule at a later stage. Many of the older children assessed under the study were not covered under routine immunization for HBV.

2. The diagram 2 shows the percentage of fully immunized children in the wards under study. A child, who completed ten months of age, is fully immunized if it received all vaccines until measles under the immunization schedule. 283 children who completed ten months were considered for the purpose.

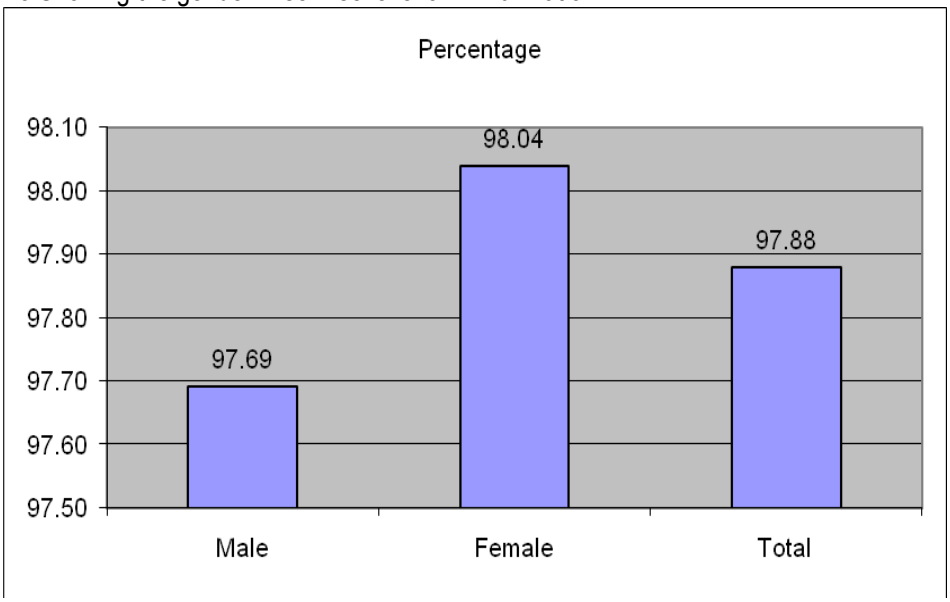
Diagram 2 showing the ward wise levels of immunization



Ninety Eight percent (277) children are fully immunized. Two percent (Five children) are partially immunized and one child in the sample is unimmunized. The parents of the unimmunized child are very resistant immunizing the child due their strong faith in naturopathy. Efforts are on to motivate the parents of the child too to immunization. See table 4.1 for more details.

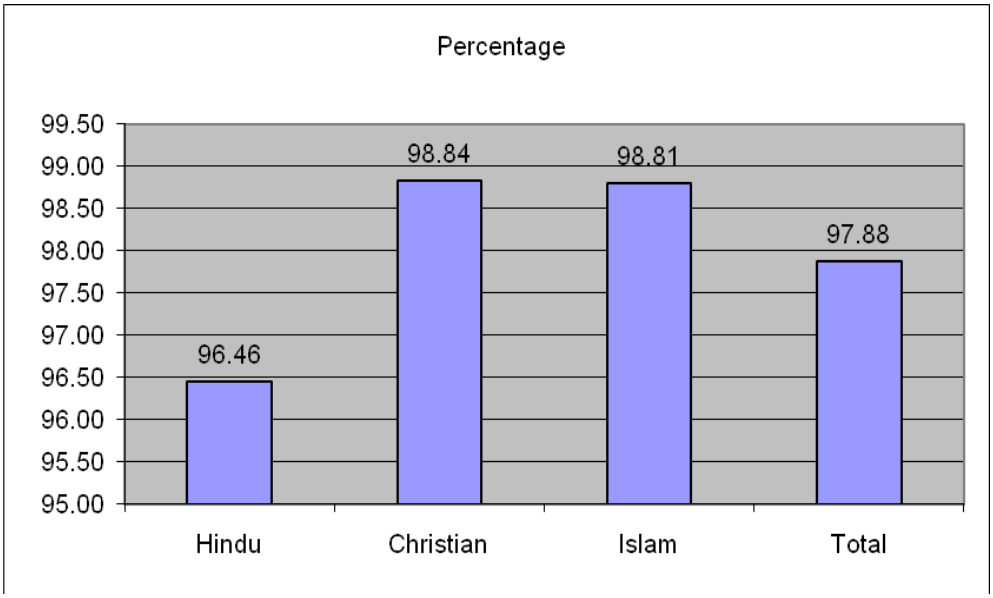
3. Diagram 3 shows the gender wise level of immunization of the sample population

Diagram 3 Showing the gender-wise wise level of Immunization



97.69 percent of the male and 98.04 percent of the female children are immunized. Three male and two female children are partially immunized. One female child is unimmunized. See details in the table no 4.2. Immunization levels of the females are more than the males; nevertheless the differences are marginal.

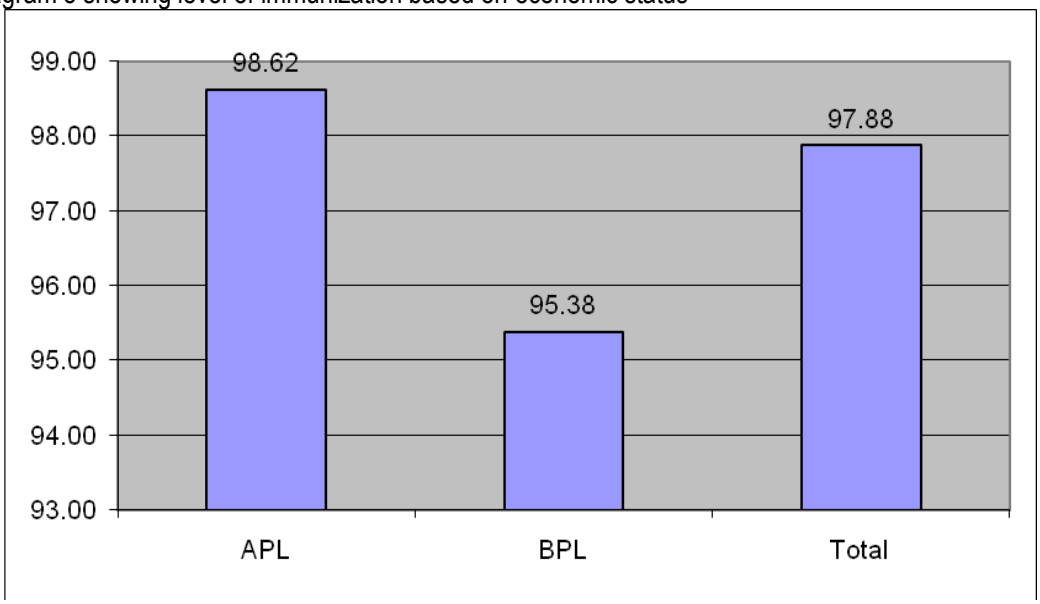
4. Diagram 4 shows the religion wise level of immunization of the sample population



96.46 percent of the Hindu, 98.84 percent of the Christian, and 98.81 percent of the Muslim children are immunized. Contrary to the popular notion immunization levels of the Muslim population is the higher than the average. Table 4.3 has the details.

5. The diagram below shows the percentage of immunized based on economic status.

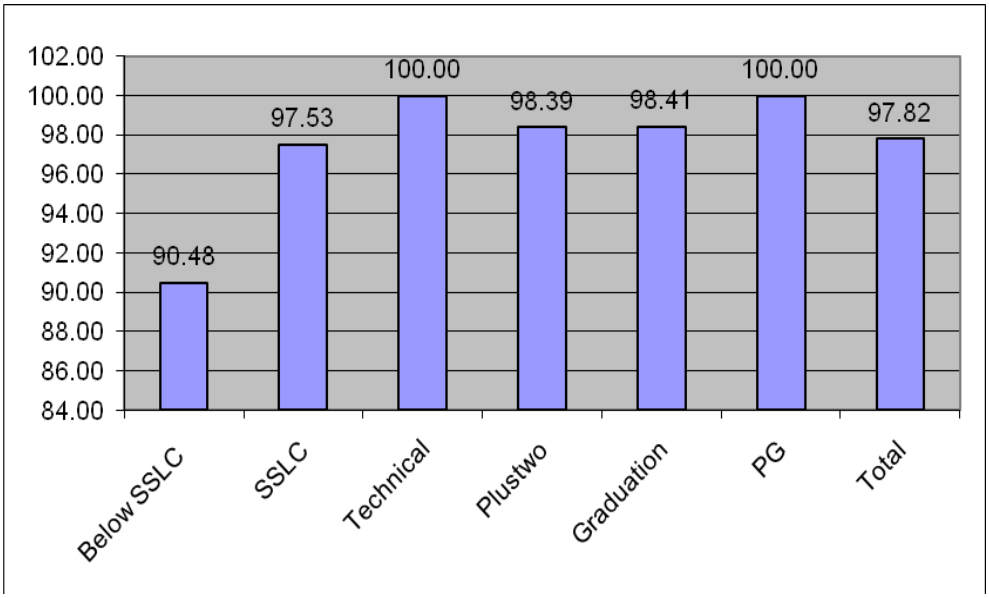
Diagram 5 showing level of immunization based on economic status



The data shows that the level of immunized are less among the Families living Below poverty Line (95.38%) compared to their counter parts in the Above Poverty Line (98.62%). Table 4.4 has the details.

6. The data was analyzed on the bases of the education of the mother. The Diagram 5 presents the comparison.

Diagram 6 showing the levels of immunization based on the education of the mother



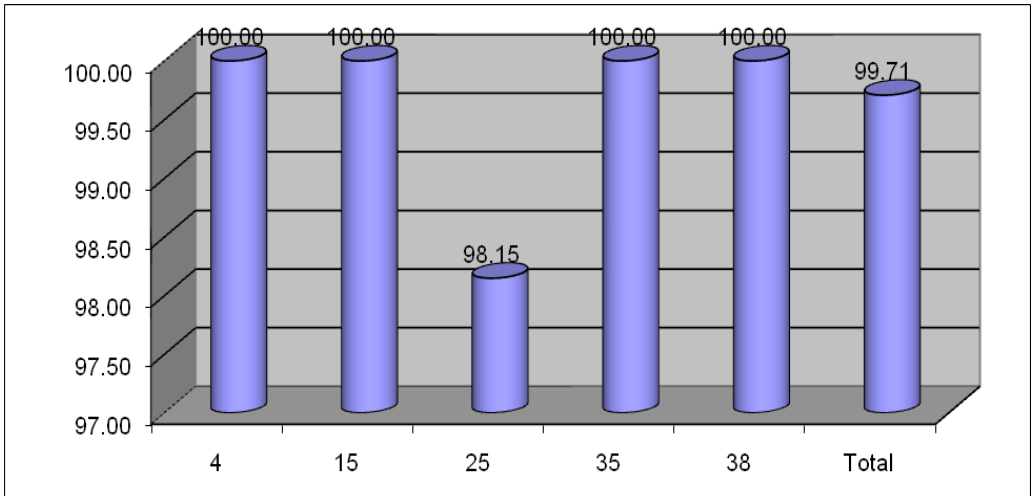
The data suggests that the level of immunization is higher among children of the more educated mothers in the sample. Table 4.5 has the details.

II. Immunization of vaccines covered under the routine Immunization

This section presents the data regarding the immunization levels of the different doses vaccines included in the Immunization schedule.

7. The diagram no. 7 shows the immunization levels with regard to the Zero dose vaccination (BCG and OPV) received by the children before the discharge from the hospital.

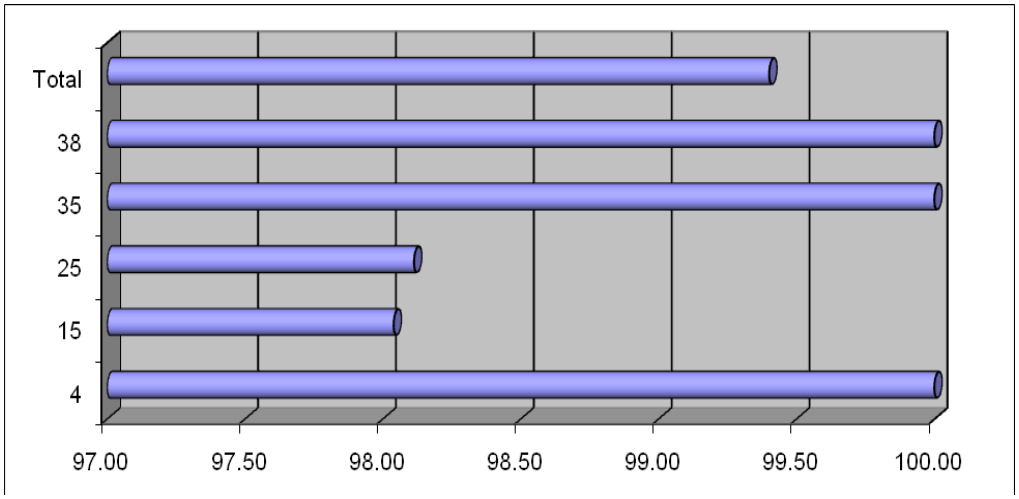
Diagram 7. Showing the ward wise distribution of children immunized with BCG and OPV Zero Dose



The diagram shows that 99.71 percent children in the sample have received the Zero dose vaccination. Considering the fact that the institutional delivery is 100 percent, this achievement is natural. But it also shows that all the private hospitals in the locality also strictly give the zero doze and BCG vaccination. Table 4.6 has the details.

8. The diagram 8 presents the ward wise pattern of first doze OPV and DPT immunization

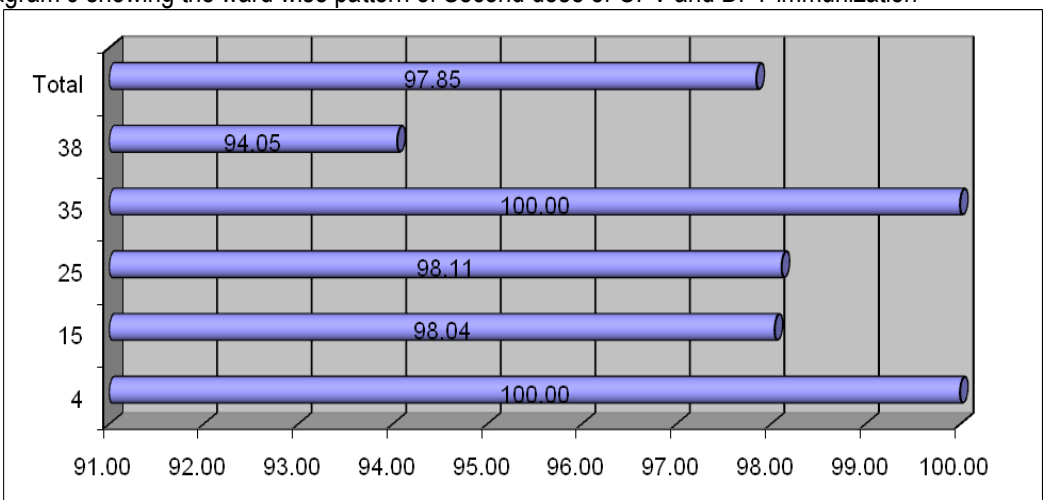
Diagram 8 showing Ward-wise Immunization Status of First Doze of OPV, DPT



Out of the 334 children eligible to receive the first dose, 332 (99.4%) have received. One child each from the Ward no. 15 and 25 were found unimmunized. Table 4.7 has the details.

9. The diagram 9 presents the ward wise pattern of Second doze OPV and DPT immunization

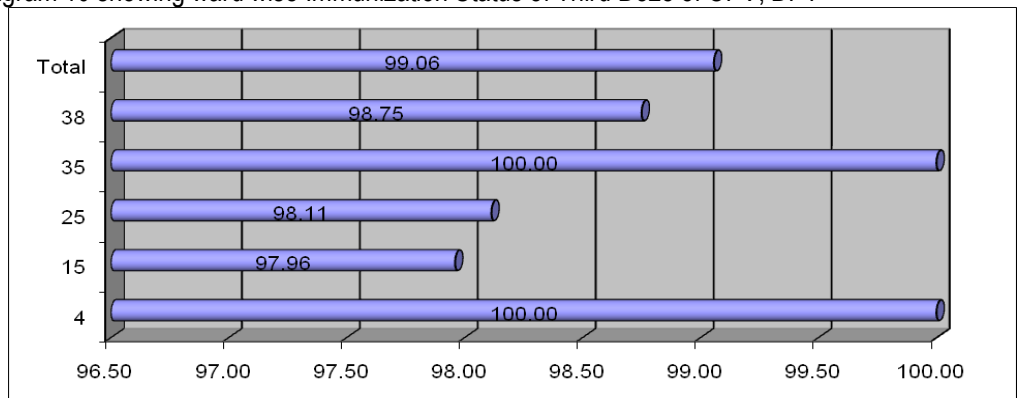
Diagram 9 showing the ward wise pattern of Second dose of OPV and DPT immunization



Out of 325 children eligible to be immunized with OPV and DPT second doze 318 (97.85percent) children were immunized. Table 4.8 has the details.

10. The Diagram 10 presents the pattern of second dose OPV and DPT vaccination.

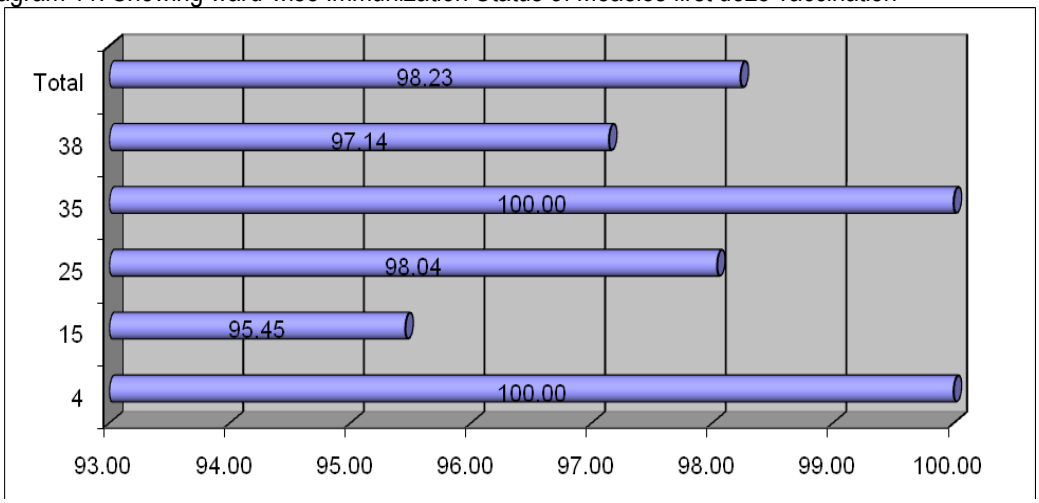
Diagram 10 showing ward wise Immunization Status of Third Doze of OPV, DPT



Out of 318 children eligible to be immunized with OPV and DPT third doze 315 (99.06percent) children were immunized. Table 4.9 has the details.

11. The Diagram 11 presents the pattern of Measles First doze vaccination

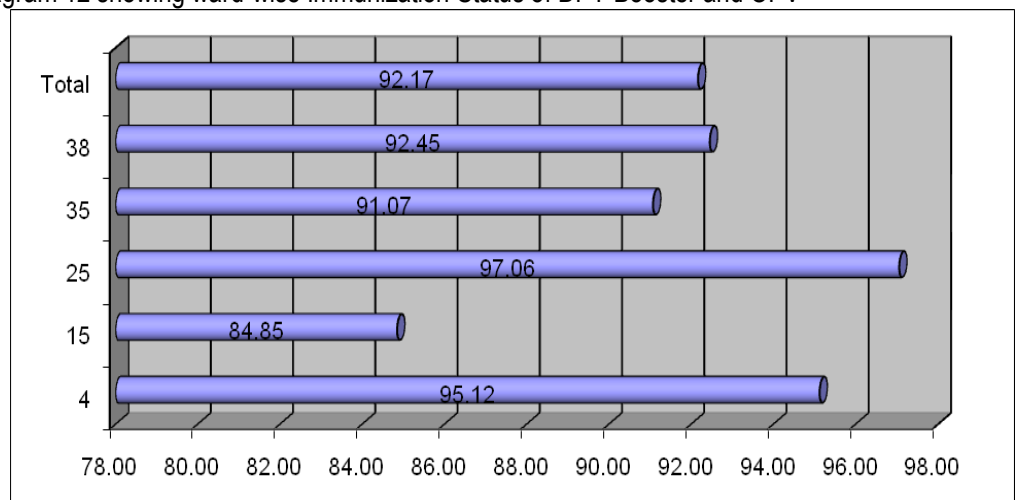
Diagram 11. Showing ward-wise Immunization Status of Measles first doze vaccination



Out of 283 children eligible to be immunized with measles first doze vaccine 278 (98.23 percent) children were immunized. Table 4.10 has the details.

12. The Diagram 12 presents the pattern of DPT Booster and OPV

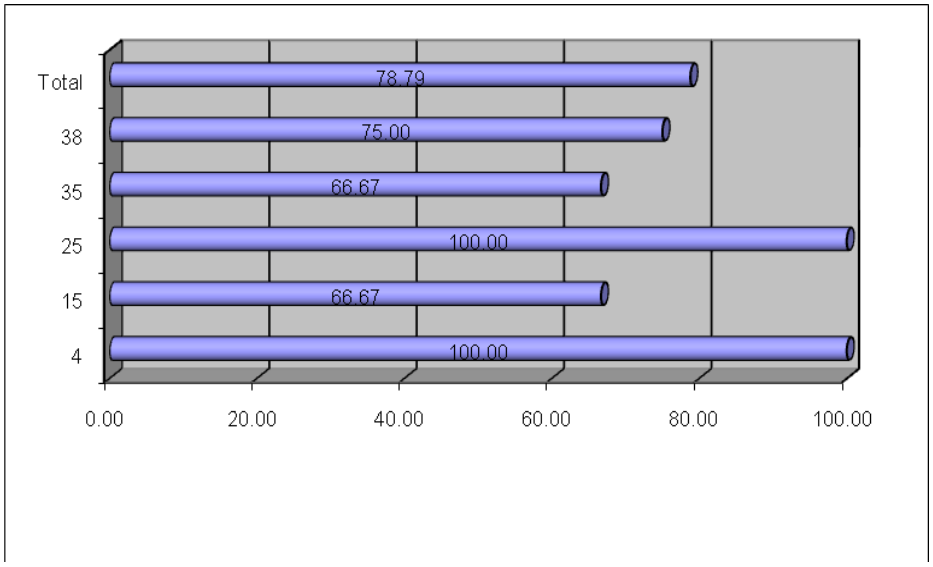
Diagram 12 showing ward-wise Immunization Status of DPT Booster and OPV



Out of 217 children eligible to be immunized with OPV and DPT booster, 200 (92.17 percent) children were immunized. Table 4.11 has the details. Ward no. 25 is the highest followed by 38. Ward no. 4 is the lowest followed by 15.

13. The Diagram 13 presents the pattern of DT Booster and OPV

Diagram 13 showing ward-wise Immunization Status of DT Booster and OPV



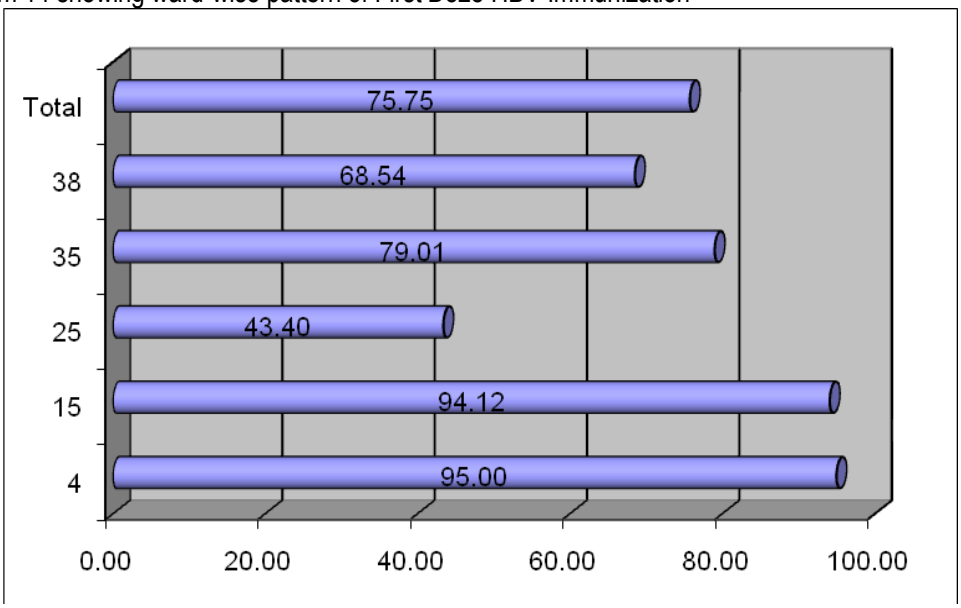
Out of 33 children eligible to be immunized with OPV and DPT second doze 26 (78.79 percent) children were immunized. Table 4.12 has the details. Ward no. 4 and 25 are the highest.

II. Optional Vaccines

Hepatitis B has been analyzed under optional vaccines because the older children in the sample have not received it as part of Routine Immunization, as it was included in the UIP only in 2007.

14. The Diagram 14 presents the pattern of First Doze HBV Immunization

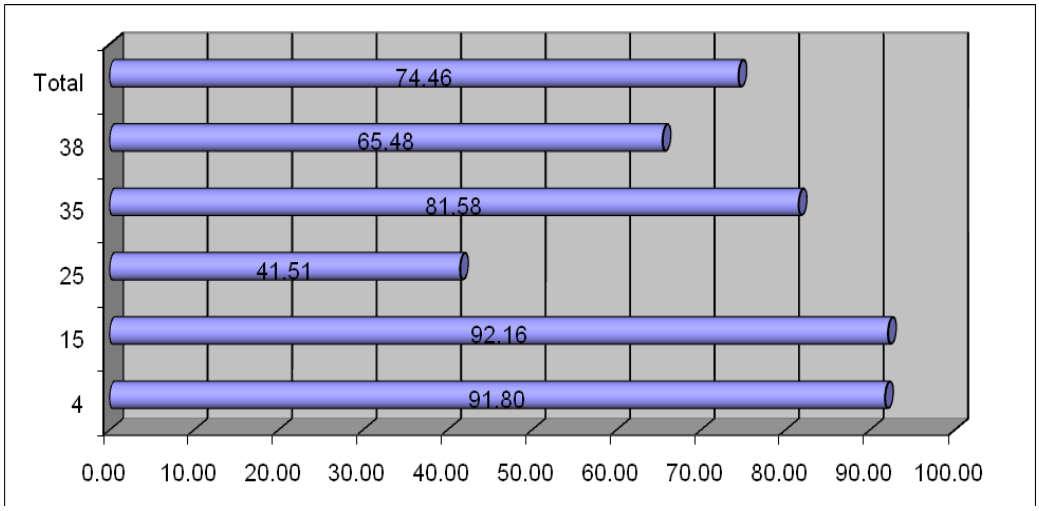
Diagram 14 showing ward-wise pattern of First Doze HBV Immunization



Out of 334 children eligible to be immunized with HBV first doze, 253 (75.75 percent) children were immunized. Ward no. 4 is the highest followed by 15. Ward no. 25 is the lowest followed by 38. Table 4.13 has the details.

15. The Diagram 15 presents the pattern of Second Doze HBV Immunization

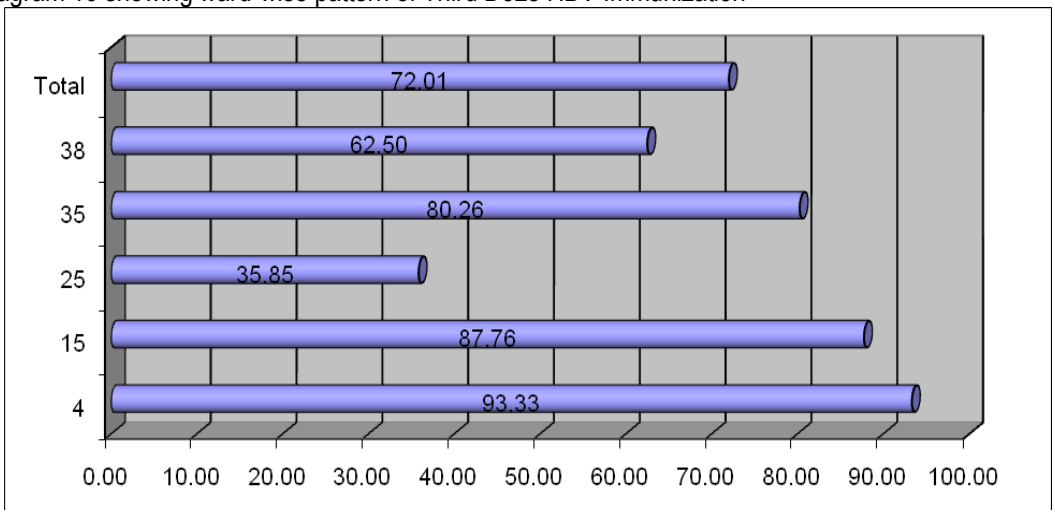
Diagram 15 showing ward-wise pattern of Second Doze HBV Immunization



Out of 325children eligible to be immunized with HBV second doze, 242(74.46 percent) children were immunized. Ward no. 4 is the highest followed by 15. Ward no. 25 is the lowest followed by 38. Table 4.14 has the details.

16. The Diagram 16 presents the pattern of Third Doze HBV Immunization

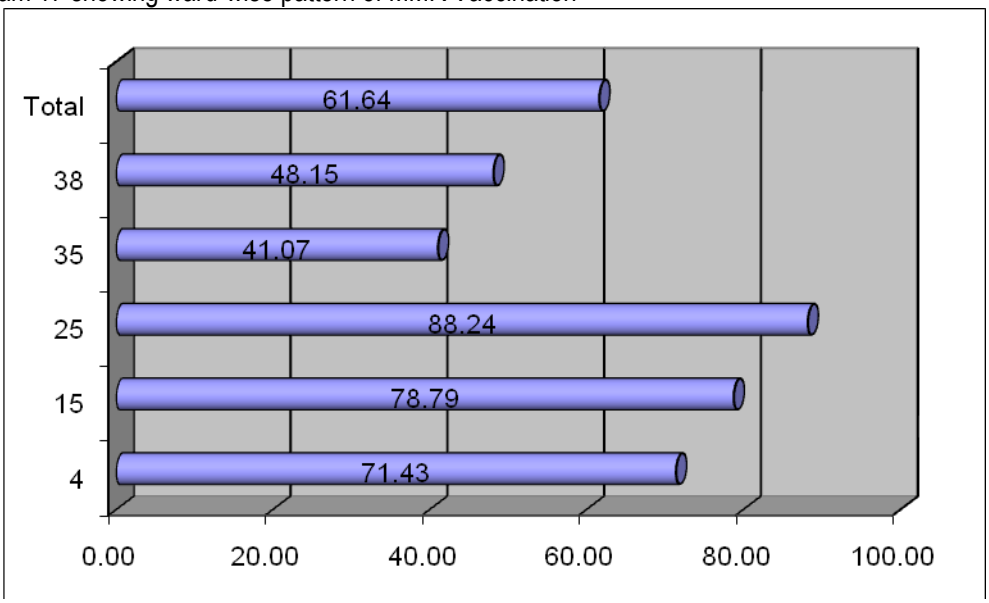
Diagram 16 showing ward-wise pattern of Third Doze HBV Immunization



Out of 318 children eligible to be immunized with HBV third doze, 229 (72.01 percent) children were immunized. Ward no. 4 is the highest followed by 15. Ward no. 25 is the lowest followed by 38. Table 4.15 has the details.

The Diagram 17presents the pattern of MMR Vaccination

Diagram 17 showing ward-wise pattern of MMR Vaccination



Out of 219 children eligible to be immunized with MMR Vaccine, 135 (61.64 percent) children were immunized. Ward no. 25 is the highest followed by 15. Ward no. 35 is the lowest followed by 38. Table 4.16 has the details.

All children found partially immunized were immunized as the information was shared with the PP Unit of the District Hospital, Kottayam and the ASHA volunteers. One child who was found unimmunized for all vaccines could not be immunized yet due to the stiff resistance from the part of the parents.

Appendix I: Tables

Table No. 4.1 showing the ward wise levels of immunization

Ward No.	Fully Immunized	Partially Immunized	Unimmunized	Total	Immunized
4	53	0	0	53	100.00
15	42	2	0	44	95.45
25	50	0	1	51	98.04
35	65	0	0	65	100.00
38	67	3	0	70	95.71
Total	**277**	**5**	**1**	**283**	97.88

Table No.4.2 Showing the gender-wise wise level of Immunization

Gender	Fully Immunized	Partially Immunized	Unimmunized	Total	Percentage
Male	127	3	0	130	97.69
Female	150	2	1	153	98.04
Total	277	5	1	283	97.88

Table No. 4.3 Showing distribution of Immunization based on Religion

Religion	Fully Immunized	Partially Immunized	Unimmunized	Total	Percentage
Hindu	109	3	1	113	96.46
Christian	85	1	0	86	98.84
Islam	83	1	0	84	98.81
Total	277	5	1	283	97.88

Table 4.4 showing the levels of immunization based on economic status

Economic Status	Fully Immunized	Partially / Unimmunized	Total	Percentage
APL	215	3	218	98.62
BPL	62	3	65	95.38
Total	277	6	283	97.88

Table 4.5 showing the levels of immunization based on the education of the mother

Education of the mother	Fully Immunized	Partially Immunized	Unimmunized	Total	Percentage
Below SSLC	19	2	0	21	90.48
SSLC	79	1	1	81	97.53
Technical	8	0	0	8	100.00
Plustwo	61	1	0	62	98.39
Graduation	62	1	0	63	98.41
PG	40	0	0	40	100.00
Total	269	5	1	275	97.82

Table 4.6 Table showing the ward wise distribution of children immunized with BCG and OPV Zero Dose

Ward No.	BCG/ OPV0	Total Number of Children	**Percentage of Immunized**
4	61	61	**100.00**
15	51	51	**100.00**
25	53	54	**98.15**
35	85	85	**100.00**
38	92	92	**100.00**
Total	342	343	**99.71**

Table 4.7 Table showing the ward wise distribution of children immunized with first doze OPV and DPT

Ward No.	OPV, DPT 1	Total Number of Children	Percentage of Immunized
4	60	60	**100.00**
15	50	51	**98.04**
25	52	53	**98.11**
35	81	81	**100.00**
38	89	89	**100.00**
Total	332	334	**99.40**

Table 4.8 Table showing the ward wise distribution of children immunized with second doze OPV and DPT

Ward No.	OPV, DPT 2	Total Number of Children	Percentage of Immunized
4	61	61	**100.00**
15	50	51	**98.04**
25	52	53	**98.11**
35	76	76	**100.00**
38	79	84	**94.05**
Total	318	325	**97.85**

Table 4.9 Table showing the ward wise distribution of children immunized with Third doze OPV and DPT

Ward No.	OPV, DPT 3	Total Number of Children	Percentage of Immunized
4	60	60	**100.00**
15	48	49	**97.96**
25	52	53	**98.11**
35	76	76	**100.00**
38	79	80	**98.75**
Total	315	318	**99.06**

Table 4.10 Table showing the ward wise distribution of children immunized with Measles Vaccination

Ward No.	Measles	Total Number of Children	Percentage of Immunized
4	53	53	**100.00**
15	42	44	**95.45**
25	50	51	**98.04**
35	65	65	**100.00**
38	68	70	**97.14**
Total	278	283	**98.23**

Table 4.11 Table showing the ward wise distribution of children immunized with DPT Booster OPV

Ward No.	DPT Booster	Total Number of Children	Percentage of Immunized
4	39	41	**95.12**
15	28	33	**84.85**
25	33	34	**97.06**
35	51	56	**91.07**
38	49	53	**92.45**
Total	200	217	**92.17**

Table 4.12 Table showing the ward wise distribution of children immunized with DT Booster OPV

Ward No.	DT Booster	Total Number of Children	Percentage of Immunized
4	4	4	**100.00**
15	4	6	**66.67**
25	6	6	**100.00**
35	6	9	**66.67**
38	6	8	**75.00**
Total	26	33	**78.79**

Table 4.13 Table showing the ward wise distribution of children immunized with First doze of HBV

Ward No.	HBV1	Total Number of Children	Percentage of Immunized
4	57	60	**95.00**
15	48	51	**94.12**
25	23	53	**43.40**
35	64	81	**79.01**
38	61	89	**68.54**
Total	253	334	**75.75**

Table 4.14 Table showing the ward wise distribution of children immunized with Second doze of HBV

Ward No.	HBV2	Total Number of Children	Percentage of Immunized
4	56	61	**91.80**
15	47	51	**92.16**
25	22	53	**41.51**
35	62	76	**81.58**
38	55	84	**65.48**
Total	242	325	**74.46**

Table 4.15 Table showing the ward wise distribution of children immunized with Third doze of HBV

Ward No.	HBV3	Total Number of Children	Percentage of Immunized
4	56	60	**93.33**
15	43	49	**87.76**
25	19	53	**35.85**
35	61	76	**80.26**
38	50	80	**62.50**
Total	229	318	**72.01**

Table 4.16 Table showing the ward wise distribution of children immunized with MMR Vaccine

Ward No.	MMR	Total Number of Children	Percentage of Immunized
4	30	42	**71.43**
15	26	33	**78.79**
25	30	34	**88.24**
35	23	56	**41.07**
38	26	54	**48.15**
Total	135	219	**61.64**

Annexure 2

Details of wards selected for the Study

1	2	3	5
Ward No.	Ward Name	Wards covered under the Survey	Cluster Number
1	Thayyikotta		5
2	Thirumala		5
3	Chirayil Padam		1
4	Old Seminary	Selected	1
5	Nagampadom		1
6	CMS College		1
7	Thirunakkara		1
8	District Hospital		1
9	Railway Station		2
10	Vimalagiri		2
11	AR Camp		2
12	Mount Carmel		2
13	Eranjal		2
15	Manganam	Selected	2
17	Malankara		2
16	Devalokam		3
17	Muttambalam		3
18	Kanjikkuzhi		3
19	Civil Station		3
20	Erayil Kadavu		3
21	Cathedral		3
22	Kodimatha		3
23	Vayaskara		3
24	Boat Jetty		3
25	Thekkumgopuram	Selected	3
26	Puthenangadi		3
26	Karappuzha		4
28	Pathinarilchira		4
29	Ambalakkadavu		4
30	Valiyakunnumpuram		4
31	Pulinakkal		4
32	Kanjiram		4
33	Kallumpurackal		4
34	Panampadi		4
35	Parappadom	Selected	4
36	Manikkunnam		5
37	Thiruvathukkal		5
38	Thazhathangadi	Selected	5

Annexure 3

Annexure 4

References:

1. http://en.wikipedia.org/wiki/Immunization

2. www.who.org

3. http://www.vaccineindia.org/index.php?option=com_content&view=article&id=10&Itemid=23

4. http://en.wikipedia.org/wiki/Vaccination_schedule

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6. http://kottayam.nic.in/