CHAPTER I
CHAPTER I

INTRODUCTION

1.1 Background of the Study

‘Children are the wealth of tomorrow; take care of them if you wish to have a strong India, every way to meet various challenges’.

- Pandit Jawaharlal Nehru

Children are one third of our population and all of our future. In order to develop a healthy society, it is important that we have healthy children. Children are an embodiment of our dreams and hopes for the future. They are the most vulnerable group in the society.

Over hundred years ago, infections were the leading cause of deaths among children, even in developed countries. Today there have been remarkable improvements in the means to control this infection. Because of vaccines, people today live a healthier and long life. Immunization is critical weapon in the battle to control and eliminate infectious diseases. No other human undertaking can equal the impact of vaccines have had a reducing infectious diseases and mortality rates not even antibiotics. Every year vaccination saves the lives of the million children.

Immunization is derived from Greek word "immune" means, "to be protected". The field of preventive and social medicine is improving with new concepts, changes and inventions, still people are facing many health problems. Protection from preventable diseases, disabilities and death through immunization is the birth right of every child. Immunization is one of the most cost-effective health care interventions.¹

Globally, under five mortality rate has decreased, from an estimated rate of 91/1000 deaths per live births in 1990 to 43/1000 deaths per live births in 2015. The average annual rate of reduction in under five morality has accelerated from 1.8% a year over the period 1990 – 2000 to 3.9% for 2000-2015, but remains insufficient to reach Millennium Development Goal 4.²
India’s rate of under-5 mortality fell from 169 in 1990 to 69 in 2008, averaging an annual rate of decline of just 2.9%. Whereas infant mortality rate (IMR) also fell from 129/1000 live births in 1971 to 55/1000 live births in 2007.  

Maharashtra is the second largest state in India in terms of population and area. The annual number of under five child deaths in Maharashtra was between 165,934 and 180,467 estimated during 1998-2000. In 2001, India’s IMR was 66 per 1000 live births whereas Maharashtra’s IMR was 45 per 1000 live births. It gradually fell down to 42/1000 live births in India and also of Maharashtra 25/1000 live births in 2012. Maharashtra, which eventually plans to take IMR down to 19 to 2014-2015 and 15 in the 12th five year plan period.  

Pune is 71st largest city in the world, by population. Around 11% of the population is under 6 years of age that is 579,681 as per 2011 census. Infectious diseases are the major cause of morbidity and mortality in children. This puts India firmly in the insufficient progress category. One of the most cost effective and easy method for the healthy well-being of child is immunization.  

Immunization is one of the most cost-effective health interventions known to mankind. Immunization is a proven tool for controlling and even eradicating disease. An immunization campaign carried out by the World Health Organization (WHO) from 1967 to 1977 eradicated smallpox. Eradication of poliomyelitis is within reach. Since Global Polio Eradication Initiative in 1988, infections have fallen by 99%, and some five million people have escaped paralysis. Although international agencies such as the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) and now Global Alliance for Vaccines and Immunization (GAVI) provide extensive support for immunization activities, the success of an immunization programme in any country depends more upon local realities and national policies. A successful immunization program is of particular relevance to India, as the country contributes to one-fourth of global under five mortality with a significant number of deaths attributable to vaccine preventable diseases. There is no doubt that substantial progress has been achieved in India with wider use of vaccines, resulting in prevention of several diseases.
Vaccine preventable diseases have been reduced in the country since the routine immunization programme started in 1978 as the Expanded Programme on Immunization, then in 1985 renamed as Universal Immunization Programme. Re-emergence of some vaccine preventable disease is a concern to all and the Government of India has launched a new multiyear plan to strengthen the routine immunization. A number of recommendations were made to address the weaknesses in the programme. Some newer initiatives were also made under the multiyear plan and National Rural Health Mission to strengthen the routine immunization. The health personnel can play a positive role while immunizing children as per Universal Immunization Programme.\(^7\)

Immunization averts an estimated 2 to 3 million deaths every year from diphtheria, tetanus, pertussis or whooping cough, and measles. Global vaccination coverage the proportion of the world’s children who receive recommended vaccines has remained steady for the past few years. For example, the percentage of infants fully vaccinated against diphtheria-tetanus-pertussis (DTP3) has held steady at 83% for the last three years. During 2012, about 110.6 million infants worldwide got three doses of DTP3 vaccine, protecting them against infectious diseases that can cause serious illness and disability or be fatal. By 2012, 131 countries had reached at least 90% coverage of DTP3.\(^8\)

Delivering effective and safe vaccines through an efficient delivery system is one of the most cost effective public health interventions. Immunization programmes aims to reduce mortality and morbidity due to vaccine preventable diseases (VPDs).\(^9\)

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.\(^10\)

The history of vaccine research and production in India is almost as old as the history of vaccines themselves. During the latter half of the 19th century, when institutions for vaccine development and production were taking root in the Western
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world, the British rulers in India promoted research and established about fifteen vaccine institutes beginning in the 1890s. Prior to the establishment of these institutions, there were no dedicated organizations for medical research in India. Haffkine’s development of the world’s first plague vaccine in 1897, which developed at the Plague Laboratory, Mumbai, India, later named the Haffkine Institute and Manson’s development of an indigenous Cholera vaccine at Kolkata during the same period bear testimony to the benefits of the early institutionalization of vaccine research and development in India. Soon, Indian vaccine institutes were also producing Tetanus toxoid (TT), Diphtheria toxoid (DT), and Diphtheria, Pertussis, and Tetanus toxoid (DPT). By the time Indians inherited the leadership of the above institutions in the early 20th century, research and technological innovation were sidelined as demands for routine vaccine production took priority. (IAP-2011)\(^1\)

A study was conducted in Wardha district. One hundred and thirty mothers in the age group 15-44 years and 142 children aged 12-59 months were selected by cluster sampling method from nine villages in Wardha district. Out of this 100 mothers and 122 children could be contacted for evaluation of immunization coverage and assessing maternal knowledge and practice regarding immunization. Mothers had a fair knowledge regarding need for immunization but a poor knowledge regarding the prevention of diseases and doses of the vaccines.\(^12\)

A study conducted in a high coverage area in Delhi. One hundred mothers of 'fully' immunized 12-24 months old children were administered a schedule to elicit knowledge regarding immunization. Knowledge regarding vaccine availability was good, except in case of measles. A much lower proportion was aware of correct doses and intervals.\(^13\)

A study was conducted in Durgapur Steel Plant, Durgapur District in West Bengal. Total of 1378 people, between November 1987 and October 1988, with a follow-up period of 3 months were included. Triple antigen, double antigen, and oral polio vaccines were considered. 110 (7.98%) of the industrial workers were unaware of the preventive aspects of health care. Most of these individuals were illiterate, rural in origin
and with monthly family incomes of less than Rs1000. The mass media was the main source of preventive health care-related knowledge, and trade unions played no role in health education. Out of the 640 parents who brought their children for immunization and understood the preventive aspect of health care, 7 believed in other than a scientific system of medicine.¹⁴

Centers for disease control and prevention (2006) in India reported that the global eradication of poliomyelitis has reached a critical stage. The disease remains endemic in only four countries like Afghanistan, India, Nigeria, and Pakistan, which have reported most of the cases in 2006. India is the most populous of the polio-endemic countries. Beginning in 2005, the Government of India (GOI) and its partners intensified eradication efforts by implementing additional immunization and surveillance strategies, including introduction of monovalent oral poliovirus vaccine types 1 and 3 (mOPV1 and mOPV3, respectively). The number of reported cases decreased from 134 in 2004 to 66 in 2005. However, cases have resurged in 2006; as of June 25, 2006, a total of 60 cases had been reported. Although intense local transmission continues in certain areas that is western Uttar Pradesh, interruption of wild poliovirus (WPV) transmission in India is feasible with continued effective interventions. This report summarizes progress toward polio eradication in India from January 2005 to June 2006. (CDC 2006)¹⁵

India has reached the final stage of polio eradication. The polio partnership in India, under the leadership of the Government of India, mounted tremendous response to the outbreak. The progress since 2003 is the most significant in the history of polio eradication in India. Surveillance sensitivity was increased to reach the goal for polio eradication. Since nearly all polio cases now occurring in India are caused by type 1 poliovirus in children, monovalent oral polio vaccine type 1 (mOPV1) was introduced in select high-risk districts of UP, Bihar and Mumbai-Thane during the April and May 2005 National Immunization Days and the June and August 2005 in 6 sub-national immunization rounds. India has made striking progress towards polio eradication.¹⁶

A retrospective study analysis of hospital records revealed decline in diphtheria morbidity from 1985 to 1997 and an increase thereafter. Case fatality rate has reduced
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over time period and now it is around 20%. Cases were found more during August to October months. Children less than five years of age accounted for 61.9% of total cases. The overall male to female case ratio was 1.06:1. Mortality was significantly higher in less than five year age group. 65.42% children had not received a single dose of DPT vaccine.¹⁷

A study reported that vaccine preventable diseases such as measles, pertussis and diphtheria have gone down significantly. The discovery and use of vaccines have made it possible to save approximately 8 million deaths, annually. This is in addition to the reduction in millions of children's suffering and disability. This paper reviews the coverage levels by surveys in the last 3 years. It has been observed that vaccination coverage levels are falling. To achieve immunization coverage major action points are: (a) The need for organizing fixed immunization sessions at the community, where low proportion of sessions are held; and (b) The need to improve demand for generation of activities where the coverage is poor despite better service availability at the community level. Therefore, the challenge for the next century is to make sure that the enormous impact of vaccines on the health and well-being of the population is maintained as well as expanded. Vaccines that effectively prevent rotavirus diarrhea, pneumococcal pneumonia, meningococcal meningitis, if made available, could prevent deaths up to two million a year.¹⁸

A study reported that Ministry of Health introduced four health prevention schemes in 1969: 1) immunization of children against diphtheria, pertussis, and tetanus; 2) immunization of pregnant women against tetanus; 3) prophylaxis of mothers and children against nutritional anemia; and 4) prophylaxis of children against blindness caused by vitamin A deficiency. As a result, infant mortality declined from 146/1000 live births to 74/1000 in 1993. Severe malnutrition and inadequate vaccination are other major causes of child deaths and morbidity.¹⁹

Study findings indicate that availability of health care facilities is a critical factor that affects the risk of measles mortality in any area. The findings show that infants have the highest morbidity and mortality in either epidemic situations or non-epidemic
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situations. There are no gender differences. A few studies involved immunization against measles and health services. Although coverage is low in these studies, the case fatality ratios (CFRs) are found to be zero or under the median recorded. Immunization plays a role in decreasing the peak of outbreaks and in increasing the inter-epidemic interval. The impact of measles on immunized children is found to be less severe and unlikely to be fatal.\textsuperscript{20}

A study was conducted in two urbanized villages in east Delhi reported that coverage levels were 82.7\% for BCG, 81.5\% for DPT/OPV 1, 76.8\% for DPT/OPV 2, 70.7\% for DPT/OPV 3 and 65.3\% for measles vaccine. It was 41.4\% and 41.6\% for DPT booster and MMR vaccine. Higher education of mother and father, father's occupation, residential status, place of birth and presence of immunization card were significant determinants for complete immunization on univariate analysis. On regression analysis mother's education (R=1.43), presence of immunization card R=2.05 and place of birth (R=3.80) remained significant.\textsuperscript{9}

The National Population Policy (2000) aims at complete protection of all children against vaccine preventable diseases by 2010. Urban poor, many residing in slums, comprise about one fourth of India's 285 million urban populations. 60\% of the children aged 12-23 months in urban India are fully immunized; coverage among urban poor children is a dismal 43\%. The interstate variations of immunization coverage in urban areas, reveals a service coverage gap which calls for a rethink on resource allocation and strengthening processes to improve immunization coverage amongst urban poor. Debilitating environmental conditions and high population density in slums expedite disease transmission. Comparisons of urban rural disease incidence indicate a particular urban risk for vaccine preventable diseases. This paper attempts to understand the current scenario and challenges in improving immunization coverage in urban slums; immunization being one of the most successful public health interventions of the past century. It also discusses possible mechanisms for effectively reaching the often left out urban poor. Coordinated activities by the multitude of providers, accurate information based outreach, effective monitoring and community enablement to demand quality
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Services are critical for improving utilization of immunization services by a heterogeneous urban poor population.\textsuperscript{21}

A study reported that immunization status of children and mothers in the north-eastern states except Assam were evaluated in comparison with data at the national level using a WHO 30-cluster survey methodology. About 1,400 children of 1-2 years age and mothers with children up to one year of age from one district each from these states were included in the study. The different vaccines that the children received and information on pregnant women receiving Tetanus Toxoid and ANC pack were collected. The study revealed that about 52 percent of children in north-eastern states received the full dose of BCG, DPT, OPV, Measles vaccination as against 63 percent at the country level. The proportion of fully immunized children and fully vaccinated mothers was lower among illiterate mothers and those living in small, inaccessible and tribal villages. The above findings indicate that literacy among women is the key for better compliance of immunization. Information, Education and Communication (IEC) activities need to be targeted to educate mothers with a special focus on those residing in remote villages in these states.\textsuperscript{22}

A study was conducted on 3035 under five children residing in the 30 slums in Surat city. The overall annual measles incidence rate was 7.67%. Post measles complications rate was 29.6%. The vaccination coverage in the 12-23 months age group was 49.8%. The commonest reason for non-vaccination was ignorance of parents about the seriousness of the disease and the need of vaccination.\textsuperscript{23}

A study was conducted on 500 children under the age of 5 years belonging to a low income group. All were attending the pediatric outpatient department of a large teaching hospital in New Delhi. Only 25% were found to have received complete primary immunization as per the National Immunization Schedule. The major reasons for non-immunization of the children were migration to a native village (26.4%); domestic problems (9.6%); the immunization centre was located too far from their home (9.6%); and the child was unwell when the vaccination was due (9%). Twelve per cent of mothers
could not give any reason for non-immunization. The lack of awareness and fear of side
effects constituted a small minority of reasons for non-immunization.\textsuperscript{24}

A survey study about immunization coverage was conducted at a military station. A house to house search was conducted and all the children below five years of age were included in the sample. Children of officers were excluded from the study. Overall 84.2% children were completely immunized for six EPI vaccines and 22.4% children were found to be immunized against Hepatitis B. The coverage for individual EPI vaccines is BCG (93%), DPT/OPV (91%), Measles (88%), and DPT/OPV (B) (83%). The immunization coverage declined progressively for the vaccines given at higher ages from 93% for BCG given at birth, to 83% for DPT/OPV (B) given at 18 months of age. The immunization coverage increased progressively with rank, being lowest in Sepoys (80.3%) and highest among Junior Commissioned Officers (97%). No statistically significant difference was found between static and field units, and the presence or absence of a Regimental Medical Officer in a unit for the immunization coverage. The study indicates that immunization coverage in the station is satisfactory; however efforts are needed to increase the vaccine coverage in the station.\textsuperscript{25}

A cross sectional survey study conducted by the WHO 30 cluster technique was carried out as a field exercise by participants of 9th Field Epidemiology Training Programme (FETP) course by National Institute of Communicable Diseases (NICD) in rural areas of Alwar district of Rajasthan. Less than one third (28.9%) of children, aged 12-23 months, were fully immunized with BCG, 3 DPT, 3 OPV and Measles vaccines; around a quarter (26.5%) had not received even a single vaccine, and little less than half (44.5%) were found partially immunized. Around half of the eligible children were vaccinated for BCG (55.9%) and Measles (43.6%).\textsuperscript{26}

Though nearly two-third (66.8%) were covered with first dose of DPT and OPV, but about one third of these children dropped out of third dose of DPT and OPV for various reasons. National Family Health Survey (NFHS) data also had revealed that BCG coverage was 64.3%; measles was 36.2%; and coverage by DPT 1, 2, 3 and Polio 1,2 and 3 were 64.4%, 57.0%, 46.6% and 77.5%, 71.1% and 54.4% respectively in rural areas.
The main reason for drop-out or non-immunization was lack of information about the immunization programme (41.3%). Though nearly all (more than 96%) of the children were immunized through Government established centers, but immunization cards/documents were made available only to 27.6% of the children.26

A study was done on to assess if immunization utilization practices differ between rural and urban primary care physicians in Kentucky. Survey was done on 200 primary care physicians. The samples were Pediatricians, family physicians, and general practitioners in Kentucky. Participants completed a 20-item questionnaire that surveyed selected demographics with regard to the physician and practice, immunizations offered to children, and reasons why the responding physicians did not offer immunizations and where they referred patients for this service. Physicians practicing in rural counties offered immunizations to their patients less frequently than did urban physicians (54% Vs 77%). Rural and urban physicians cited immunization costs to patients as the chief reason that immunizations were not used more often and referred patients primarily to county health departments. The conclusion of study is rising costs have limited physician use of immunizations in rural areas to a greater extent than that seen in urban areas. This may make access to immunizations more difficult for children living in rural areas.27

Maharashtra shows a completely dismal picture in full immunization coverage that made considerable progress between 64 percent in 1992–1993 to 78 percent in 1998–1999, while decline in during 59 percent in 2005–2006. Moreover, In spite of manifold increase in expenditure, there was a drastic decrease in full immunization was noticed in Maharashtra.28

The Union Health Ministry under the Right to Information Act, disclosed that 128 children died in 2010 due to adverse effects after immunization (AEFI). The number of deaths has escalated over the past three years from 111 in 2008 and 116 in 2009. According to media sources, the numbers only appear to be climbing upwards. The government’s response to the number of AEFI deaths in 2010 said there were 48 deaths with Maharashtra topping with 18 such deaths. Sources in the logistics industry and the
medical fraternity are analyzing the cause of death and indicate that among other reasons, neglect of cold chain facilities could be a possible reason for such deaths.29

The research studies reported that while there was under-provision of rural health infrastructure, their results showed that the availability of health infrastructure had only a modest effect on immunization coverage. Larger and better-equipped facilities had bigger effects on immunization coverage. The presence of community health workers in the village was associated with increased immunization coverage.30

Various studies and the reviews observed that there is pressing need to accelerate efforts in improving the immunization coverage in urban as well rural area.

1.2 Need of the study

‘The childhood shows the man as morning shows the day’

-- John Milton

Experiences of the past lead us to a better future. Hence, it is important to know the events of the past. Infectious diseases are as old as mankind. People knew how to deal with some of the infections using herbs & many a times they succumbed to infections.

Immunization is the process by which resistance to an infectious disease is produced. It is an act of creating immunity by artificial means. India has long history of immunization, where our ancestors used to inject milk or oils extracted from vegetable and animals source to the body after making scratches on the body. According to modern concept immunity is defined as the ability of the body to recognized, destroy and eliminate antigenic material foreign to its own.31

Immunization does more than just protect individual. It protects entire population, preventing the diseases to spread. Mass vaccination has not only eliminated incidence of diphtheria and tetanus from most of the developed world, it has actually eradicated small pox from the world. This remarkable achievement saves much suffering worldwide and saves money.
In 15 states, Nagaland, Meghalaya, Assam, Arunachal Pradesh, Bihar, Rajasthan, Uttar Pradesh, Jharkhand, Madhya Pradesh, Tripura, Jammu and Kashmir, Mizoram, Manipur and Uttarakhand, full immunization is below the national average 46% and in only 10 states and union territories i.e. in Maharashtra, Karnataka, Punjab, Goa, Kerala, Himachal Pradesh, Dadra and Nagar Haveli, Pondicherry and Tamil Nadu is full immunization above 70%. Almost half of the children in the age group 12-23 months in Bihar have not received a single vaccine, and it ranges from 20% to 45% in Jharkhand, Uttar Pradesh, Rajasthan, Arunachal Pradesh, Uttarakhand, Assam and between 10% and 20% in Meghalaya, Madhya Pradesh, Mizoram, Nagaland, Harayana.\textsuperscript{32}

The study was undertaken to assess immunization coverage in India. The focus of this paper is to examine the status and performance during 1980-2004 of the child immunization programme in India, U.P. and Uttarakhand and to suggest policy and programmes for realization of the goals of universal immunization services. Data sources on immunization coverage used for this study include secondary data from the National Family Health Surveys and RCH Surveys in U.P. Uttarakhand and all over India. The analyses reveal that a large number of children who have contact with services providers are missed out of subsequent services. There is a wide gap between routine data and survey data. Almost every other child in Uttarakhand and U.P is incompletely protected and one out every of three children is a dropout from the immunization programme. Uttarakhand has not reached the goal of universal immunization coverage despite a focused and intense immunization programme since 1985.\textsuperscript{33}

A study conducted on the knowledge, attitude and practice of mothers toward childhood immunization was surveyed in 2 neighborhoods in greater Bombay. The areas were slums of 75,000 called Malavani, and a nearby area called Kharodi. Measles and triple (DPT or DPV) vaccines were available at local health centers, 1.5 km away at the most; oral polio vaccines were given by field workers to the Malavani community to children in their homes, but only in the center for those in Kharodi. BCG tuberculosis vaccinations were available to all, but from a center 5 km away. Malavani mothers had
significantly better knowledge of triple and measles vaccines, but knowledge about BCG was similar in the 2 groups.³⁴

A study contributes to the debate by examining the contextual effects of women's education on children's immunization in rural districts of India. The 1991 district-level Indian Census demonstrate that a positive and significant relationship exists between the proportion of literate females in a district and a child's complete immunization status within that district, above and beyond the child's own mother's education as well as district-level socioeconomic development and healthcare amenities.³⁵

The study was done on Evaluation of immunization knowledge, practices, and service-delivery in the private sector in Cambodia. This study was of private-sector immunization services undertaken to assess scope of practice and quality of care and to identify opportunities for the development of models of collaboration between the public and the private health sector. A questionnaire survey was conducted with health providers at 127 private facilities, clinical practices were directly observed and a policy forum was held for government representatives, private healthcare providers, and international partners. In terms of prevalence of private-sector provision of immunization services, 93% of the private inpatient clinics surveyed provided immunization services.³⁶

The private sector demonstrated a lack of quality of care and management in terms of health workers' knowledge of immunization schedules, waste and vaccine management practices, and exchange of health information with the public sector. Policy and operational guidelines are required for private-sector immunization practices that address critical subject areas, such as setting of standards, capacity-building, public-sector monitoring, and exchange of health information between the public and the private sector. Such public/private collaborations will keep pace with the trends towards the development of private-sector provision of health services in developing countries.³⁶

The study was done on Evaluation of the Cold-Chain for Oral Polio Vaccine in a Rural District of India. The Ministry of Health and Family Welfare, Government of India, guidelines was used for evaluation of the cold chain. The cold chain evaluation was conducted in a rural district of central India. This district has an area of 5,000 square
kilometers and a population of about 1.2 million. The district is served by one district hospital, 46 primary health centers/community health centers, and 196 sub-health centers. Five compatible polio cases and 64 acute flaccid paralysis cases were reported in this district in 2004.

The evaluation instrument included information on demographics, electrically powered vaccine storage equipment, non-electrical vaccine storage equipment, icepacks, power generators, and temperature monitoring charts; assessment of the set-up and maintenance of electrical equipment; problems relating to frequency and seasonal trends of power failure; availability of a repair technician; and a vehicle for transporting the vaccines. A stratified multi-stage sampling strategy was used in this study. Stage I involved sampling of vaccine storage and distribution facilities at each level in the cold chain. Stage II involved sampling equipment used to store and transport the OPV within each vaccine storage facility that was sampled in Stage I.

In District hospital, all sampled refrigeration equipment was adequately maintained at the district hospital. Two of the four vaccine carriers sampled at this level did not have a properly formed icepack; however, the vaccine carriers were able to maintain the required temperature. This facility had a working electrical power generator. Because icepacks in two of the four sampled vaccine carriers were not frozen, this district hospital was not in full compliance and procured a cold chain compliance score of 87.5%.

In Primary health centers seventy-three percent of the deep freezers, ice-lined refrigerators, and refrigerators were present and maintained the required temperature. Sixty-five percent of the facilities adequately maintained the temperature-monitoring chart. Ninety-five percent of the vaccine carriers had adequately maintained temperatures. Seventy-five percent of these facilities at this level complied with the cold box requirements. Eighty percent of the icepacks sampled at this level were in proper condition. Only 45% of the health centers had an electrical power generator, and 90% (n=18) of these health centers reported frequent power failures. These primary health centers (n=20) procured an average cold chain compliance score of 74%.
In Sub-health centers only 58% of vaccine carriers maintained the required temperature. Thirty-eight percent of the icepacks lining the sampled vaccine carriers were in the proper condition. These sub-health centers 524 procured an average cold chain compliance score of 48%. The relationship between health centers and compliance scores primary health centers were more compliant with cold chain requirements than were sub-health centers. Eighty percent of primary health center facilities obtained a cold chain compliance score of more than 50% compared with 33% of sub-health center facilities.

In general, as the distance of the primary health centers or sub-health centers from the district hospital increased, the cold chain compliance scores decreased. For every one-kilometer increase in distance, the cold chain compliance score decreased by 0.16 units; however, this relationship was not statistically significant (p>0.05). Results demonstrate that as distance from the district hospital increases, there is a concomitant difficulty in maintaining the cold chain. There is difficulty in reaching rural communities with adequate immunizations.

The above study guided investigator to adopt multistage sampling technique for selecting parents and health personnel from all regions of Pune district.

A survey study was conducted on 796 children in proportion of their distribution in urban, rural and slum areas UP, Chandigarh. The evaluation recorded fully immunized children as 72.23%, partially immunized as 22.99% and not immunized 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%. No gender-wise difference was noticed in the study.

A study was conducted to assess the child immunization coverage and availability of safe motherhood intervention services for expecting mothers under RCH programmed in Alwar district in Rajasthan. WHO-30 cluster sampling method was used and 26 rural and 4 urban clusters were surveyed. Fully immunized children were more in urban areas 82.1% as compared to rural 45.1% areas. The immunization coverage was more or less similar in both sexes. BCG and Measles coverage was also higher 89.3% and 85.7% in
urban areas than 69.61%, and 52.2% in rural respectively. High dropout rate was found for DPT 25.3% and OPV 23.2% in rural areas as compare to urban. Failure of immunization in rural areas was mainly due to unawareness of need for immunization 35.4%, mother too busy in 16.8%, place and time not known in 9.7%, place for immunization too far 8.8% and 7.1% each for unaware of need to return for subsequent doses, fear of side reactions and vaccinator’s absence.³⁹

Literature concerning vaccination rates in India indicates a considerable disparity between children in urban compared with rural areas. In addition, 75% of the health infrastructure, medical personnel, and other health resources are concentrated in urban areas of India, whereas only 27% of the population lives in the urban parts of the country. The weak health infrastructure and unsanitary conditions contribute to the increased incidence of diseases like polio, cholera, and hepatitis in rural compared with the urban areas.⁴⁰

The above review shows that our population is not adequately covered under immunization. There are very few studies done on rural population. Investigator during supervision observed that many children are partially immunized or not immunized at all in spite of free availability. Therefore there is need to find immunization practices among parents and the reasons for non-compliance. The studies also show that health personnel have very vital role for successful immunization campaign. The health personnel need to emphasis on maintenance of cold chain and effective immunization care. Hence the investigator also felt the need identify health personnel’s practices regarding immunization.

The above studies reflect that sustained and untiring efforts need to be made each and every time a child comes for immunization to educate the mother about further doses. So the investigator thought of developing information booklet on immunization for parents and health personnel.
1.3 Statement of the problem

A comparative study to assess and develop information booklet on immunization practices among parents and health personnel from selected urban versus rural areas of Pune district.

1.4 Aim of the study

The aim of study is to observe immunization practices in parents as well as of health personnel from urban and rural areas of Pune. Based on their immunization practices information booklet will be developed.

1.5 Objectives of the study

1. To assess knowledge and practices about immunization among parents of urban and rural areas.
2. To assess knowledge and practices of immunization among health personnel of urban and rural population.
3. To compare immunization knowledge and practices among parents and health personnel from urban and rural areas.
4. To assess reasons for non-compliance of immunization.
5. To find association of selected demographic variables with knowledge and practices of immunization among parents of urban and rural areas.
6. To find association of selected demographic variables with knowledge and practices of immunization among health personnel of urban and rural areas.
7. To develop and provide information booklet on immunization for parents and health personnel.

1.6 Operation definition

Assess:

‘Assess’ referred as ‘to evaluate or estimate the value, importance or quality.’

In present study, assess means to evaluate immunization practices.
Assess and develop information booklet on immunization practices among parents and health personnel from selected urban versus rural areas.

Develop:
‘Develop’ referred as ‘to make or become larger or more advanced’

In this study, it means to make information booklet based on immunization practices.

Information Booklet:
It is defined as ‘information booklet’ as ‘a small book with facts or details supplied to or learned by someone’

In this study, information booklet is small book, which will provide information regarding immunization for parents & health care personnel.

Immunization:
Immunization refers as the induction of immune response by deliberate inoculation of appropriate immunogens in the form of a vaccine.

In present study immunization refers as immunization given as per national immunization schedule during first five year for child.

Practices:
Practices refer as usual procedures or routine.

In present study practices means usual procedures related to child immunization which are observed practices in health personnel and reported practices in parents.

Parent:
It is defined as ‘One who begets, gives birth to, or nurtures and raises a child; a father or mother’

In present study parents refers as father or mother of under 5 age child.

Health Personnel:
Health personnel are defined as all people engaged in the promotion, protection or improvement of the health of the population.

In present study health personnel refers as people who are engaged in the immunization services in health center of selected area of Pune.
Assess and develop information booklet on immunization practices among parents and health personnel from selected urban versus rural areas.

Urban Area:

An urban area is characterized by higher population density and vast human features in comparison to areas surrounding it. In present study, urban area refers as selected higher population density area of Pune.

Rural Area:

It is defined as areas that are not urbanized, though when large areas are described, country towns and smaller cities will be included. They have a low population density, and typically much of the land is devoted to agriculture. In present study, rural area refers as selected low population density area of Pune District.

1.7 Assumption:

- Children may not be adequately covered under immunization.
- Rural population may not be getting adequate facilities for immunization.
- There may be noncompliance for immunization under certain population.
- Health care personnel may not be following right practices in relation to immunization.

1.8 Hypothesis:

H₀₁ – There will be no statistical significant difference in knowledge and practices regarding immunization of parents from urban and rural areas.

H₀₂ - There will be no statistical significant difference in knowledge and practices regarding immunization of health personnel from urban and rural areas.

H₀₃ - There will be no statistical significant difference in knowledge and practices regarding immunization with selected demographic variables of parents from urban and rural population.
Assess and develop information booklet on immunization practices among parents and health personnel from selected urban versus rural areas.

H₀ₐ₄ - There will be no statistically significant difference in knowledge and practices regarding immunization with selected demographic variables of health personnel from urban and rural population.

1.9 Variables

Variables are the characteristics, quality, attribute of a person, or object that the experimenter manipulates controls or observes. Variables are an attribute of a person or object that varies that takes on different values.⁴⁴ Attributive variables in this study is Mother’s age, education, Parent’s occupation, no. of children, gender of the index child, types of family, monthly family income, order of birth, No. of children, Type of delivery and in Health care personnel age, gender, qualification, experience.

1.10 Ethical Considerations

The study has got approved from Ethical Committee. The consent was taken from parents and health personnel for participation in study. It was ensured to participants whatever information especially confidential to which he/she has had access during the course of this research will be used only for academic purposes.

1.11 Conceptual Framework

The present study aims at assessing immunization practices among parents & health personnel. The framework of the present study is based on the Nola J. Pender’s Health Promotion Model

The health promotion model (HPM) proposed by Nola J Pender (1982; revised, 1996)⁴⁵ was designed to be a ‘complementary counterpart to models of health protection.’ It defines health as a positive dynamic state not merely the absence of disease. Health promotion is directed at increasing a client’s level of wellbeing. The health promotion
model describes the multi-dimensional nature of persons as they interact within their environment to pursue health.

THE MAJOR CONCEPTS AND DEFINITIONS OF THE HEALTH PROMOTION MODEL

- Individual Characteristics and Experience
- Behaviour specific cognition and affect
- Behavioural outcome

INDIVIDUAL CHARACTERISTICS AND EXPERIENCE

Prior Related Behavior

It is the frequency of the similar behavior in the past, which has direct and indirect effects on the likelihood of engaging in health promoting behaviors.

Personal Factors

Personal factors categorized as biological, psychological and socio-cultural. These factors are predictive of a given behavior and shaped by the nature of the target behavior being considered.

Personal biological factors

Include variable such as age, gender, body mass index, pubertal status, strength, agility, or balance. In this study personal biological factor for parents are age of the mother, gender of index child, order of birth, type of delivery and for health personnel are age, gender and their experience.

Personal psychological factors

Include variables such as self-esteem, self-motivation personal competence perceived health status and definition of health. In this study personal psychological factor comprises of acceptability for immunization by parents and health personnel.

Personal socio-cultural factors

It includes variables such as race, ethnicity, education and socioeconomic status. In this study personal biological factor comprises of educational status of parent, family monthly income and category of job for health personnel.
BEHAVIORAL SPECIFIC COGNITION AND AFFECT

Perceived Benefits of Action

It anticipated positive outcomes that will occur from health behavior. In this study, parent and health personnel anticipated positive outcome by adopting positive attitude towards immunization. As they understand benefit in term cost effectiveness as well as need of society.

Perceived Barriers to Action

It is anticipated imagined or real blocks and personal costs of understanding a given behavior. In this study, parents and health personnel understands the barriers that can be environmental stimulus such place is too far, economic status, knowledge or awareness of need of immunization and for health personnel it can workload, lack of facilities, beliefs of parents regarding immunization.

Perceived Self Efficacy

It is about judgment of personal capability to organize and execute a health-promoting behavior. Perceived self-efficacy influences perceived barriers to action so higher efficacy result in lowered perceptions of barriers to the performance of the behavior.

In this study, Parents and health personnel try to overcome the barriers & accept and follow the immunization schedule.

Activity Related Affect

Subjective positive or negative feeling that occur before, during and following behavior based on the stimulus properties of the behavior itself. Activity-related affect influences perceived self-efficacy, which means the more positive the subjective feeling, the greater the feeling of efficacy. In turn, increased feelings of efficacy can generate further positive affect. In this study, it is related to the positive or negative feeling of Parents and health personnel towards the immunization.

Interpersonal Influences

It is cognition concerning behaviors, beliefs, or attitudes of the others. Interpersonal influences include: norms (expectations of significant others), social
support (instrumental and emotional encouragement) and modeling (vicarious learning through observing others engaged in a particular behavior). Primary sources of interpersonal influences are families, peers, and healthcare providers. In this study, it is concern with the advice for parents from peer, family, care provider & mass media whereas it may be in-service education, motivation, guidance from higher authority.

**Situational Influences**

Situational influences are personal perceptions and cognitions of any given situation or context that can facilitate or impede behavior. Include perceptions of options available, demand characteristics and aesthetic features of the environment in which given health promoting is proposed to take place. Situational influences may have direct or indirect influences on health behavior.

In this study, it is concern with the immunization practices that can influence due to distance, parent too busy and fear of immunization. For health personnel it may be less staff, number of beneficiaries and support of community leaders.

**BEHAVIORAL OUTCOME**

**Commitment to Plan of Action**

The concept of intention and identification of a planned strategy leads to implementation of health behavior. In this study commitment to plan of action it means that parents & health personnel are actively getting involved immunization.

**Immediate Competing Demands and Preferences**

Competing demands are that alternative behavior over which individuals have low control because there are environmental contingencies such as work, family care responsibilities. High control can be through education such as provision of booklet on immunization.

**Health Promoting Behaviour**

Endpoint or action outcome directed toward attaining positive health outcome such as optimal well-being, personal fulfillment, and productive living.

In this study, health promoting behavior is that Parents and health personnel sustain satisfactory health habits in relation with immunization.
Assess and develop information booklet on immunization practices among parents and health personnel from selected urban versus rural areas.
1.11 Summary

This introduction chapter dealt with background of the study, need of the study, statement of the problem, aims of the study, objectives of the study, operational definition, assumption, hypothesis, variables, ethical consideration and conceptual framework used in the present study.