FACTORS AFFECTING UTILIZATION OF CHILDHOOD IMMUNIZATION SERVICES IN A BLOCK, KHURDA DISTRICT, ORISSA

By

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(MAE-FETP Scholar 2002-2004)

Dissertation project submitted in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology (M.A.E) of

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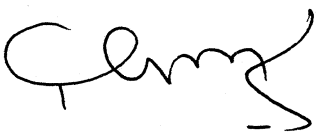
CERTIFICATION

This is to certify that this dissertation, entitled **'Factors affecting utilization of childhood immunization services in a block of Khurda District, Orissa'**, submitted by Dr. Kamala Kanta Das, in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology, is the original work done by him and has not been submitted earlier, in part or whole, for any other (Publication or degree) purpose.



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CONTENTS:

TABLES:

FIGURES:

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Abstract:

Background: India is facing a dual burden of high birth rate and high death rate especially in children suffering from vaccine preventable diseases (VPD) due to non-compliance of childhood immunization services. Limited studies are done on the factors associated with non-compliance of childhood immunization services in Orissa.

Objectives: 1) To estimate the proportion of children of 12-23 months of age i) Fully immunized ii) Partially immunized and un-immunized in Bhubaneswar block, dist Khurda, Orissa 2) Identifying the factors associated with non-compliance in availing childhood immunization services.

Methods: 3o Cluster survey method recommended by WHO was utilized for rapid estimation of immunization coverage, using a linear systematic sampling technique proportional to the population size. Totally 467 children were selected and studied for status of immunization.Their parents were interviewed for informations on different background characteristics.. Mothers of partially or un-immunized children were asked reasons for not immunizing the child .

Result: Out of the total 467 children 217(46.5%) were fully immunized, 243 (52%) partially immunized (171 completed all the doses and 72 not completed all doses) and 7(1.5%) children were unimmunized with no vaccination. The coverage for Polio1 and DPT1 was more than 95%, PolioIII and DPT III is more than 74% and measles is 63%. In case of Polio and DPT drop out rate is 24% and in case of Measles 25% of the vaccine is administered outside the time frame of immunization schedule. Both male and female child are equally covered. The sex of the head of the family, the schedule caste and Scheduled Tribe are associated significantly with the immunization status. Though not significant the education of mother and father play a definite role for fully immunization,

Conclusion: The programme has touched 98.5% of the population. The coverage for fully immunized is only 46.5%. The head of the family and the caste of SC and ST play a definite role for the partial immunization. The education of both the parents is cruucial for fully immunization

1. INTRODUCTION

Two million children die worldwide due to vaccine preventable diseases (VPDs) each year [1]. Globally 132 million children need to be fully immunized and 26% of them do not have access to basic immunization services. Among all the regions of World Health Organization (WHO), the Sub Saharan Africa , South Asia and East Asia and Pacific are the major contributors for the not–fully immunized children[2]. Global immunization efforts since 1980 have resulted in unprecedented progress in preventing childhood diseases, deaths and about 7,50,000 children were protected from becoming disabled[3].

Significant achievements have been made in India under the National immunization programme. At the national level there is a reduction of over 75% in VPDs. From around 5,70,000 VPDs annually (1976-79) it has come down to around 2,00,000 (1980) and further reduced to less than 1,00,000 since 1995. Presently majority of VPD cases (>70%) are of measles[4].

The Government of India launched its first vaccination campaign against Small Pox[4] in 1940s and eradicated the disease within 30 years. Expanded programme of immunization (EPI) was launched in 1978, which was followed by Universal Immunization Programme (UIP) in 1985. UIP became a part of Child survival and safe motherhood programme in 1992 and Reproductive & Child Health in 1997. The Planning Commission,[5] Tenth five year plan (2002-2007) Government of India recommends 100% coverage of six VPDs as well as strengthening routine immunization programme, improve quality using appropriate sustainable technology.

National Family Health Survey NFHS II [7](1998-99) reported the coverage as: DPT 62%, Polio 68%, BCG 84% and Measles 54%. However, the report of Government of Orissa[8] (2001-2002) indicates a stark difference in the coverage of routine immunizations. In 2001-2002, the coverage was high for the State: DPT 97.3%, Polio 97.3%, BCG 98.4% and Measles 88.4%. But for Bhubaneswar Block[9] coverage was low (DPT 79.4%, Polio 79.4%, BCG 76.5 % and Measles 61%).

2. JUSTIFICATION OF THE STUDY

Vaccines are responsible for the control of many infectious diseases. All children deserve to benefit from vaccination which has been made more safe effective and easier to use. The infant mortality rate (IMR)[10] in Orissa is highest (95%) in the country as per 2002 report. It is known that VPDs contribute a major proportion to IMR, which are preventable by immunization.

The immunization reports of NFHS II survey and Government of Orissa reports show a contrast. In order to assess the true situation actual coverage needs to be estimated. Not many studies are available in Orissa on this aspect. The present study is an attempt to assess the true situation and factors adversely affecting childhood immunization coverage.

3. OBJECTIVES

1. To estimate the proportion of children of 12 to 23 months of age:
    a. Fully Immunized
    b. Partially Immunized and un-Immunized in the Bhubaneswar Block ,District Khurda ,Orissa

2. Identify the factors associated with non-compliance in availing Childhood Immunization services.

4. LITERATURE REVIEW

4.1 INTRODUCTION

Immunization plays a major role in offering protection against the infectious diseases and helps in assuring healthy human living and development. Childhood immunization is one of the outstanding public health achievements of a developing country like India. The first immunization programme in India was launched in 1940s for vaccination against small pox. In 1962-63 Government of India launched BCG[4] vaccination for 0-20 years of age as a preventive component to National Tuberculosis Control Programme. After achieving the expertise on indigenous production of BCG vaccine in 1967-68 Government of India went ahead with launching of EPI, UIP, introduction of Measles vaccine in the schedule in 1985 and introduction of '0' dose polio in 1989-90. During 1990-91 Universal child immunization [4] was achieved and introduction of National Immunization Day for Pulse Polio was launched during 1995-96.

4.2 Epidemiology of the Vaccine preventable diseases

4.2.1Global Morbidity due to vaccine preventable diseases:

High vaccination levels in the population are necessary to decrease disease transmission and prevent the occurrence of childhood diseases. But at different country level it is not becoming feasible to cover the whole target population there by giving rise to a huge burden of VPDs through out the world[11]. WHO/United Nations International Children's Emergency Fund (UNICEF) estimate for 2002, report the prevalence of polio to be minimum (1918) and highest for measles (5,85955) globally.

Vaccine preventable diseases are major killers through out the globe. Globally measles is the major killer[3] (7,45,000) followed by Pertusis, Tetanus, Diphtheria and Polio. Globally 132 million infants need to be fully immunized each year but almost 34 million children (26%) do not have access to immunization services. Among all the regions of WHO Sub Saharan Africa and South Asia are the major contributors for the not–fully immunized children in the globe, the least contributor being the Central/East Europe. However, around the globe the immunization status against the six vaccine preventable diseases was about 74% in 1998 as compared to 5% in 1974.[11]

4.2.2 South East Asia Region (SEAR) scenario

SEAR contributes a major share to the VPDs load of the globe[12] due to low socio-economic status, low literacy rates, low per capita income and lack of sustainability of immunization coverage of the member countries. WHO/UNICEF estimate for 2002 were highest for measles being 78,333 and the lowest for polio (1600).

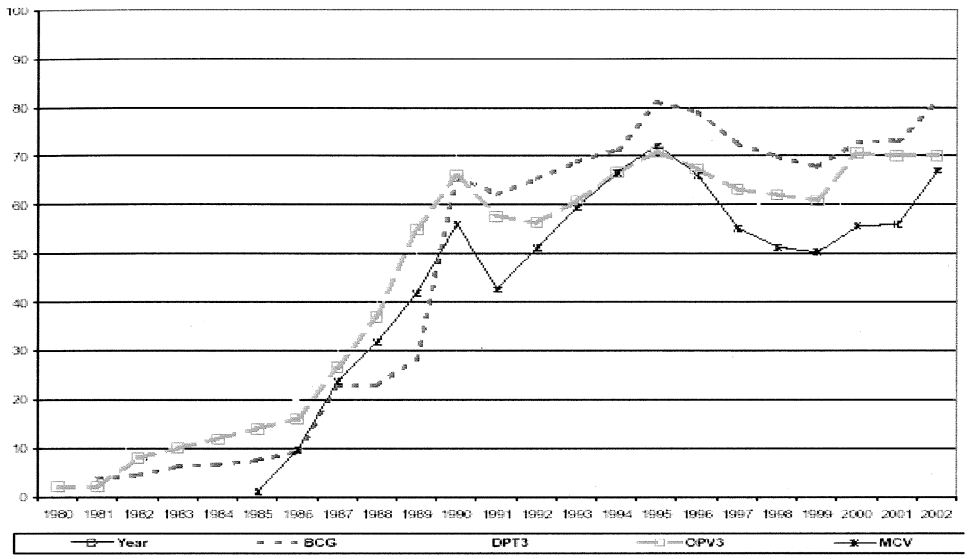
4.2.3 Indian scenario:

Ministry of Health and Family welfare, Government of India, New Delhi and Unicef[13] Conducted an evaluation of immunization in the year 2001-2002 and estimated an decrease in immunization coverage from 68% 1996-1997 to 38% in 1999-2000. The evaluation showed that the coverage level for fully vaccinated were over 80% in Tamil Nadu, Kerala, Maharashtra and Karnataka. It was in the range of 60-80% in West Bengal, Madhya Pradesh, Punjab, Delhi and Andhra Pradesh. In Uttar Pradesh, Jharkhand, Rajasthan and Bihar < 30% of infants were fully vaccinated.

In India the progress made under the UIP was impressive and in 1990 India achieved Universal Child Immunization (Minimum 80% coverage of infants). Nearly 22 million infants[4] are reported to be receiving full courses of immunization annually since then. But the evaluated coverage for the fully immunized children revealed a complete different picture. The coverage decreased from 68% in 1996-97 to 38% in1999-2000[4]

The Indian scenario of vaccine preventable diseases has improved much after the launching of UIP. Due to multiple factors, the vaccination programme coverage is not becoming sustainable there by giving rise to more number of cases. In India immunization showed steady increase coverage from 1980-1989 (Fig:1). (WHO/UNICEF review of national immunization coverage, June – 2003) [14]. But from 1996-99 the coverage declined even to 50% in case of Measles, 60% in case of DPT3, 60% for Polio and 70% for BCG. Diseases reappear when immunization coverage drops[15]. Hence the VPDs are remaining as a big Public Health problem in India.

Fig: 1 Immunization coverage status of Polio, DPT, BCG and Measles in India from 1980 to 2002



4.2.4 National Immunization Programme in Orissa:

The programme runs in the state as per the directives from Government of India .It is implemented in all the 30 districts of the state through 314 Block level Primary Health Centers (PHC), 79 Urban family welfare centers, 157 Community Health Centers and 5927 health sub centers .Now immunization sessions are taken up in every village once a month on a fixed day. The vaccination coverage[8] for the state is shown in Table 1.

Table 1. Immunization coverage in (%) children of 0-1 year of age, Orissa 1998-2002

VPD	1998-99	1999-00	2000-01	2001-02
Measles	89.8	84.5	93.4	88.4
BCG	96.8	104.3	107.5	98.5
Polio	101.0	92.8	105.0	97.3
DPT	101.0	92.6	98.0	97.8

The vaccine coverage shown is up to the mark and the coverage of measles is maintained above 84% always. There is decline in the immunization coverage is marked from 2001-2002.

After so much effort it is observed that 34 million children are not fully immunized globally[11]and 2.3 million children still die each year from vaccine preventable diseases[11] Despite enriched with recent advances in vaccine delivery, the goal for Universal Immunization set in 1977 has not been reached in U.S. In 2001,only 77.2% of U.S. toddlers had received their basic immunization .[16] A Measles outbreak in United States in 1989 led to123 deaths-ninety percent of those who died had not been immunized.[17]

Evaluation of factors influencing vaccine uptake in Mozambique

F.T. Cutts and colleagues[18] (1989) presents the result of a study in Southern and Central Mozambique. The objective of the study was to evaluate the vaccine coverage and to find out the factors responsible for percentage of low coverage of immunization in the rural and urban areas.

Thirty clusters of seven children aged 12-23 months were selected using the expanded programme of immunization (EPI) sampling method. At the start of the work in each cluster, the area representative was interviewed about his knowledge regarding immunization .He then accompanied the interviewers to visit the seven children in the cluster. For each child, information regarding immunization was abstracted from the home based 'Road to health" card if available .If the "Road to Health" card was not available, then mother was interviewed regarding immunization status of the child. . Following this, an interview was conducted with the guardian of the child in the local language unless the respondent was fluent in local Portuguese. They also gathered information on length of residence in the area, literacy in Portuguese, membership of grass root orgnisations, knowledge about vaccination, target diseases and attitude to vaccinate an ill child.

It was found that vaccine coverage based on the "Road to health" card was 53% in urban areas ,60% in Rural areas and could be12% higher if a verbal history at vaccination was considered. A further 17% of children would have received effective vaccination if the correct schedule had been followed for all vaccinations given. Factors relating to the individual mother, child and factors relating to the clusters were investigated for their association with the vaccine uptake

Here they have defined the "Fully Vaccinated' child as having taken all the doses irrespective of timing (as the authors categorically spelt out that they were concerned with mother's compliance with the vaccine programme and not the effectiveness of the

programme). The unvaccinated group included incompletely vaccinated and never vaccinated.

The personal and the local variables were considered for association with vaccine uptake individually. Out of the local variables only one became significantly associated with vaccine uptake in urban areas was the number of days per week the vaccination was available at the nearest health center .Of all the local variables in rural sample only one factor was significantly associated with vaccination is the speaking power of the local representative in Portuguese.

Those showed a strong nagative association included vaccination on offer at the nearest health post but remains open for a few number of days, cancellation of immunization sessions, knowing a child with post vaccination abscess, child born at home,. at least five children in a family and mother's inability to speak Portuguese.

They have recommended improvement in supervision of health services, and immunization and making the vaccine center open at least 3 days a week.

An epidemiological assessment of immunization programme participation in the Philippines.

Andrew M. Friede, et al[19] present an epidemiological assessment of Immunization programme participation in the Philippines.

The objective of the study was to1) Characterize the children at high risk of not being immunized.2) Generating specific suggestion for a programme and for immunization programme managers in similar third world settings.

In 1980 the authors studied a free DPT Vaccination camp at Cavite a rural agricultural areas of phillipines. Astonishingly the attendance was very much low even if it was a free vaccination camp, which made the authors to investigate the causes how the attendance could be so much low even in a free camp which tallies with our situation of free vaccination camps. Five of the 7 villages of Cavite were introduced into the study having 100 families with 159 children. 14 were excluded as they were ineligible for immunization, 10 had been excluded for medical reasons and 4 were already been immunized earlier. So lastly 94 families with 145 eligible children,with 50 families with one child, 37 families with 2 children and 7 families with 3 children were included.

The Background characteristics like age, sex, village of residence, mothers' education, no of pregnancies, order of birth and Parents knowledge about vaccination were asked.

They defined fully immunized if a child has taken two doses and partially immunized if taken 1 dose or '0' dose. It was seen that 37% were immunized and 63% non-immunized.

They opined choosing a day for vaccination is very much important and the time of the day, the season (harvesting season etc) and the distance of the booth from the villages.. Taken individually the distance above 0.5Km and inappropriate time of the day significantly associated them with non-immunization.

Factors affecting immunization coverage levels in a district of India

Vinohar Balraj and colleagues[20]et al present factors affecting immunization coverage levels in a district of India.

The study was conducted in 1988 amongst 12-23 months of old children in North Arcot district of Southern India. In all the 12 towns of the district 30 cluster sample survey was conducted and in rural blocks out of 1590 panchayats 159 were selected systematically and all children were surveyed. (Panchayat is a rural local body of 2000 to 5000 population)

The immunization history was collected from the immunization card ,otherwise the information was obtained from the mother or a responsible adult female member of the family through an interview using a pretested questionnaire The respondent was asked who has given the individual vaccine doses and children were examined for BCG scars also.

Here the authors have not taken into consideration the immunization card, hence mother's recall or an adult female member's recall was the only source of information. Only 24% of the urban families were having immunization card and it was also found that the health workers information was highly unreliable. The authors have admitted another omission of not crosschecking the cards and parents recall in urban areas. But to this question earlier in a nearby district an evaluation has showed 85% concordance between mothers recall and the immunization register.

Actually when this coverage evaluation was done, the rural sector was well equipped with health staff due to the impact of EPI. But in towns no such facilities were there, but the coverage was high in towns may be due to high income,better education and better awareness regarding immunization . They have better access to private

immunization centers open all days a week. They had access to all vaccines much before EPI was launched.

So in rural area private clinics of immunization were non-existent., lower level of awareness, low access to health facility in terms of time and distance. But one thing has become very clear that total immunization in the villages tells that the infrastructure of immunization has touched the villages completely., no matter how difficult or isolated the terrain may be.But both the demand and supply are less in the rural areas which is a fact to be admitted in case of measles. Wide disparity was marked amongst panchyats. It was observed that the variations are due to population size, the proximity and access to the urban area.

In a system analysis of immunization programme, all activities of achieving the target coverage levels including establishment of infrastructure training of staff, supply of vaccine, syringe, needle, logistical support, cold chain, health education etc., These inputs' evaluation will show the efficiency of the programme ..

In reduction of morbidity, mortality, elimination of disease, eradication of infection, demand creation etc are the elements of output evaluation which will show the effectiveness of the programme..

Cluster Survey Evaluation of coverage and risk factors for failure to be immunized during the 1995 National Immunization Days in Egypt.

Mary.R.Reichler[21] et al present cluster survey evaluation of coverage and risk factors for failure to be immunized during the 1995 Natural immunization days(NID) in Egypt.

In 1995 Egypt continued to experience endemic wild polio virus transmission despite achieving high routine immunization coverage with at least 3 doses of oral polio vaccine (OPV) and implementing National immunization days annually for several years. They started the study with the objective:

> To Estimate the coverage achieved during the 1995 NID,To evaluate risk factors for failure to be immunized ,To determine the effectiveness of mass media in promoting community awareness of the NIDs

As it was expected that the coverage could vary differently for distinct geographical areas it was designed earlier to divide the total Egypt to 6 sectors and to carryout a 30 cluster survey.

A standard questionnaire was used to collect information from a parent in each selected household for each child of 0-47 months of age. Information was collected on NID, OPV receipt,. NID center location, sources of information for the NIDs and routine OPV coverage. Vaccination data were ascertained by card and /or history.

A total of 4188 children residing in 3216 households were surveyed over all.

OPV3 coverage among the children in the survey population was high nation wide that is 93% with (CI-91.5, 94.6.)

Although greater than 80% of the target population nationwide was estimated to have received the vaccine, OPV during NID was estimated to be 84% in NID1 and 83% in NID2. Coverage by stratum ranged from 78-86% for NID-1 and from 73-86% for NID-2.

Fewer than $3/4^{th}$ received both NID1 and NID2 –74% (95% CI 71.4,77.3),

17% -(95% CI 14.6,19.7) received only one NID dose.

9% - (95% CI 7.1,9.9) received neither of the NID doses.

It was also seen that previously partially immunized or non-immunized children were less likely to be immunized than the children those who have received 3 does of OPV in routine immunization programmes prior to NID.

The risk factors identified for failure to be immunized during the NIDs are

1. More than lo minutes walk to the immunization site 2)To be informed at least one day earlier3) Have a radio or television in the household to get due information.

About 53% of the parents told (53% of each round) that they were not informed.

Small portion of the parents reported problems with vaccine delivery like absence of vaccinator, lack of vaccine, failure of NID staff to administer a sick child, long waiting time at the NID are very minimal that is 5% for NID –1 and 6% for NID-2.Other reasons are Too busy –10%, Sick child –11%, Fully immunized –4%, inconvenient time –5%, Vaccination site too far – 1%, NID Vaccination not important and being afraid – 0.5%.

The study concluded that the failure of NID to vaccinate the partially immunized and non-immunized children of the routine immunization programme (8% of NID Nation wide to 17% of certain strata) might have contributed substantially for the transmission of wild virus and these children were the real ones to be covered during NIDs.

As most parents told that they were not informed, a comprehensive multimedia operation was taken up and implemented by involving a number of changes to the original message.

-T.V, Radio, News Paper, Vans, Megaphones announcement on school, mosques and churches.

-Special Banners of National Immunization Sites with increasing visibility

-One month prior improved short robost Soco (Single overriding communication Objective)

-Steps to administer the doses to previously un-immunized or partially immunized children

Few studies are done in India to assess the immunization status of the children of India. They have studied the association of some factors responsible for non-compliance of childhood immunization services.

Padam Singh and R.J.Yadav [22](2000) conducted a Cluster Survey in 90 districts of India giving due representation to all the states and union territories. They found that 63% of the children are fully immunized, 27% are partially immunized and 10% are un-immunized. They recommended further improvements are possible by targeting illiterate mothers, inaccessible and tribal areas and low performing states.

. B.J Selwyn[23] (1978) found out that amongst all the adverse factors, there is some evidence that when economic and belief barriers are overcome the distance and the like factors become less important.

Rosenstock I.M[24] after studying the Poliomyelitis campaign in the United States for 27 years recorded that it is easier to make an extra visit than to change the beliefs of the people.

4. 3 SUMMARY

The prevalence of childhood VPDs is very high in India and other developing countries.The prime cause for increased prevalence of the VPDs are for non-compliance in availing the childhood immunization services.The proportion of fully non-immunized children are high in India and also in the globe..Out of the 34 million fully non-immunized children South East Asia contributes a major share.The Risk factors for non compliance in availing the childhood immunization services in Indian scenario can be summarized as :

1)Lack of Awareness that leads to non attendance at the immunization camp

2)Lack of Education amongst parents.

3)Low socio-economic status. Unable to go to the health facility headquarter if they fail in attending the immunization session once at their village..

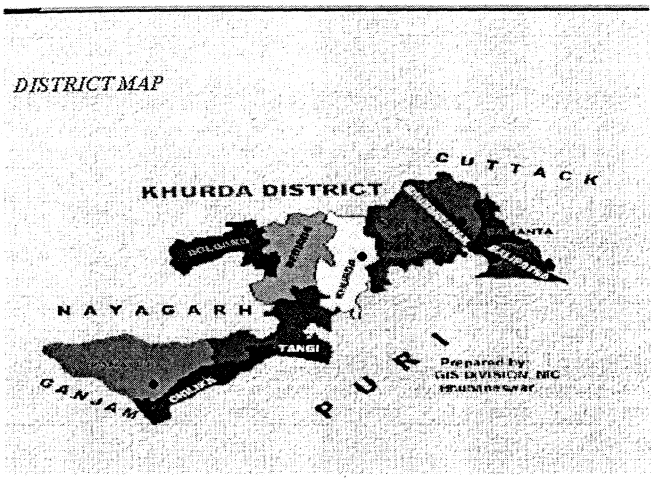
4)Lack of motivation by peer group and health staff to play a better advocacy role.

5. METHODOLOGY

5.1 Study Setting

The study was conducted in district Khurda of Orissa State

Figure 2. Map showing Khurda district of Orissa State



There are10 blocks, 168 Gram Panchayats and 1562 villages spread over in an area of 2813 square kilometers of. Khurda district. The population of the district is about 18 lakhs. There are 2 upgraded Primary Health centers, 3 Community health centers and 5 Block level Primary Health center (PHC),53 sector level primary Health Centers under the district health system.

Selection of study area: One Block area was selected purposively for the study for operational feasibility keeping in view the time and financial constraints The name of the Block is Bhubaneswar block and the name of the Block level Primary Health Center area is Mendhasal. This block is located at a distance of about 15 kilometers from Bhubaneswar city, the capital of Orissa. The Block population is 1,29,000.Under the block level PHC there are 4-sector PHC s and 21 health subcentres.

5.2 Study Design

30-cluster survey method[26,27] was utilized. WHO recommends this method for rapid estimation of immunization coverage in children, using a linear systematic sampling technique proportional to the population size.

The following steps were followed

1) Identification of clusters 2) Random selection of household in each cluster, 3) Collection of data.

1.Identification of Clusters:

All the revenue villages of the Bhubaneswar block were listed along with their population. The village population were cumulated and the total cumulative population of all the villages was determined. Then the sampling interval was calculated by dividing the total cumulative population by 30 and the decimals were rounded off to the nearest whole number. Then a random number was chosen less than or equal to the sampling interval keeping the number of digits same as that of the sampling interval. The village where this random number was located was the first cluster[28]. Then the sampling interval was added to the random number to get the second cluster and third cluster and so on and 30 clusters were identified.

2.Random selection of Household in a cluster:

Keeping in mind that all the households in the cluster should have an equal opportunity of being selected, the first household was selected at random. As the clusters were in the rural area, household lists were not available and it was not feasible to number each house within the limited period. The central place of the village was chosen and a pencil was spinned on even ground. When the pencil stopped rotating, it pointed towards a lane of the village and that was the lane of the first household. All the houses in that lane from the center to the end of that lane were counted and a random number was selected between 1 and the total number of houses in that lane. The household bearing this random number is the first household to be visited.

5.3 Sample Size:

The required sample size[26] is based on the assumption that partially immunized and non-immunized children (12 –23 months) in the community would be around 50%. The required sample size with 10% absolute precision would be as per the formula

$n=z^2 pq/d^2$.

$n=(1.96^2 \times 0.50 \times 0.50)/ 0.10^2 = 96$

Assuming the design effect as 2 the required sample size will be 96 x 2 =192. This would amount to selecting 7 households from each of the thirty clusters. However for preparing cross tabulations to identify the factors that could be responsible for differences in the utilization of immunization services, the sample size was increased to 15 households per cluster instead of 7 households per cluster making the total sample size 30 x 15 = 450 children.

5.4 Study Subjects:
Children 12 to 23 months of age in selected villages of Bhubaneswar block.

5.5 Study Team:
Consists of the MAE-FETP Scholar as the principal investigator, one male health supervisor and one female health worker.

5.6 Study Instrument:
Ad hoc questionnaires were constructed first in English language. The questionnaire was translated into the local language Oriya by one person and then retranslated from Oriya to English by another person to examine the consistency.
Four types of interview schedules were prepared namely format A, B, C and D.

Format A: is for collection of general data like identification of the household, details of head household and father, available of any eligible child of 12-23 months in the household. If it is 'yes' then format B is to be referred,

Format B: For collection of data regarding the Date of Birth of the eligible child, sex, availability of immunization card ,the date of receipt of individual vaccines and fully immunized or not.

Format C: It includes socio-economic variables like place of living, Type of house, education and occupation of parents and highest material possession of the family. The distance of the household from the nearest health facility was also recorded.

Format D: Designed only for the mothers of the children partially immunized or not-immunized. After completion of interview the mother was asked an open-ended question

about the most probable reason that made her not to immunize the baby in scheduled time.

5.7 Training:

One week training was imparted to the two health workers on the purpose of the study, selection of clusters, selection of sample and households, explanation of items in the questionnaires and pilot testing of the questionnaires in the field. The schedule of questionnaires was finalized after the training.

5.8 Data collection:

The MAE-FETP scholar briefed the Block medical officer regarding the study. An action plan was drawn to conduct the study in consultation with the Medical Officer. The first step was to identify the 30-clusters (i.e. villages) for study using a linear systematic sampling technique proportional to the population size. Within each selected area, a household was selected at random and subsequent selection continued to the next nearest contiguous household until a total of 15 children aged 12-23 months were identified and their immunization status was assessed. If immunization card was not available, interviewing the mother regarding the immunization of the child, the status of immunization was assessed. In each cluster their parents/guardians were interviewed (in most instances it was the mother of the child), for assessing the immunization status.

5.9 Definition of Immunization status:

Fully immunized: A child is defined[28] as having been fully immunized if he/she satisfies the following conditions:

DPT/Polio-First dose is given at any time 6 weeks after birth. Subsequent two doses are to be given with intervals of at least 4 weeks to 45 days between successive doses and all the three doses are administered before the child had completed one year.

BCG: The vaccination is given at any time after birth and before 12 months of age.

Measles: Immunization is administered after completion of 9 months but before the completion of 12 months of age.

Partially Immunized: A child who had completed all the doses within 23 months of age but not as per the schedule [will be referred to as 'completed all doses']. (or)
a child who had not completed all the doses within 23 months and also not as per the schedule [will be referred to as 'not completed all doses'].

Un-immunized: If a child has not taken any of the vaccines, he / she will be classified as un-immunized child.

5.10Ethical Considerations:

The study subjects were interviewed, and the immunization cards were checked only after explaining the objective of the study, the study procedures, and obtaining oral consent of the respondents. Personal information like the level of education and highest material possession etc are limited for the purpose for which it is collected and strict confidentiality was assured. Confidentiality of the information was also assured when they were requested to provide informations regarding the health workers. At the end of the interview, if any of the family members was sick, due medical consultation was given including treatment for minor ailments. Counseling about immunization and health care were also imparted..

5.11Data Analysis:

All the coded data were checked for consistency, completeness and credibility using Epi-info 6.04 d. Univariate analysis of some selected characteristics were performed and Crude Odds Ratio (OR) and 95%Confidence interval (CI) were calculated. Significance level was taken at p =<0.05. Multivariate analysis was performed for assessing the independent role of factors associated with immunization status.

Multivariate Analysis:Multiple logistic regression was done to assess the independent association of factors associated with partially immunized and unimmunized status of immunization..Adjusted Odds ratio(AOR) and 95% confidence intervals(CI) were calculated by multiple logistic regression analysis, starting with all the variables in the study,using SPSS package version10.0[13]

6. RESULTS:

A total of 467 children (12-23 months) were studied after surveying the thirty clusters (villages) in the Bhubaneswar block area. The result section is described under following headings:

1. Overall Immunization coverage
2. Immunization coverage for individual vaccines
3. Immunization coverage level by background characteristics
4. Immmunization status by distance from the health centre
5. Reported reasons for non-compliance of the mother
6. Univariate analysis of selected characteristics
7. Multivariate analysis

6.1.Overall Immunization coverage:

The overall immunization coverage of all the 467 children studied, along with the partially immunized category, is shown in two groups as completed all doses and not completed all doses (Table 2).

Table 2. Immunization coverage of children (12-23 months) Bhubaneswar block, Orissa 2003

Status of immunization	No of Children (n=467) n (%)		95% CI
Fully immunized	217	(46.5)	41.88,51.10
Partially immunized	243	(52.0)	47.39,56.36
i) Completed all doses not as scheduled in the first year of life	171	(36.6)	32.26,41.18
ii) Not completed all doses	72	(15.4)	12.32,19.08
Un-immunized	7	(1.5)	0.65,3.20

6.2. Immunization coverage for individual vaccines

Immunization coverage levels of different vaccines are shown in Table 3. The coverage of Polio I and DPT I is more than 95%, DPT II and Polio II more than 77% and only 74% of the children have taken DPT III and Polio III. In case of measles, 63% of the children have taken the vaccine.

The drop out rate observed in case of DPT and Polio vaccine is 24%. Out of 467 children 395 children have taken Measles. But out of that 395 children 297 have taken within the schedule period of 9 to 12 months and 98 outside the schedule period. (67 before completion of nine months and 31 after completion of 12 months)

Table 3. Proportion of individual vaccines taken as per the schedule in Bhubaneswar block, Orissa 2003

Vaccine	No of Children Taken Timely	Coverage (%)	95% Confidence Interval
BCG	445	95.29	91.35,97.56
Polio-I	459	98.28	95.25,99.47
Polio-II	360	77.08	70.86,82.34
Polio-III	347	74.30	67.91,79.83
DPT-I	457	97.85	94.66,99.23
DPT-II	362	77.51	71.31,82.73
DPT-III	348	74.51	68.13,80.02
Measles	297	63.59	56.82,69.88
ALL	217	46.46	39.77,53.28

6.3 Immunization Coverage level by background characteristics:

The coverage level by background characteristics is presented in Table 4. The immunization level varies depending upon the background characteristics like sex,head of the family,caste ,education and occupation of parents etc.

Table 4. Immunization coverage (%) of children (12 - 23 months) by background characteristics, Bhubaneswar block, Orissa, 2003

Characteristic	Fully Immunized (n=217) n (%)	Partially Immunized		Un-immunized (n=7) n (%)
		Completed all doses (n=171) n (%)	Not completed all doses (n=72) n (%)	
Sex of the Child				
Male	110(45.8)	94(39.2)	33(13.2)	3(1.2)
Female	107(47.1)	77(33.9)	39(17.2)	4(1.8)
Sex of head of household				
Male	204 (45.1)	170(37.6)	71(15.7)	7(1.5)
Female	13(86.7)	1(6.7)	1(6.7)	0
Caste				
Schedule Caste	35(35)	41(41.0)	21(21.0)	3(3.0)
Schedule Tribe	9(34.6)	9(34.6)	7(26,9)	1(3)
Other Backward Caste	32(64.0)	12(24.0)	6 (12.0)	0
General Caste	141 (49.5)	106(37.2)	35(12.3)	3(1.1)
Others	0	3(50.0)	3(50.0)	0
Educational status of mother				
Illiterate	37(40.7)	35(38.5)	17(18.5)	2(2.2)
Primary	56(44.1)	49(38.6)	21(16.5)	1(0.8)
Middle	49(53.8)	24(26.4)	15(16.5)	3(3.3)
High	61(49.2)	49(39.5)	14(11.3)	0
More than High School	14(41.2)	14(41.2)	5(14.7)	1(2.9)
Educational status of Father				
Illiterate	13(36.1)	16(44.4)	69(16.7)	1(2.8)
Primary	53(48.6)	39(35.8)	17(15.6)	0
Middle	41(46.6)	33(35.8)	11(12.5)	3(3.4)
High	66 (45.21)	51(37.5)	27(18.5)	2 (1.4)
More than High School	44(50.0)	32(36.4)	11(12.5)	1(1.1)
Education of parents				
Both parents illiterate	12(40.0)	13 (43.3)	5(16.7)	0
Mother literate + father illiterate	1(16.7)	3(50.0)	1(16.7)	1(16.7)
Father literate+ mother illiterate	25(41.0)	22(36.1)	12(19.7)	2(3.3)
Both literate	179(48.4)	133(35.9)	54(14.6)	4(1.1)

The percentage of fully immunized is almost same in female child and male child .When the head of the family is a female the compliance is 86% compared to 45% if head of the family is a male.

The proportion of fully immunized is low amongst Scheduled Tribes (ST) and Scheduled castes(SC) than the group of other backward class(OBC) and general castes in getting fully immunized..

The fully immunized status of a baby is well achieved (48%) when the status of education of both the parents are high. When only mother is literate (completed doses group) of partial immunization is higher than other groups.

Literacy of the father stands out as a strong factor influencing compliance36% of children of illiterate father compared with 50% of children of literate or higher educated show compliance.

6.4 Immmunization status by distance from the health centre:
No effect of distance emerged on compliance of immunization (Table 5).

Table 5. Distance of the health facility from the head quarters of the village

Distance	Fully Immunized (n=217) n (%)	Partially Immunized		Un-immunized (n=7) n(%)
		Completed all doses (n=171) n(%)	Not completed all doses (n=72) n(%)	
Headquarter village	57 (48.7)	39 (33.30)	20 (17.1)	1 (0.9)
< 1 km	39 (42.9)	36 (39.6)	15 (16.5)	1 (1.1)
1 - < 2 km	43 (40.2)	43 (40.2)	19 (17.8)	2 (1.9)
2 - <3 km	39 (47.0)	27 (32.5)	14 (16.9)	3 (3.6)
3 km and above	39 (56.5)	26 (37.7)	4 (5.8)	0 (0)

6.5 Reported reasons for non-compliance:
Excluding the 217 mothers of children fully immunized, the mothers of the 243 children partially immunized and 7 un-immunized were asked the reason for the children not taking the vaccine doses in right time. Out of 243 mothers of partially immunized 43 declined to comment and out of 7 mothers of un-immunized children 2 declined to

comment. The opinion of partially immunized mothers were asked (Table 6) .Out of them 110 replied that they were not aware regarding the dates and the facts related to vaccine, 33 mothers replied that they could not take the vaccine due to sickness of the baby and 32 mothers responded that the deviation in the scheduled time was done by health staff themselves.

Table 6. Reasons given by the mothers of partially immunized Children for not taking the vaccine in due time (n=200)

Causes	Total no of Respondents	Percentage
Lack of awareness	110	55.0
Lack of Motivation	12	6.0
Lack of facility	3	1.5
Lack of Time	7	3.5
Lack of Finance	3	1.5
Child sick	33	16.5
Irregularity by Health staff	32	16.0

6.6 Univariate analysis of selected characteristics in relation to immunization status:

To carry out the univariate analysis the fully immunized (the case group) group is compared with controls defined in three different ways-1) Partially immunized + un-immunized 2) Partially Immunized (completed all doses) 3) Partially Immunized (not completed all doses)+ un-immunized.

Table 7. Factors related to partially immunized and un-immunized status of the children (12 - 23 months) Bhubaneswar block, Orissa 2003

Characteristics	Partially Immunized* O R (95%CI)	Partially Immunized† O R (95%CI)	Partially Immunized ‡ OR (95%CI)
Sex of the child- Male Vs female	1.05 (0.72,1.55)	1.19(0.78,1.82)	0.81(.47,1.42)
Sex of Head of house hold- male Vs female	7.90(1.65,51.98)	10.83(1.44,227.91)	4.97(0.65,105.22)
House- Hut, thatch, mixed Vs Pucca, Mansion	1.06(0.70,1.59)	1.04(0.66,1.64)	1.09(0.61,1.98)
Education of Father- illiterate Vs literate	1.59 (0.74,3.44)	1.62(0.71,3.72)	1.53 (0.52,4.34)
Education of Mother- illiterate Vs literate	1.34(0.82,2.20)	1.25(0.72,2.17)	1.54(0.78,3.03)
Occupation of father unemployed Vs employed	1.25(0.83,1.89)	1.11(0.70,1.76)	1.59(0.90,2.83)
Occupation of Mother unemployed Vs employed	0.46(0.06,2.71)	0.79(0.08,8.00)	0.24(0.03,1.80)
Caste SC & ST Vs OBC & General caste	1.92(1.23,3.01)	1.62(0.99,2.67)	2.68(1.47,4.88)
Distance from Health facility >3km Vs headquarter village	1.13(0.72,1.76)	1.21(0.73,1.99)	0.98(0.53,1.85)
Material possession † None Vs all	1.58(0.64,3.99)	1.74(0.66,4.66)	1.23(0.31,4.60)

Partially Immunized*(n=243)+ Un-immunized (n=7) Vs Fully Immunized (n=217) Odds Ratio (95%CI)

Partially Immunized† (Completed all doses n=171) Vs Fully Immunized (n=217) Odds Ratio (95%C.I)

Partially Immunized ‡ [(Not Completed all doses n=72)] + Un-Immunized n=7 Vs Fully Immunized (n=217) Odds Ratio (95%CI)

†Cycle, Sewing machine, Television, Video cassette player, motorcycle or moped. Ratio, C.I.-Confidence Interval, VS-Verses

When compared it is found that among the selected characteristics of the parents the high rate of partially immunized and non immunized were associated with a male being the head of the household. The odds of Partially immunized and Un-immunized among the males being the head of households is 7.9 times higher than females (95% CI

1.65,51.98), the odds of Partially immunized (completed all doses)is 10.8 times higher than females being the head of the household (95%CI 1.44,227,91) and the odds of [partially immunized (not completed all doses) and Un-immunized] is 4.97 times higher when the head of the family is a male than a female(95%C.I 0.65,105.22.) Among the selected characteristic of the parents the high rate of partially immunized and un-immunized were associated with the caste being SC and ST. The odds of partially and un immunized among the SC and ST are 1.9 times higher than other backward caste and general caste (95%CI 1.23,3.01) The odds of [partially immunized (not completed all doses) and un-immunized] amongst the SC and ST is 2.68 times higher than the OBC and general caste (95%CI 1.47,4.88)

The odds of partially immunized and un-immunized among the illiterate mothers is 1.34 times higher than the literate mothers in the group of(partially immunized +un-immunized),1.25 in the group of partially immunized(completed all doses) and1.54 in the group of partially immunized[(not completed all doses) + un-immunized)].

The odds of partially and non immunized among the illiterate fathers is1.59 times higher than the literate father in the group of (partially and non-immunized),1.62 in the group of Partially immunized (completed all doses) and 1.53in the group of [(partially immunized(not completed all doses) + un-immunized]

6.7 Multivariate analysis

Multiple Logistic regression was used to identify factors that were independently associated with partial or un-immunized status of the child.(Table 8) Only the two variables (sex of the head of the household and the caste) that were significant in the univariate analysis also remained significant in multiple logistic regressions. When the head of the household is a male the odds of partially immunized (completed all doses) category (AOR 13.88 95% CI 1.75,109.65) and partially immunized (not completed all doses) and unimmunized category (AOR 5.77 95%CI 0.71,46.80) is higher than the head of the household being a female. In case of SC and ST the odds of partially immunized (completed all doses) category (AOR 1.73 95% CI 1.01,2.98) and Partially immunized (not completed all doses) and unimmunized (AOR 2.85 95%CI 1.47,5.55)are higher than the other backward class and general caste.

Table 8. Mutiple Logistic regression analysis of characteristics associated with partial immunized and unimmunized status of children Bhubaneswar block Orissa2003

Characteristics		Partially immunized (Completed all doses) vs fully immunized		Partially immunized (not completed all doses) and unimmunized vs fully immunized	
		Crude OR* (95% CI) †	Adjusted OR (95% CI)	Crude OR (95% CI)	Adjusted OR (95% CI)
Sex Of the child	Male	1.19	1.31	0.81	0.88
	Female	(0.78,1.82)	(0.86,1.98)	(0.47,1.42)	(0.51,1.53)
Sex of head ofhousehold	Male	10.83	13.88	4.97	5.77
	Female	(1.44,227.91)	(1.75,109.65)	(0.65,105.22)	(0.71,46.80)
House	Hut,kutcha,mixed	1.04	0.97	1.09	0.81
	Pucca,Mansion	(0.66,,1.64)	(0.61,1.55)	(0.61,1.98)	(0.44,1.50)
Education of Father	Iliterate	1.62	1.76	1.53	1.18
	Literate	(0.71,3.72)	(0.70,4.41)	(0.52,4.34)	(0.37,3.75)
Education of Mother	Iliterate	1.25	0.66	1.54	0.74
	Literate	(0.72,2.17)	(0.44,1.67)	(0.78,3.03)	(0.32,1.72)
Occupation of Father	Unemployed	1.11	0.91	1.59	1.35
	Employed	0.70,1.76	(0.55,1.50)	(0.90,2.80)	(0.73,2.48)
Occupation of Mother	Unemployed	0.79	1.51	0.24	0.37
	Employed	(0.08,8.00)	(0.19,11.76)	(0.03,1.8)	(0.05,2.56)
Caste	SC,ST	1.62	1.73	2.68	2.85
	OBC+Gen+Others	(0.99,2.67)	(1.01,2.98)	(1.47,4.88)	(1.47,5.55)
Distance from Health facility	>3 Kms	1.21	0.78	0.98	1.11
	Headquarter village	(0.71,1.76)	(0.48,1.26)	(0.53,1.85)	(0.60,2.05)
Material‡ possession	None	1.74	1.35	1.23	0.98
	All	(0.66,4.66)	(0.53,3.46)	(0.31.4.60)	(0.26,3.63)

*OR-Odds Ratio
†CI-Confidence Interval
‡ Material Possession

7. DISCUSSION

Status of Vaccination:

The percentage of fully vaccinated children of 12-23 months of age were only 36% in Orissa as per the First National Family Health Survey (NFHS) [6] India 1992-93 and 44% as per NFHS-II[7], 1998-99. The present study showed 46.5% of the children fully immunized while in 2000 a study by Padam Singh[23] and R.J.Yadav it is 63.1% in Orissa.

NFHS I & II and the study by Padam Singh and R.J.Yadav were conducted for the whole country and for the state and the present study is conducted for a single Block. The results are not strictly comparable. But as no such study was done earlier either for this district or for this block, the two national level surveys and the survey conducted by Padam Singh and R.J.Yadav[22] have been used as base line surveys for comparison.

Availability of Immunization Cards:

The following table (Table 9) shows the availability of immunization cards as reported in different studies.

Over a period of time mothers have probably realized the value of preserving immunization card. From 1992-93 NFHS-I[6] to the present study it is seen that the mothers are preserving the immunization cards in increasing numbers. In 1992-93 it was 41,7% and in the present study it is 86%.

Table 9.Availability of Immunization cards (%) in vaccine coverage studies, India

Name of the studies	Availability of (%) immunization card	Year of study
NFHS-I[6]	41.7%	1992-93
NFHS-II[7]	46.2%	1998-99
Padamsingh & R.J.Yadav[22]	71.0%	2000
Present study	86.0%	2003

Sex of the child:

Pande R.P.[29] had conducted a study on gender inequality and found that gender differentials are spread through most of the states regardless of immunization levels or wealth inequalities According to her, gender inequalities are seen in South Asia and in a number of health indicators. Pande has shown that both in urban and rural set up, the fully immunization status of boys are more than girls by 5%. But the present study shows the fully immunization status of the girl's are 1.3% higher than the boys and in Padam Singh and R.J.Yadav's[22] study it is only 2% and in NFHS II[7] study it is only 0.8%.

A study conducted by the World Bank thematic group[30] concerning gender coverage differences in 41 countries of the world found that socio-economic inequalities in full immunization coverage constitute a much more significant cause for concern than do gender inequalities. Because in overall assessment of all countries males are 51.6% fully immunized and females are 50.9% fully immunized.

Sex of the Head of the House hold:-

It is observed from the present study that when head of the household is a female, the fully immunized status is higher as that of a male head of household. It was significant in the univariate analysis and also in multivariate analysis (AOR 13.88 95% CI 1.75,109.65) when the partially immunized (completed all doses) are compared with the fully immunized group and (AOR 5.77 95% CI 0.71, 46.80) when partially immunized (not completed all doses and un-immunized) compared with fully immunized.

Caste:

Fully vaccinated among the Schedule Castes in NFHS I[6], were 26.8% and Schedule Tribe were 24.8%. In NFHS – II[7] the fully vaccinated amongst the Schedule caste were 44.5%, Scheduled tribe-26.4, Other Backward Caste-48.5 and general caste 49.3%.

Findings of the present study of fully immunized amongst the Schedule caste and scheduled tribe are statistically significant even after adjusting for other variables in the logistic regression analysis (AOR 1.73 95% CI 1.01 , 2.98) when partially immunized completed all doses are compared with fully immunized. When(partially immunized not completed all doses and un-immunized) were compared with fully immunized then the (AOR 2.85 95% CI 1.47, 2.55).

This findings are consistent with the NFHS –II[7] findings for other backward caste and general caste. The fully vaccinated Schedule Caste and Schedule Tribe have become significant in comparison to other backward caste and general caste excluding the comparison group of partially immunized (completed all doses) compared with fully immunized.

Educational Status Of Mother:

The involvement of a mother in immunizing her child is the best amongst all other members of the family. In the present study it is observed, when mother is illiterate the chances of getting not immunized and not completed all the doses category is higher. A study conducted by Singh P and Yadav R J[31] concluded that the coverage levels were lower for children of illiterate mothers. In Alexandra, Rees H[32] and colleagues conducted a study on immunization coverages and reasons associated with non immunization, concluded that an illiterate mother is a potential factor associated with non immunization. The same conclusion was made in a study conducted by Alemu W[33] and colleagues, Ethiopia. So the education of the mother plays a definite role on getting the child fully immunized. So Mothers, not Fathers are the usual focus of strategies to maximize immunization coverage in a low-income country. [32,33]

Father's Education:

Tweneboa-Kodua A and colleagues[34] recorded the potential role of father and the need to involve them through targeted health education in the health care of their children In another study done by Ahluwalia I.B.[35] and colleages found that the influence of father's educational level was greater than that of the mother.

The present study is showing the likelihood of partially immunized or non immunized is at least 1.5 times higher (though not significant) if the father is illiterate. So father is having a definite role in immunizing the child. A study by R.F.Brugha[36] and colleagues have concluded that the programmes which educate and involve men or which involve educated men, in making a decision about his children's use of a preventive health services could significantly contribute to timely immunization coverage.

Education of Parents: UNICEF has emphasized the need of educating both the parents as a quicker route in achieving universal child immunization. The present study has

shown, when both the parents are educated, the percentage of fully immunization has gone upto 48%.

Distance From the Headquarter:

Distance: The fixed immunization sessions in a sub centre area is as follows: The delay effects in attendance rates in health care facilities. The decrease in utilization of health services with distance is a key determinant for the use of a health facility. In the present study no such trend or any thing significant is found. But good knowledge and understanding of how people use health facilities are vital for health resource allocation, and planning[34]. The decrease in utilization of health services is a key determinant to use the heath facilities.

In a study conducted by Reichler concluded that in Egypt the failure to receive OPV was due to the setting of the NID booth at a distance of more than 10 minutes walk. But in the present study no such conclusion could be reached.

The socioeconomic variables like material possession and occupation of father or mother were not related to the fully immunized status.

Timeliness of taking the Vaccine:

The National Immunization Programme has prescribed a schedule within which time frame the child is to be immunized with a gap of 28-45 days in between doses in case of some specific vaccines like Polio and DPT. In the present study 24% of children were not given Polio and DPT at the prescribed schedule. Similarly 25% of Measles vaccine was administered either before or after the schedule time. These factors have brought down the overall fully immunized coverage to 47 %. Hence it is important to educate the health staff and also the parents regarding the National immunization schedule .In the National Immunization Schedule it is scheduled to administer the Measles vaccine from 9-12 months. The time 9-12 months itself is becoming ambiguous and some health staff are administering Measles vaccine in the 9^{th} month itself. .It may be nicer to prescribe the time period for Measles as 10^{th},11^{th} and 12^{th} month instead writing 9-12 months. So effective Information, Education and communication ,Education of parents and reorientation training to health staff can bring a change in the existing scenario.

Reason to the Mother for not immunizing the child timely

Out of all the mothers, 16% of the mothers have responded that they have vaccinated their children as per the advice of the health staff. So there was no scope for them to know whether the vaccine was administered early or late. So health staff require repeated re-orientation trainings about immunization, post immunization problems, immunization counselling and acquaint themselves more with the National Immunization Schedule.

Organisational impact on the programme-Though not stated as the objective, however some lacunae of the organizational system is described here in brief which may have some impact on the performance of National Immunization programme.

The infrastructure facilities like institutional buildings, residential buildings, equipments manpower, logistics, maintenance of equipments and human resource development are not upto the mark..

Limitations of the Study:

The study area Bhubaneswar Block was selected by purposive sampling procedure keeping in view the operational feasibility. Going to the center of village and selecting the first household randomly is a limitation by itself as the SC and ST families and the poor families generally stay at the periphery of the village. So, their representation is not adequate and representation of the general caste and wealthy people is more in real situation.

As 86% of immunization cards were available, mother's recall bias may play negligible role in the immunization information.

The socioeconomic status information that was obtained from the family like highest education of parents, highest material possession in the family, occupation of father or mother, could not be validated. Hence the conclusions were drawn on the socioeconomic variable cautiously.

Recommendations:

The following steps are recommended in order to overcome the factors associated with the non-compliance of childhood immunizations

1) As the present study has shown that, when the head of the household is a female, the fully immunized status is increasing almost double. Hence it is suggested that the female folks should take advocacy role and motivate their male counterparts for the timely immunization of the children.

2) A special programme is to be chalked out for SCs and STs at the local area level after doing a thorough community need assessment survey for them.

3) The mother and father of the child should be sensitized to take the full advantage of the Immunization programme.

4) The health staff are to be trained regularly about immunization, after effect of immunization, immunization reactions and counselling about immunization.

5) Massive information, education and communication activities are required with community participation.

Strengthening the Immunization System:

The following factors are to be taken care of while strengthening the Immunization System.

Time: The Time of the Immunization session is to be fixed, on a specific day of the week, month and year categorically mentioning the duration of the session, the time of the day.

Distance: The distance of the immunization site should be optimal so that no distance factor comes into action.

Reliability: The reliability of the conduction of the sessions should be such that no mother should return from the immunization site.

Communication and information:

The communication to be made clear, so that people will be able to know where and when, the routine immunization sessions are conducted with the help of motivated health workers, media and community nodal persons..

The immunization camp is the best place to dispel misconception from the mind of the mothers. The issues like child sickness and administration of immunization can be sorted out in the camp itself.

The fixed immunization sessions in a sub centre area is as follows:

Village	Day Every month	*AWC	LP School	UP School
A	1st Wednesday	+		
B	2nd Wednesday		+	
C	3rd Wednesday			+
D	4thWednesday	+		

**AWC-Anganwari center,. Lower Primary school(L.P.School), Upper Primary School(U.P.School)*

In village A every month the immunization camp is held on first Wednesday at the Anganwardi center (8 a.m. to12 noon). As the village "B" has got no Anganwadi Center there, the camp is held at the L.P.School on 2nd Wednesday. In village 'C' there is no AWC or LP School so there the camp is held at the U.P. School on the 3rd Wednesday. But as village 'D' has an AWC there the camp is held at the AWC for village D on 4th Wednesday. So the time, day, places for a week, month, and year are constant.

If such immunization sessions are followed the percentage of partial immunization and un-immunization may be reduced.

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9:APPENDICES

Project on Factors affecting the Utilisation of Childhood Immunization Services in Bhubaneswar block, District Khurda, Orissa,India

State:- Orissa

District:-Khurda

Block-Bhubaneswar

Village:-

No of members in the Household

Cluster No:-

Format A:General Information

Sl No	HH. No	Head of HH/ Relation-ship to To father	Name	Age	Sex	Child 12 - 23 month	
						Yes	No

Investigator

Project on Factors affecting the Utilisation of Childhood Immunization Services in

Bhubaneswar block ,District Khurda,Orissa,India

State:- Orissa District:-Khurda
Block-Bhubaneswar Village:-

Birth day of Age Range to be studied ----------to---------- Cluster No:-
Format B : Immunization Details

Sl No	Date of Birth	Immu Card		BCG	Polio 1	Polio 2	Polio 3	Dpt 1	Dpt 2	Dpt 3	Measles	Full Immu	Part Immu		Not Immu At All	Remarks
		Ye	No										Comp. All Doses	Not Comp. All Doses		

Investigator

Project on Factors affecting the Utilisation of Childhood Immunization Services

in Bhubaneswar block ,District Khurda,Orissa,India

State:- Orissa
Block-Bhubaneswar
Format C : Details of parents

District:-Khurda
Village:-
Cluster No:-

Sl No.	HH No	Name of th parent (Father)	Place of Living	Type of house	Education		Occupation		SC/ ST/ OBC/ GEN	Distance of Nearest Health Facility.	Highest Material Possession
					Husband	Wife	Husband	Wife			

Investigator

Project on Factors affecting the Utilisation of Childhood Immunization Services in Bhubaneswar block ,District Khurda,Orissa,India

State:- Orissa

District:-Khurda

Block-Bhubaneswar

Village:-

No of members in the Household

Cluster No:-

Format D

Reasons to the Mother for not immunizing the child.

Lack of awareness

Lack of Motivation

Lack of facility

Lack of time

Lack of finance

The child was sick

Negligence of Health staff