FULL IMMUNIZATION COVERAGE VERIFICATION AND VALIDATION STUDY IN LOW PERFORMING DISTRICTS OF NEPAL

STUDY REPORT
2018

Government of Nepal
Ministry of Health and Population
Department of Health Services

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unicef

Acknowledgement

Development of this document has only been possible with contributions of time, dedication, and expertise from a large group of individuals. We would like to extend our gratitude towards the entire study team whose dedication and commitment have made this report a reality.

The purpose of this study was to verify and validate the status of full immunization coverage in low performing districts through population-based estimates of the coverage of fully vaccinated children aged 12-23 months and key stakeholder consultations. This study, carried out from March to May 2018 will also help measure results as per GAVI co-financing mechanisms.

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List of Abbreviations

BCG	Bacille Calmette-Guérin
CHD	Child Health Division
CMYP	Comprehensive Multi Year Plan
DHO	District Health Office/r
DPHO	District Public Health Office/r
DICC	District Immunization Coordination Committee
DoHS	Department of Health Services
DPT	Diphtheria-Pertussis-Tetanus
EPI	Expanded Program on Immunization
FCHV	Female Community Health Volunteer
FID	Full Immunization Declaration
GAVI	Global Alliance for Vaccines and Immunization
GoN	Government of Nepal
HepB	Hepatitis B
Hib	Hemophilus Influenza type B
HMIS	Health Management Information System
IDI	In-Depth Interview
IMR	Infant Mortality Rate
JE	Japanese Encephalitis
KII	Key Informant Interview
LB	Live Births
LMD	Logistics Management Division
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MoHP	Ministry of Health and Population
MR	Measles-Rubella
NDHS	Nepal Demographic Health Survey
NIP	National Immunization Program
NMR	Neonatal Mortality Rate
NPC	National Planning Commission
OPV	Oral Polio Vaccine
RHD	Regional Health Directorate
SDG	Sustainable Development Goal
U5MR	Under Five Mortality Rate
UNICEF	United Nation Children Fund
VDC	Village Development Committee
VPD	Vaccine Preventable Diseases
WHO	World Health Organization

Disclaimer

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EXECUTIVE SUMMARY

Nepal has achieved significant outcomes on child health, significantly reducing preventable childhood deaths in the last few decades and successfully achieving the Millennium Development Goals (MDGs). As per *The MDG: Final Status Report 2000-2015 (National Planning Commission, Government of Nepal, 2016),* under five mortality rate (U5MR) reduced to 38 per 1000 live births (LB) in 2014 from 162 in 1990 and 91 in 2000. Similarly, infant mortality rate (IMR) reduced to 33 per 1000 LB in 2014 from 108 in 1990 and 64 in 2000. A major contributor to this success is the national immunization program, a priority one program of the Government of Nepal (GoN), which currently provides free vaccinations to over 630,000 children annually against eleven types of vaccine preventable diseases (Child Health Division / MOHP, Ministry of Federal Affairs and Local Development and WHO, 2014). However, the coverage of all basic vaccinations in the five-year period preceding the survey has shown a decrease, from 87% in 2011 to 78% in 2016 (NDHS 2016), and still 1% children are not receiving any vaccination at all.

Nepal has committed to the post-MDG Sustainable Development Goals (SDG) 2030 and has developed strategies to 'leave no one behind' in reaching all children with full range of immunization services as per the national legislative framework and policies related to child health and immunization. Full Immunization Declaration of rural and urban municipalities and districts, a novel initiative of GoN started in 2012 and scaled up recently, is one such strategy. The concept of full immunization declaration relates to complete vaccination of all children from zero to 15 months of age according to the national schedule of immunization. The second Comprehensive Multi-Year Plan (CMYP) 2017-2021 for Immunization aims at achieving 100 percent full immunization coverage by 2021. As of mid-July 2018, 55 districts have been declared as full immunization district.

OBJECTIVES OF THE STUDY

The objective of this study was to verify and validate the status of full immunization coverage in low performing districts[1] through population-based estimates of the coverage of fully vaccinated children aged 12-23 months and key stakeholder consultations.

Specific objectives

The specific objectives of the study were:

1. To explore socio demographic characteristics of respondents living in the full immunization declared study districts.
2. To ascertain immunization status of children aged 12 to 23 months in the study districts
3. To determine status of full immunization in the study districts and full immunization declared municipalities[2].
4. To appreciate the role of health facilities, local bodies and FCHVs of full immunization declared districts and municipalities.
5. To understand the barriers to immunization at full immunization declared districts and municipalities.

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[1] *This includes 13 districts: (in alphabetical order) Bhaktapur, Bardiya, Gulmi, Humla, Kailali, Kanchanpur, Kathmandu, Lalitpur, Makwanpur, Manang, Mustang, Ramechhap and Salyan.*

[2] *For the purpose of this study, the term 'municipality' is used to collectively denote rural municipality (*Gaun Palika*) and urban municipality (*Nagar Palika, Upa-Maha Nagar Palika, Maha Nagar Palika*) in the study districts.*

STUDY METHODOLOGY

This was a mixed method study, using both quantitative and qualitative methods to collect and analyze data. Quantitative method included a population based survey in eight districts of 1,353 households with a child aged 12 to 23 months, selected through systematic random cluster sampling based on the standard method of vaccination coverage survey (World Health Organization, 2015). Qualitative method included in-depth interview (IDI) and key informant interview (KII) with 40 purposively selected informants, checking of documentation for verification of certain data provided by the informants.

The study covered 13 districts, selected in consultation with MoHP/Child Health Division, UNICEF and WHO that are considered as low performing based on the coverage and drop-out rates for DPT vaccination. Among these, eight districts representing 60% of the total were purposively selected for this study ensuring a mix of different geographical categories (mountain, hill and Terai): Bardiya, Gulmi, Kailali, Kanchanpur, Lalitpur, Manang, Mustang and Ramechhap.

Data was collected from March to May 2018, supervised by a Data Safety and Monitoring Board team in addition to supervision by field supervisors. Ethical approval was obtained from Nepal Health Research Council (NHRC). Necessary steps were taken to maintain confidentiality of the study participants.

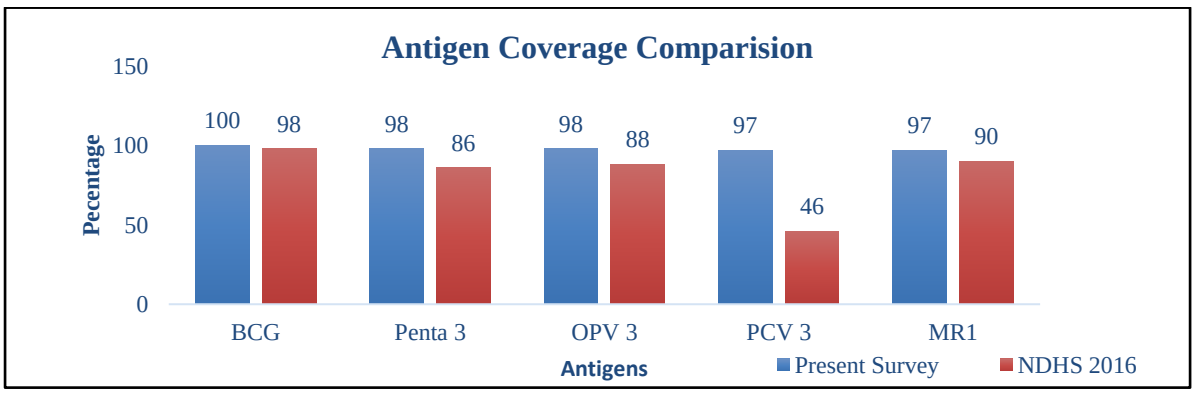
Quantitative Data was analyzed in SPSS, and Qualitative, manually into two themes – enablers and barriers to full immunization. A study report weaving the findings and analysis into a structured format was prepared and finalized with feedback and inputs from relevant MoHP Department and Directorates, UNICEF, WHO and other key stakeholders at the national level.

FINDINGS AND DISCUSSIONS

Immunization Status

This study found very high rates of immunization coverage of the 12-23 months old children in the study area for most vaccines in the national immunization schedule. The coverage rates for basic vaccines (BCG, DPT, OPV and Measles)– individually and collectively (as full immunization) – are higher than the national average reported in the NDHS 2016 (see figure A below) as well as (for individual vaccines only) in the 2016-17 Annual Report of the Department of Health Services (DoHS). The drop-out rates are also minimal and well below the acceptable maximum in the national guidelines. The newly introduced vaccines, MR2 and JE, are yet to reach the coverage levels of basic vaccines, possibly because these are given beyond the well-known age (0 to 9 months) for basic vaccines.

Figure A: Antigen coverage compared with NDHS 2016



The study found that more than three quarters of children received basic vaccines behind the schedule. This study however did not look at how far behind the schedule these children were vaccinated in, and this could be an area to study in further depth. As Nepal has been able to achieve high immunization coverage levels, which is essential to achieve individual as well as herd protection, strategies should be reviewed, based on further in-depth studies, to ensure that all children are vaccinated as per schedule and benefit optimally from immunization.

Adverse event following immunization (AEFI)[3] are common with over half of the studied children having experienced it (53%). A large majority were common and self-recovered, with only a small proportion requiring advice or treatment. Awareness raising at mass as well as individual levels is important, in addition to ensuring immunization service providers counsel the mothers, following the guidelines properly, while rendering the service.

Full Immunization Status

The study validated the full immunization coverage rates for these districts and verified the processes followed, stakeholders' engagement and decision-making by the surveyed districts that had been declared full immunization districts (Bardiya was surveyed but it had not been formally declared at the time of the study).

The household survey showed that over 95% of the children were fully immunized in the study districts (see table A below). Though only one of the eight study districts had 100% coverage, remaining districts individually had over 90% coverage, which is above the WHO and national standards of effective vaccination coverage rates. Children of illiterate mothers and of Muslim community are less likely to be fully immunized.

Table A: Full immunization coverage for surveyed children (aged 12-23 months) by district

Districts	12-23 month old children with full immunization		Total Children (N)
	n	%	
Bardiya	201	96.2	209
Gulmi	140	97.9	143
Kailali	400	95.7	418
Kanchanpur	228	94.2	242
Lalitpur	225	97.4	231
Manang	10	90.9	11
Mustang	11	100	11
Ramechhap	82	93.2	88
Total	**1297**	**95.9**	**1353**

The study districts and municipalities were found to have largely followed necessary steps as per the Guidelines for full immunization declaration. All districts and most of the municipalities had sustainability plans and resources allocated by local bodies, and were undertaking key activities as per the plans. However, since not all districts have been able to maintain 100% full immunization coverage, health and local authorities need to analyze the

[3] *Adverse event following immunization is any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. If not rapidly and effectively dealt with, can undermine confidence in a vaccine and ultimately have dramatic consequences for immunization coverage and disease incidence.*
[Source: http://www.who.int/vaccine_safety/initiative/detection/AEFI/en/]

situation and rigorously follow the sustainability plan, mainly micro planning and annual surveys to detect and vaccinate missed or dropped-out children. Repositioning or expanding outreach sessions may be necessary to take immunization session closer to remote and less accessible communities. However, workload and additional costs (e.g. for transport) on health workers and FCHVs need to be carefully considered.

Enablers and Barriers to Full Immunization Efforts

National Immunization Program is widely accepted and well established, and the Full Immunization program is gradually taking shape with increasing numbers of districts full immunization declared. The drive for full immunization declaration has created a positive enabling environment at local levels. However, there is a risk of complacency, as evidenced by the varying degree of implementation of FID sustainability plans in many municipalities, and without concerted efforts, the gains can be lost quickly.

With the recent elections and establishment of three tiers of government – federal, state / province and local – in line with the 2015 Constitution, the governance context of Nepal has changed. In line with the restructured state functions, Ward and Municipality authorities (local government) are responsible for ensuring immunization services. Sufficient resource allocation and aggressive technical support and capacity building of the local authorities is paramount to ensure sustained full immunization at all local levels. Continuous follow up and supervision from higher levels (State and Federal) is crucial to ensure the drive is maintained to sustain the achievements.

Vaccine shortage, though not very frequent, results in delay in vaccinating children, and in some cases missed or drop-out children. Proper planning, timely procurement and distribution, effective storage, stock-keeping and cold chain is essential to minimize drop-out or missed cases due to unavailability of vaccines at scheduled immunization sessions. In the context of newly restructured state, it is highly important to clarify roles and responsibilities of and to ensure coordinated action amongst the three levels of government for an uninterrupted and effective supply chain of vaccines at the immunization clinics and sessions.

Conclusions

This study has been able to ascertain immunization status of 12-23 month old children and also determine full immunization status of the study districts. Encouragingly, the study has shown high levels of coverage of basic vaccinations as well as full immunization. The health and local authorities have meticulously followed the process, as per national guidelines, for full immunization declaration of the study districts and municipalities. Continued and concerted efforts are needed to sustain the gains.

1. BACKGROUND

Status of Child Health and Immunization in Nepal

Nepal has made remarkable progress in improving health outcomes for under five children and, thereby accelerating reduction in preventable childhood morbidities and mortalities in the last few decades. Nepal was successful in achieving the child health related targets set for the Millennium Development Goals (MDGs) – an international time-bound commitment, adopted by the United Nations in September 2000. As per *The MDG: Final Status Report 2000-2015 (National Planning Commission, Government of Nepal, 2016)*, under five mortality rate (U5MR) reduced to 38 per 1000 live births (LB) in 2014 from 162 in 1990 and 91 in 2000. Similarly, infant mortality rate (IMR) reduced to 33 per 1000 LB in 2014 from 108 in 1990 and 64 in 2000. As per the Nepal Demographic and Health Survey (NDHS) 2016, U5MR and IMR are 39 per 1000 LB and 32 per 1000 LB respectively for the 5-year period preceding the survey.

Immunization is the most cost-effective and efficient way to control and eliminate vaccine-preventable diseases that contribute to childhood illnesses and deaths. The Nepal MDG Final Status Report 2016 highlights immunization against preventable diseases as one of the main contributors to the remarkable decline in infant and under-five mortalities in Nepal. Immunization program has been a successful public health intervention in Nepal. Immunization coverages have been high with, for example, 92% of one-year old children immunized against Measles in 2015. A secondary data analysis of NDHS and Multiple Cluster Indicator Survey (MICS) has shown that targeting of disadvantaged population by the immunization program is a significant contributor to its success (KC, Viktoria, Singh, & Malqvist, 2017). Nepal has committed to the post-MDG Sustainable Development Goals (SDG) 2030 and has developed strategies to 'leave no one behind' in reaching all children with full range of immunization services as per the national legislative framework and policies related to child health and immunization.

In the National Health Policy 2014 and the Constitution of Nepal 2015, healthcare is regarded as a fundamental right of the people (Government of Nepal, 2015). Immunization Act 2015 stipulates that every child has the right to get quality vaccines (Goverment of Nepal, Nepal National Assembly, 2016). For effective implementation of immunization policy, various departments and divisions, branches and subdivisions of the current organizational structure of the Ministry of Health and Population (MoHP) from ministry to ward level, along with partner organizations, have been working collectively.

Current Situation of the National Immunization Program

National Immunization Program (NIP), initially launched in 1977 as Expanded Program on Immunization (EPI), is one of the highest priority programs of the Government of Nepal (GoN). Currently government provides free immunization services to children against 11 types of vaccine preventable diseases (Tuberculosis, Diphtheria, Pertussis, Tetanus, Poliomyelitis, Hepatitis-B, Hemophilus influenza B, Pneumococcus, Measles, Rubella and Japanese Encephalitis). The antigens are given as six single or multi-antigen vaccines between zero to 15 months of age: BCG 1 dose (against Tuberculosis), Pentavalent (DPT-HepB-HiB) 3 doses (against Diphtheria, Pertussis, Tetanus, Hepatitis B and Hemophilus influenza B), Oral Polio Vaccine (OPV) 3 doses, Pneumococcal Conjugate Vaccine (PCV) 3 doses, Measles-Rubella (MR) 2 doses and Japanese Encephalitis (JE) 1 dose. HepB, HiB, Rubella and JE antigens were introduced in the recent decade only, while the rest have been in the national immunization schedule for over 3 decades. All children in Nepal need to

receive these vaccines in the recommended number of doses. Around 630,000 children receive immunization service every year through over 16,000 routine, fixed and outreach immunization sessions conducted every month throughout the country (Child Health Division / Ministry of Health and Population, Ministry of Federal Affairs and Local Development and WHO, 2016).

As per NDHS 2016, amongst the children aged 12-23 months, 78% have received all basic vaccinations (one dose of BCG, 3 doses of Pentavalent and Oral Polio, and one dose of Measles vaccines), which is a reduction from the coverage (87%) shown by the previous survey (NDHS 2011). On the other hand, the percentage of children aged 12-23 months who did not receive any vaccination decreased from 3% in 2006 and 2011 to 1% in 2016. Ninety-eight percent of children have received BCG, 97% have received the first dose of Pentavalent, and 98% have received OPV 1. Eighty-six percent and 88% of children have received the third doses of the pentavalent and polio vaccines, respectively. Coverage of MR1 vaccination is 90%. (Ministry of Health and Population, Nepal, New ERA and ICF,2017)

Full Immunization Program

The initiative of Reaching Every Child and declaring Village Development Committees (VDCs), now called rural municipalities (*GaaunPalika*), municipalities (*Nagar Palika, Upa-Maha Nagar Palika, Maha Nagar Palika*) and districts as full immunization administrative area was initiated in 2012 to search for and vaccinate never reached and 'drop-out' children. As per the Full Immunization Guidelines (second edition) 2016 [Child Health Division / Ministry of Health and Population, Ministry of Federal Affairs and Local Development and WHO, 2016], full immunization refers to a state when all children in a given administrative area by the age of 15 months receive complete doses of vaccines as per the national immunization schedule[4]. It is measured by a household survey of 16-23 months old children conducted locally every year. As per the first edition of the Guideline (2014), the definition included receiving complete doses of BCG (1 dose), Pentavalent (3 doses), OPV (3 doses) and Measles (1 dose) only by the age of 12 months and 12-23 month old were to be surveyed for measurement.

GoN's ambitions on improving the coverage of immunization services have increased progressively. Comprehensive Multi-Year Plan (CMYP 2011-2016) aimed to have 90 percent coverage of full immunization by the end of 2016 in all districts (Child Health Division, Department of Health Services, Ministry of Health and Population, 2011). The follow on CMYP 2017-2021 aims at achieving 100 percent full immunization coverage by 2021. As of mid-July 2018, 55 districts have been declared as full immunization district.

Full immunization program aims to sustainably ensure immunization services for all children, specially focusing on hard to reach population, through local ownership, participation and resource mobilization. The program concentrates on not missing a single child without vaccination and getting back 'drop-out' children into the mainstream. With support of organizations such as UNICEF, WHO and other development partners, Nepal government has initiated the process in all 75 (now 77) districts. This program is expected to significantly contribute to achieving the SDG commitment to end preventable deaths of children (reducing U5MR to 25 per 1000 LB) by 2030.

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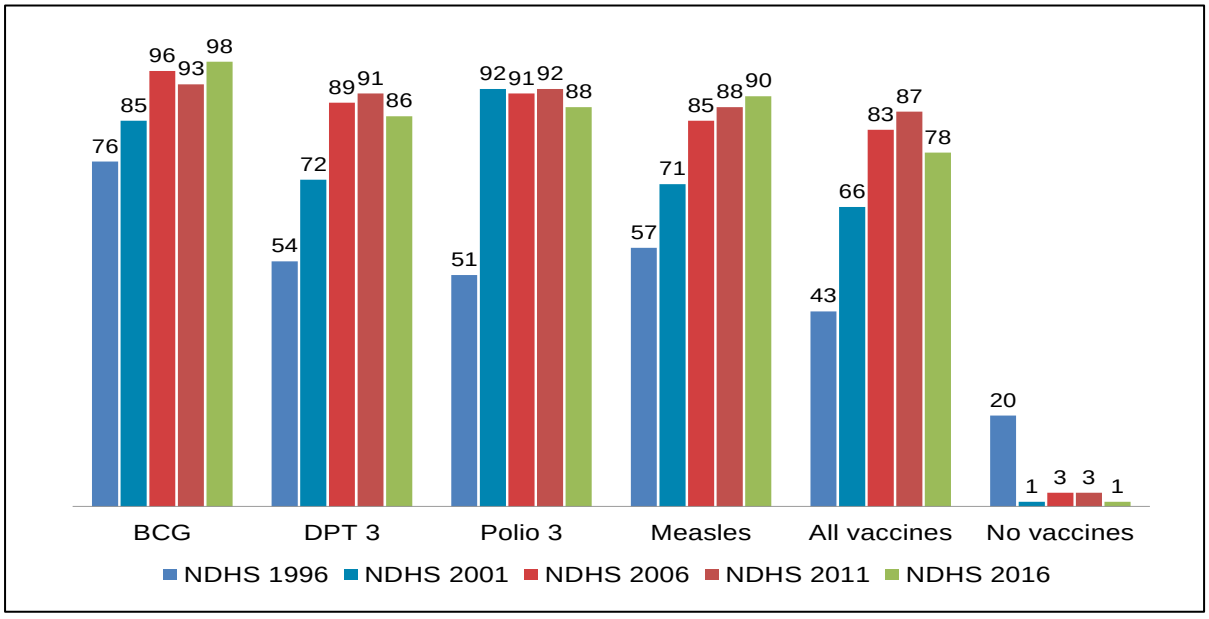
[4] *This includes BCG - 1 dose, Pentavalent (DPT-HepB-Hib) - 3 doses, OPV - 3 doses, PCV – 3 doses, MR - 2 doses and JE – 1 dose.*

Context of the Full Immunization Verification and Validation Study

Nepal has achieved significant outcomes on child health, significantly reducing preventable childhood deaths in the last few decades. A major contributor to this success has been the national immunization program, a priority one program of the GoN, which currently provides free vaccinations to all children against eleven types of vaccine preventable diseases. However, the coverage of all basic vaccinations in the five-year period preceding the survey has shown a decrease, from 87% in 2011 (NDHS 2011) to 78% in 2016 (NDHS 2016). Though decreased from a 3% in 2006 and 2011, the recent NDHS 2016 showed that still 1% children are not receiving any vaccination at all, and this proportion is as high as 2% in certain geographical areas (State 2). The Full Immunization Program is progressing but at a slower pace than planned in the successive CMYPs. There is an increasing trend in declaration of full immunization districts, however national immunization coverages for DPT and OPV have seen a decrease in recent past (see figure below, source: NDHS 2016). The surveys have also shown that, despite high levels of national coverage, disparities persist across different socio-demographic strata. Quality and consistency of routine data have also been questionable as the coverage shown by the recent DHS survey is not fully congruent with those obtained through the routine HMIS.

Figure 1: Trends in vaccination coverage among children 12-23 months, 1996-2016 (%)
[Source: NDHS 2016 Key Indicators report]



Full immunization declaration is a novel initiative of the GoN to reach every child. This study was aimed at verifying and validating the current process of full immunization declaration, based on the Full Immunization Declaration Guidelines, in a selected group of districts. Data was generated by this study, using both quantitative and qualitative methods, to add credibility to the full immunization status of the districts, and elicit issues, barriers and challenges in implementing and sustaining the full immunization program. The findings from this study will also contribute necessary data to measure progress against GAVI's disbursement linked indicator 2 (*Improved equity and access to immunization services in targeted districts: 60% of low performing districts* (based on DPT coverage and drop-out) *have fully immunized VDCs*). The results of the validation study are also expected to provide the GoN / MoHP and External Development Partners (EDPs) with relevant information regarding the effectiveness of strategies used to immunize children.

2. OBJECTIVES OF THE STUDY

The objective of this study was to verify and validate the status of full immunization coverage in low performing districts[5] through population-based estimates of the coverage of fully vaccinated children aged 12-23 months and key stakeholder consultations.

Specific objectives

The specific objectives of the study were:

1. To explore socio demographic characteristics of respondents living in the full immunization declared study districts
2. To ascertain immunization status of children aged 12 to 23 months in the study districts
3. To determine status of full immunization in the study districts and full immunization declared municipalities[6]
4. To appreciate the role of health facilities, local bodies and FCHVs of full immunization declared districts and municipalities
5. To understand the barriers to immunization at full immunization declared districts and municipalities

3. STUDY METHODOLOGY

Study design, and methods and approaches used in selection of study area, sampling, data collection and entry, analysis, reporting, data quality management and ethical research practice are briefly outlined in this section. Details of the methodology are given in Annex I.

Study Design

This was a mixed method study, using both quantitative and qualitative methods to collect and analyze data.

Quantitative method included a population based survey, using a close-ended, structured and pre-tested questionnaire, in households with a child aged 12 to 23 months, selected through systematic random cluster sampling, in eight selected districts.

Qualitative method included in-depth interview (IDI) and key informant interview (KII) with purposively selected informants in the study districts using separate semi-structured questionnaire for each category of informants. It also included checking of documentation (meeting minutes, records, registers) for verification of certain data provided by the informants.

Study Districts and Clusters

The study covered 13 districts – selected in consultation with MoHP/Child Health Division, UNICEF and WHO – considered as low performing based on the coverage and drop-out rates

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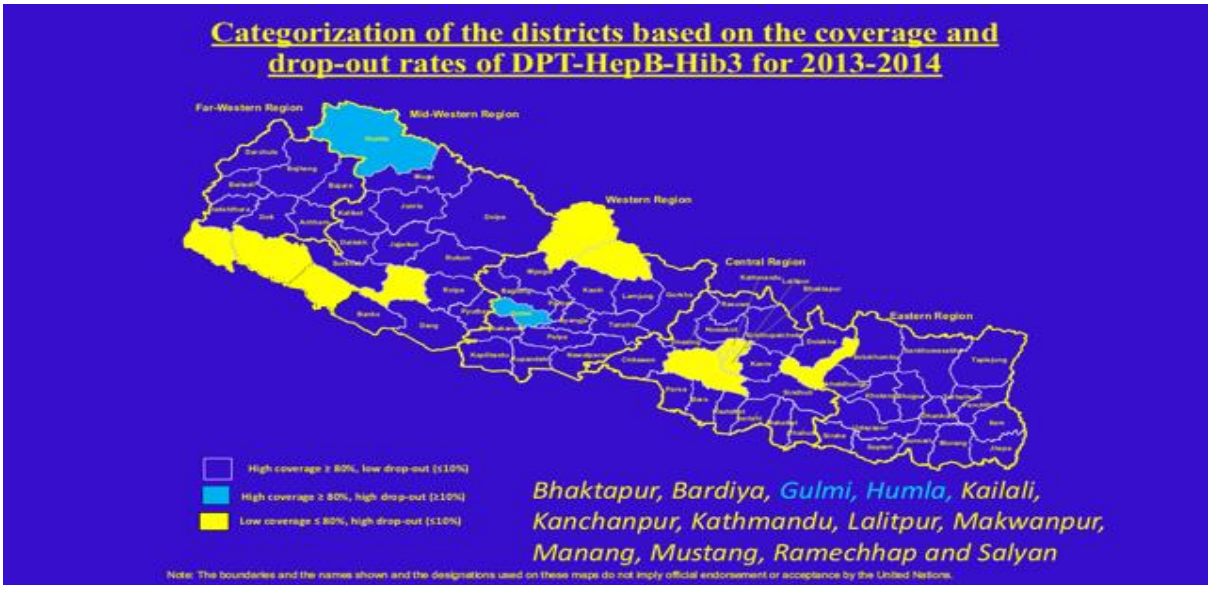
[5] *This includes 13 districts: (in alphabetical order) Bhaktapur, Bardiya, Gulmi, Humla, Kailali, Kanchanpur, Kathmandu, Lalitpur, Makwanpur, Manang, Mustang, Ramechhap and Salyan.*

[6] *For the purpose of this study, the term 'municipality' is used to collectively denote rural municipality (*Gaaun Palika*) and urban municipality (*Nagar Palika, Upa-Maha Nagar Palika, Maha Nagar Palika*) in the study districts.*

for DPT vaccination: Bhaktapur, Bardiya[7], Gulmi, Humla, Kailali, Kanchanpur, Kathmandu, Lalitpur, Makwanpur, Manang, Mustang, Ramechhap and Salyan.

Among these, eight districts representing 60% of the total were purposively selected for this study ensuring a mix of different geographical categories (mountain, hill and Terai).

1. Bardiya
2. Gulmi
3. Kailali
4. Kanchanpur
5. Lalitpur
6. Manang
7. Mustang
8. Ramechhap



The list of full immunization municipalities is given in Annex II.

Study Population

The study population for the survey were children aged 12 to 23 months in the selected districts, and the respondents for the survey were a parent (mother or father) or a caretaker of the child who slept in the same household the previous night.

The study population for the qualitative part included the following in the study districts: Mother of a 12-23 months old child for IDI; and District Health Office (DHO) chief or Immunization focal person, health workers providing immunization at health facilities, female community health volunteers (FCHVs) and District Immunization Coordination Committee Chair or representative for KII.

Sampling

Quantitative: The sample size for the household survey was calculated based on the standard method of vaccination coverage survey (World Health Organization, 2015). As per this sampling technique (systematic random cluster selection without replacement, demonstrating probability proportional to size), 123 clusters were selected in the eight districts. A cluster was a former ward of a VDC or municipality. In each cluster, 11 households with children

[7] *Bardiya was not declared as full immunization district at the time of the study as 3 municipalities were not full immunization declared then*

aged 12 to 23 months were randomly selected. The survey was thus carried out in 1,353 households in the eight study districts representing the study population.

Qualitative: Convenience sampling of fully immunized municipalities in each study district was done to select the informants purposively. A total of 40 key informants were interviewed in the study.

Preparation of Tools, Orientation and Pre-testing

Close-ended structured questionnaire for survey, separate semi-structured questionnaires for IDI and KII and checklists for verification of documented evidence were developed by the lead consultants in close consultation with DoHS/CHD, UNICEF and WHO. The questionnaires were pre-tested in Bhaktapur (which is not a study district) before finalization. The data collection teams were trained by the lead consultants and CHD/Immunization Section team for three days on their roles and responsibilities, the study methods and questionnaires / tools and other practical aspects of data collection and field work, with a day dedicated to field practice in Bhaktapur.

Mobilization of Field Teams, Monitoring, Supervision and Quality Control

Data was collected by enumerators / interviewers from March to May 2018.The data collection teams included 7 teams with 5 supervisors and 6 enumerators / interviewers.

To ensure quality and consistency, the supervisors worked closely with and monitored the enumerators / interviewers in the field, checked on the completeness and accuracy of the filled questionnaires and ensured that the survey was conducted according to the guidelines provided by the lead consultants and CHD/immunization team. A Data Safety and Monitoring Board team, comprising of the lead consultants, representatives of DoHS/CHD and Logistics Management Division (LMD) and UNICEF and WHO, visited the survey teams to check on quality of data and work done in the field, and advised on immediate corrective measures in cases of errors and missing information. This committee was responsible for ensuring the data quality of the study and communicating the findings with, and was accountable to, DoHS and UNICEF.

Data Management, Analysis and Reporting

Quantitative: Data was entered by trained data entry clerks on the following day of collection into an MS Excel template, with appropriate field protections and drop-down boxes to facilitate accuracy in data entry. After the completion of data entry for all surveys, dataset was exported, data quality checks performed and analyzed in SPSS by a Statistics consultant. Cross tables and chi square tests (where relevant) generated were analyzed and interpreted in line with the study objectives.

Qualitative: Data was analyzed by manually extracting and categorizing the data into two themes – enablers and barriers to full immunization.

A study report was prepared by the lead consultants weaving the findings and analysis into a structured format. Draft report was shared with MoHP / DoHS / Family Welfare Division (FWD)[8], UNICEF and WHO for review, key findings presented to a group of key stakeholders at the national level and report finalized incorporating the feedback received.

[8] *At this stage, the erstwhile CHD had been merged with Family Health Division into the newly formed FWD.*

Ethical Considerations

Ethical approval was obtained from Nepal Health Research Council (NHRC). An approval was also taken from CHD / Immunization Section. The questionnaire was administered in local Nepali language, widely spoken in the study districts. Proper verbal informed consent was taken (and recorded by the enumerator/ interviewer in a form) from the respondents and interviewees assuring confidentiality of the information provided and its use for the study purpose only without revealing their personal identity (maintaining anonymity). Respondents and interviewees were also informed that their participation was completely voluntary, without any undue inducement or sanction for participation or non-participation. Necessary provisions were made during the data collection, entry, analysis and reporting for the protection of privacy and confidentiality of the study participants and the information they provided. Interviews were conducted in an open environment to avoid suspicion, but private enough to avoid interference by neighbors, relatives, local leaders and/or other curious onlookers.

Limitations of the Study

Since the districts covered by this survey had declared full immunization using the criteria in the previous full immunization guidelines (first edition 2014), this study also used the older definition for verification and validation.

Of the 13 low coverage districts, eight were selected purposively for this study, ensuring a mix of different geographical categories (mountain, hill and Terai). The findings of the study can be generalized to the sampled eight districts only. It may not represent the 13 low coverage districts. The findings may not be disaggregated by geographical regions or other categories.

6. FINDINGS

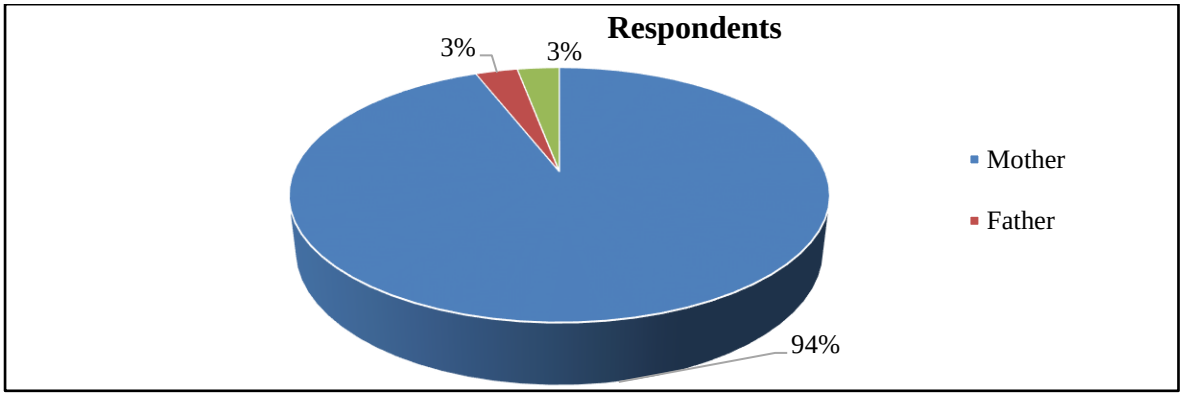
This is divided into two sub-sections: Quantitative and Qualitative.

Quantitative Findings

Respondents

The respondents of the survey were a parent or a caretaker of a child aged 12-23 months, the survey population, who had stayed in the same household the night before. A large majority of the respondents were mothers (94.3%) and the remaining were either fathers (2.7%) or other family members (2.9%) of the children in surveyed households.

Figure 2: Type of respondent

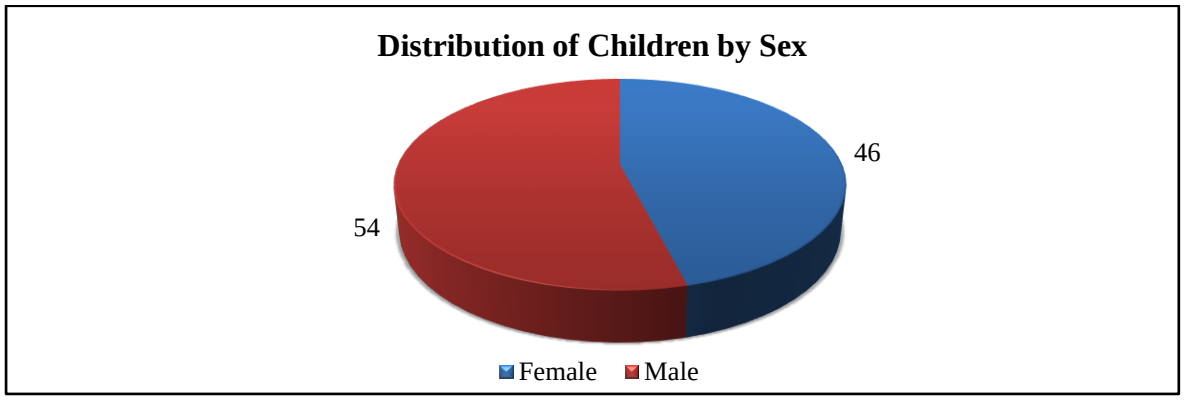


Ninety-four percent of the respondents had immunization card or other document with immunization details of the surveyed children. This is higher than the recent NDHS 2016 in which vaccination card were seen only for 52% of the surveyed children.

Demographic distribution of the surveyed children

Of the 1,353 children aged 12-23 months covered by this survey, 46% were female and 54% were male.

Figure 3: Distribution of children by sex



The proportion of female to male children is close to the sample of 12-23 month old children in NDHS 2016 (female: 44%, male: 56%). The average age of the children was 17.3 months. The number of children covered in each district disaggregated by sex is given in the table 1 and age distribution is given in table 2.

Table 1: Sex distribution of the surveyed children (in number and %)

S.N.	District Name	Number of Children aged 12 -23 months				Grand Total (n)
		Female (n)	%	Male (n)	%	
1	Bardiya	98	47	111	53	**209**
2	Gulmi	64	45	79	55	**143**
3	Kailali	195	47	223	53	**418**
4	Kanchanpur	112	46	130	54	**242**
5	Lalitpur	108	47	123	53	**231**
6	Manang	6	55	5	46	**11**
7	Mustang	3	27	8	73	**11**
8	Ramechhap	37	42	51	58	**88**
Total		**623**	**46**	**730**	**54**	**1353**

Table 2: Age distribution of the surveyed children (in %)

S.N.	District	Age of the Children												Total Child
		12	13	14	15	16	17	18	19	20	21	22	23	
1	Bardiya	2.9	4.3	6.2	8.6	8.1	7.7	9.1	12	13.4	14.8	8.6	4.3	209
2	Gulmi	9.8	7	5.6	9.8	8.4	5.6	5.6	7	11.2	8.4	9.8	11.9	143
3	Kailali	7.9	9.1	10.3	9.8	8.4	12.4	10.8	8.4	10.3	5.5	4.5	2.6	418
4	Kanchanpur	6.6	12.4	12.8	12.8	9.1	5.4	9.1	6.2	11.6	6.2	2.5	5.4	242
5	Lalitpur	7.4	9.1	9.5	8.2	8.2	10	7.8	13	7.4	8.7	4.3	6.5	231
6	Manang	18.2	18.2	0	18.2	0	9.1	0	0	0	27.3	9.1	0	11
7	Mustang	9.1	18.2	9.1	9.1	9.1	0	18.2	0	9.1	9.1	9.1	0	11
8	Ramechhap	4.5	9.1	12.5	4.5	10.2	11.4	5.7	3.4	10.2	10.2	10.2	8	88
Total		**6.9**	**8.9**	**9.5**	**9.6**	**8.5**	**9.1**	**8.8**	**8.7**	**10.5**	**8.4**	**5.8**	**5.3**	**1353**

Table 3: Birth place of the surveyed children (in %)

S.N	District	Birth Place of the Child			
		Home	Health Institution	Other (On the Way to hospital, India)	Number of Children
1	Bardiya	5.7	94.3	-	209
2	Gulmi	11.9	88.1	-	143
3	Kailali	11.7	87.6	0.7	418
4	Kanchanpur	2.9	94.6	2.5	242
5	Lalitpur	5.6	94.4	-	231
6	Manang	27.3	72.7	-	11
7	Mustang	36.4	63.6	-	11
8	Ramechhap	38.6	58	3.4	88

Table 4: Birth order of the surveyed children (in %)

S.N	District	Birth Order of the Children					
		First	Second	Third	Fourth	Fifth and above	Number of Children
1	Bardiya	44.5	44.5	8.1	1.4	1.4	209
2	Gulmi	39.2	44.8	13.3	1.4	1.4	143
3	Kailali	49.3	30.1	11.2	5.7	3.6	418
4	Kanchanpur	47.5	39.3	8.3	2.9	2.1	242
5	Lalitpur	52.8	37.7	7.8	1.3	0.4	231
6	Manang	54.5	18.2	9.1	18.2	0	11
7	Mustang	72.7	9.1	9.1	9.1	0	11
8	Ramechhap	48.9	31.8	15.9	2.3	1.1	88

As given in table 3 above, nine out of 10 surveyed children were born at an institution (88.8%) and the remaining at home (10.3%), with a few elsewhere (0.9%). Nearly half of the children were first born (48.0%), 36.7% second born, 10.1% third born and 5.3% were of the fourth or higher birth order (see table 4).

Other demographic attributes are given in table 5.

Most of the surveyed children's mothers were literate (17.0%) or educated (primary: 44.3%; SLC or above: 31.8%), while 6.9% were illiterate.

Large majority of the surveyed children lived within 30 minutes' walk of an immunization facility (87.8%), 9.4% within 30 to 60 minutes' walk and 2.8% more than an hour's walk away.

Table 5: Other demographic attributes of the surveyed children

Variables		Number	%
Caste/ethnicity	Dalit	197	14.6
	Janjati/Aadibasi	608	44.9
	Madhesi	14	1.0
	Muslim	14	1.0
	Brahmin/Chhetri	490	36.2
	Others	30	2.2
Geographical region	Mountain	22	1.6
	Hill	462	34.1
	Terai	869	64.2
Level of education of mother	Illiterate	93	6.9
	NFE/Primary	230	17.0
	SLCC and above	1030	76.1
Time to reach to EPI center	Less than 30 Minutes	1188	87.8
	30 – 60 Minutes	127	9.4
	More than 60 Minutes	38	2.8
Retention of Immunization Card	Yes	1277	94.4
	No	76	5.6
Total		1353	100%

Eight in 10 of the respondents mentioned FCHVs as the source of information on immunization (79.4%). Other common sources of information were health workers (58.4%), family member (27.4%), radio (21.7%), and television (11.6%). One in 10 also said that they were self-aware about immunization (9.5%).

Table 6: Respondents' source of information regarding immunization (in %, multiple response)

S.N	Source	Total
1	Poster	6.9
2	Radio	21.7
3	TV	11.6
4	FCHV	79.4
5	Miking	2.1
6	Newspaper	2.7
7	Other Family Members	27.4
8	Health Worker	58.4
9	Self-Awareness	9.5
10	Neighbor	3.3
11	Not mentioned in the survey	0.1

Immunization status of the surveyed children

Immunization coverage for the following 6 vaccines covering 11 antigens – BCG, Penta 3 doses, OPV 3 doses, PCV 3 doses, MR 2 doses, and JE as per the national immunization guidelines – amongst the surveyed children are given in figure 4, and coverage of the antigens by district is given in table 7 below.

Figure 4: Immunization coverage amongst the surveyed children by antigen

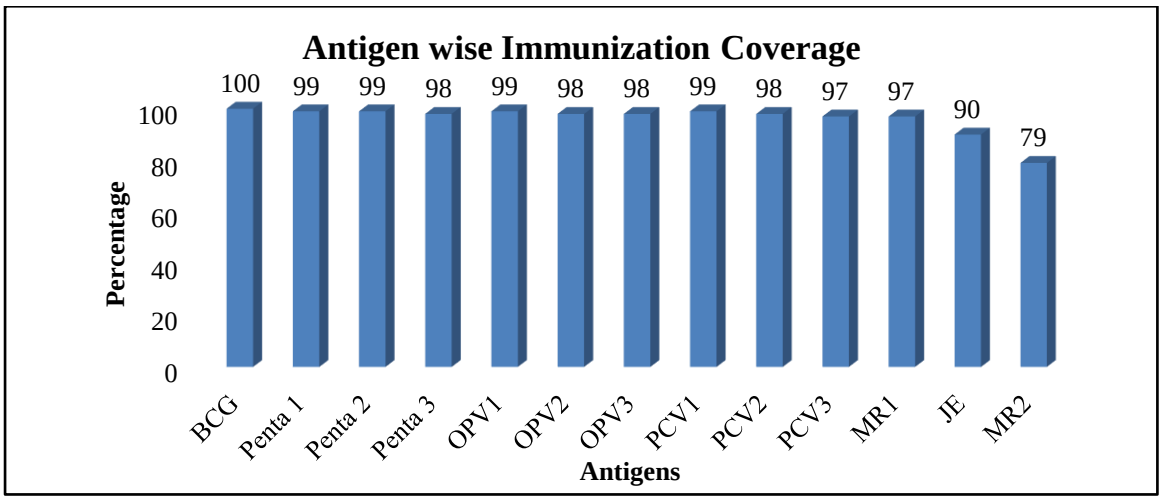


Table 7: Immunization coverage for all antigens in the NIP by surveyed district (in %), N = 1,353

S.N.	District	Antigen												
		BCG	Penta1	Penta2	Penta3	OPV1	OPV2	OPV3	PCV1	PCV2	PCV3	MR1	JE	MR2
1	Bardiya	100	99	98	97	100	98	97	98	97	96	97	95	90
2	Gulmi	100	99	99	98	99	99	99	99	99	98	98	95	90
3	Kailali	100	99	99	99	99	99	99	99	99	98	96	87	75
4	Kanchanpur	100	98	99	98	98	99	98	98	99	95	96	88	67
5	Lalitpur	100	100	98	97	99	99	97	100	98	98	99	91	80
6	Manang	100	100	100	100	100	100	91	100	100	100	100	82	71
7	Mustang	100	100	100	100	100	100	100	100	100	100	100	91	100
8	Ramechhap	100	100	96	95	99	94	94	100	94	94	96	90	82
Total		**100**	**99**	**99**	**98**	**99**	**98**	**98**	**99**	**98**	**97**	**97**	**90**	**79**

* For MR2, only 15-23 month old children (N = 1,019) were taken as MR2 is given at 15 months as per the NIP schedule.

BCG is the only vaccine which all 1,353 children surveyed were immunized with (100%). The coverage rates for the remaining vaccines administered before 12 months of age – Penta3, OPV3, PCV3 and MR1 – though not at cent percent, were high at above 97% (98.2%, 98.1%, 97.1% and 97.2% respectively), whereas coverage rates for recently introduced JE and MR2, both given between 12 to 15 months, were lower at 90.3% and 79.2% respectively. 97.7% of the children had received all three Penta doses, 97.6%, all three OPV doses, and 96.6%, all three PCV doses.

The coverage for basic vaccines (given before 12 months of age) amongst 12-23 month old children shown by this survey is much higher than the national coverage shown by NDHS 2016 (see figure 5 below). Though not directly comparable, the coverage is also higher than that shown by the 2073/74 (2016/17) HMIS data (see table 8 below).

Figure 5: Antigen coverage compared with NDHS 2016

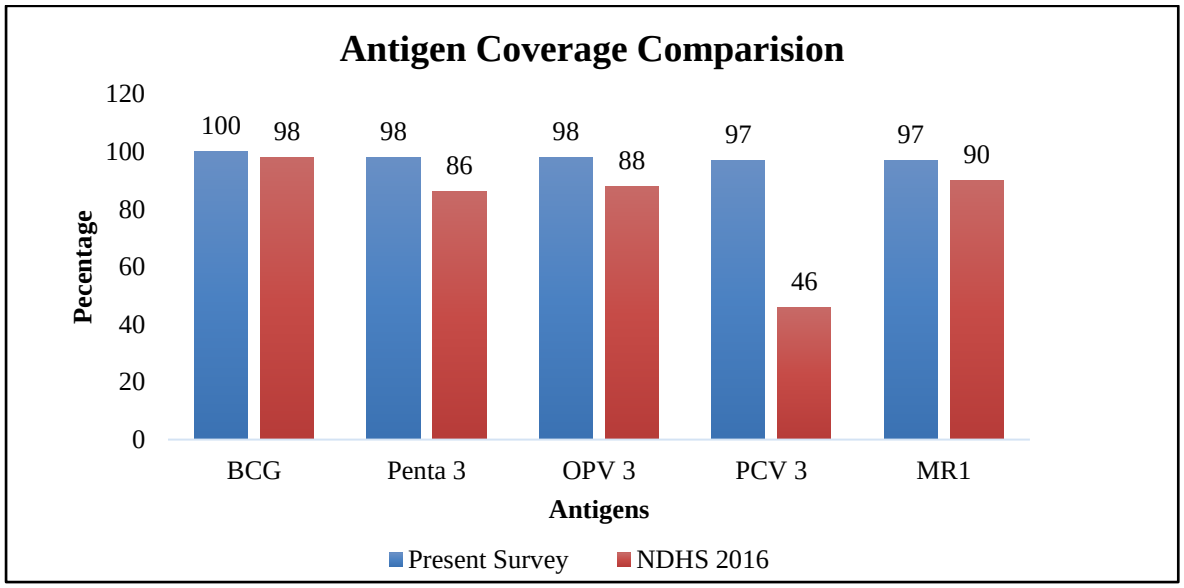


Table 8: National vaccination coverage data from HMIS 2073/74 (2016/17) by antigen

Antigen	Coverage (in %)	Antigen	Coverage (in %)
BCG	91.3	PCV 1	88.2
Penta 1	90.7	PCV 2	85.6
Penta 2	88.5	PCV 3	77.7
Penta 3	86.5	MR 1	84.0
Polio 1	90.1	JE	67.4
Polio 2	88.2	MR 2	57.0
Polio 3	85.9		

Drop-out rates shown by this survey are minimal and well below the acceptable maximum in the National Immunization Guidelines. Drop-out rates between the first and the third doses of Penta, OPV and PCV are at or below 2% and dropout between BCG and MR1 is less than 3%. Dropout between MR1 and MR2, for surveyed children aged 15-23 months (n= 1,019) is however quite high at 38.7%.

The survey also collected data on whether vaccinations received by the children were as per the national schedule (see table 9).

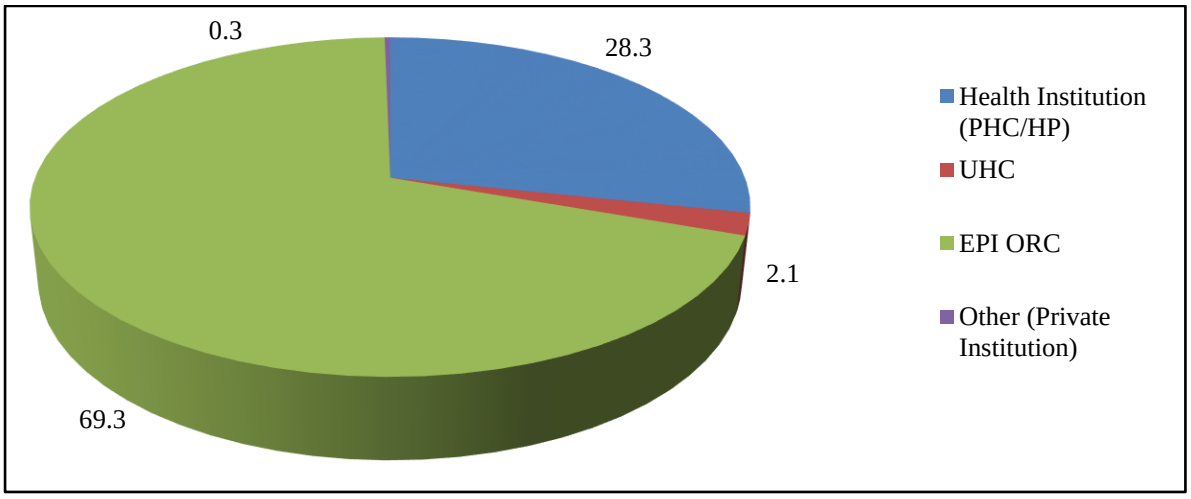
Table 9: Proportion of the surveyed children receiving vaccinations as per NIP schedule

S.N.	Antigen (NIP schedule for the antigen)	Vaccination coverage as per NIP Schedule (%)
1	BCG(day 0)	8
2	Penta1(6 weeks)	24.9
3	Penta2 (10 weeks)	22.8
4	Penta3 (14 weeks)	18.4
5	OPV1 (6 weeks)	24.5
6	OPV2 (10 weeks)	22.9
7	OPV3 (14 weeks)	15.8
8	PCV1 (6 weeks)	23.7
9	PCV2 (10 weeks)	22.4
10	PCV3 (9 months)	56.2
11	MR1 (9 months)	57.2
12	JE (12 months)	62.4
13	MR2 (15 months)	7.5

Except for the vaccines given at 9 and 12 months (PCV3: 56.2%, MR1: 57.2% and JE: 62.4%), only less than a quarter of the vaccinated children had been vaccinated as per schedule. Though vaccination coverage is higher than the WHO and national standards, large proportions of children are being vaccinated behind the national schedule for all antigens, and hence may not be receiving optimal benefit and protection from the vaccines if they are vaccinated too long behind the actual schedule. The study however did not look at how long behind the schedule these children were vaccinated in.

Seven in 10 of the surveyed children were vaccinated at immunization outreach clinics (69.3%), 28.3% at primary healthcare facilities (PHC or HP), 2.1% at urban health clinics (UHC) and a very small proportion at private facilities (0.3%). (See figure 6)

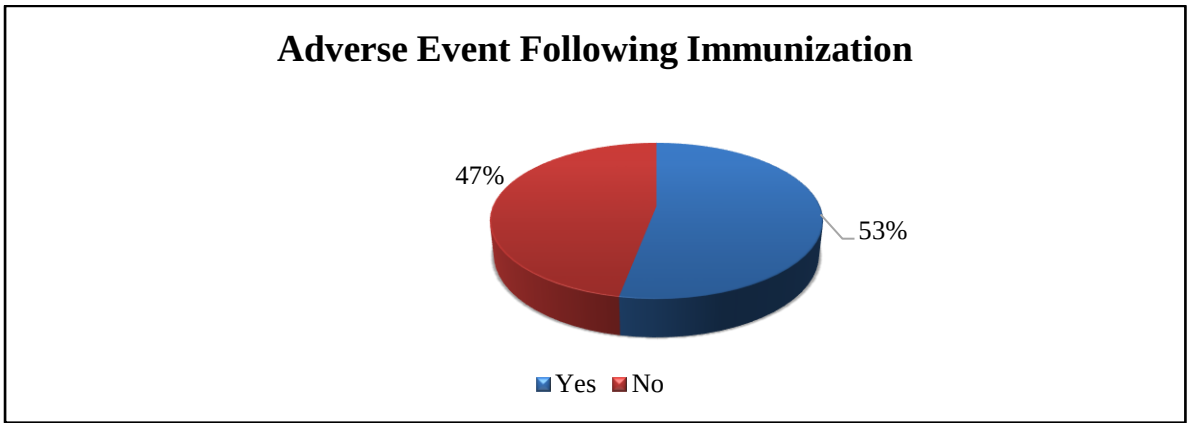
Figure 6: Distribution of the surveyed children by vaccination site



Adverse event following immunization (AEFI) and its management

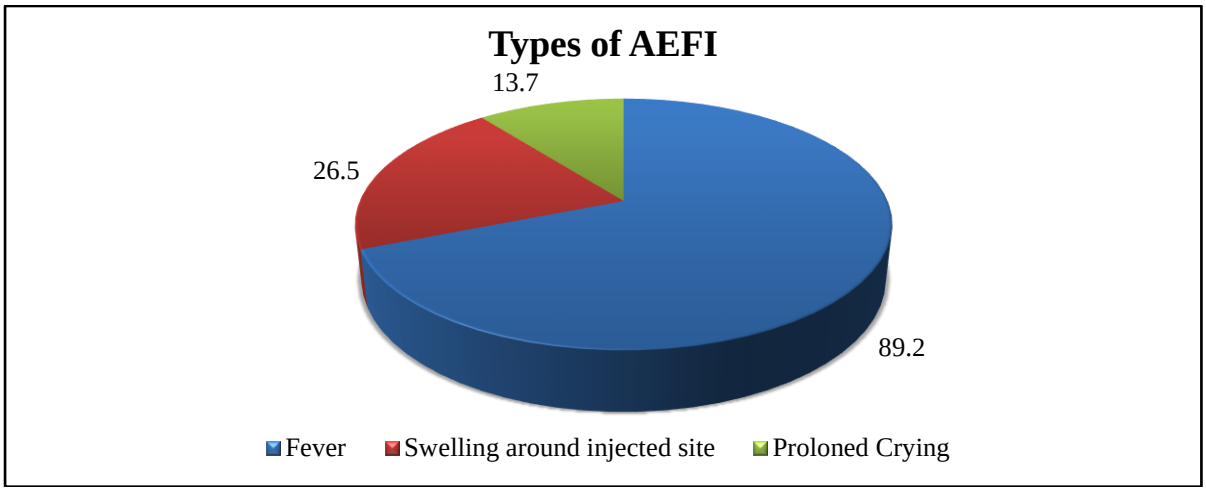
Over half of the surveyed children had had one or more adverse event following immunization (52.7%).

Figure 7: Distribution of AEFI experienced



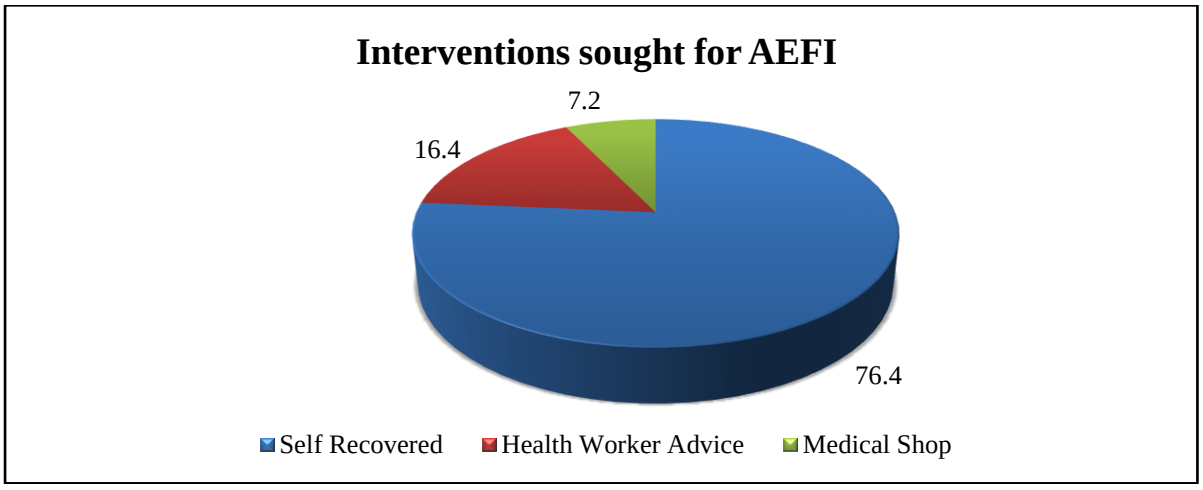
Of those, nearly nine in 10 had fever (89.2%). Other common adverse events were swelling around the injected site (26.5%) and children crying for a prolonged time (13.7%).

Figure: 8 Distribution of types of AEFI experienced



Over three quarters of those children suffering adverse events self-recovered without medical advice or help (76.4%) while for the rest their mother or caretaker discussed the issue with health workers for advice (16.4%) or had them treated at private clinics or medical shops (7.2%).

Figure: 9 Distribution of interventions sought for AEFI experienced



Full immunization coverage amongst the surveyed children

In line with the National Immunization Program, Full Immunization Guidelines (First Edition) 2014, this report considers BCG, Pentavalent 1-3, OPV 1-3 and MR1 only for the calculation of full immunization status amongst the surveyed 12-23 months old.[9] This also allows comparison with the NDHS 2016 data (NDHS 2016 also used BCG, Pentavalent 1-3, OPV 1-3 and MR1 only).

Table 10: Full immunization coverage for the surveyed children (aged 12-23 months) by district

Districts	12-23 month old children with full immunization		Total Children (N)
	N	%	
Bardiya	201	96.2	209
Gulmi	140	97.9	143
Kailali	400	95.7	418
Kanchanpur	228	94.2	242
Lalitpur	225	97.4	231
Manang	10	90.9	11
Mustang	11	100	11
Ramechhap	82	93.2	88
Total	**1297**	**95.9**	**1353**

Of the surveyed 1,353 children aged 12-23 months, 95.9% were fully immunized with vaccines given between 0 to 11 months of age. Only one of the eight surveyed districts, Mustang, had 100% fully immunized children. Remaining districts had between 90.9% to 97.9% of the surveyed children fully immunized. This reflects that though the full immunization coverage is quite high (above WHO and national standards for national vaccination coverage), there still are gaps that need to be covered to maintain full immunization district status in all but one of the surveyed districts. Not a single child was found who had not received any vaccine at all (zero dose).

Disaggregation of the fully immunized children (n = 1,297) by certain socio-demographic characteristics (see table 11) shows that full immunization coverage is:

- Significantly lower (p-Value 0.00) amongst (i) Muslim children (78.6%) than those from other caste/ethnicity group (93.4% or higher), and (ii) children of illiterate mothers (88.2%) than those of literate or educated mothers (95.7% or higher);
- Not significantly different (i) between female and male children; (ii) between children of different geographical regions (mountain, hill and Terai); and (iii) by travel time to a nearest immunization facility.

[9] *The second edition (2016) of the Full Immunization Guidelines has revised the definition of full immunization coverage, (i) including newly introduced vaccines (PCV, MR2 and JE) also and (ii) changing the age group to be surveyed to 16-23 months. PCV, MR2 and JE have been recently introduced and are yet to be fully institutionalized, and hence the surveyed districts had considered older definition to declare fully immunized districts. This study also followed the old definition for consistency.*

Table 11: Distribution of the fully immunized children by socio-demographic characteristics

Variables		Fully Immunized Children		p-Value
		N	%	
Caste/ethnicity	Dalit	185	93.4	**0.00**
	Janjati/Aadibasi	590	97.0	
	Madhesi	14	100.0	
	Muslim	11	78.6	
	Brahmin/Chhetri	468	95.5	
	Others	29	96.7	
Geographical region	Mountain	21	95.5	0.49
	Hill	447	96.8	
	Terai	829	95.4	
Sex of the child	Female	594	95.3	0.37
	Male	703	96.3	
Level of education of mother	Illiterate	82	88.2	**0.00**
	NFE/Primary	220	95.7	
	SLC and above	995	96.6	
Travel time to a nearest immunization facility	Within 30 minutes	1143	96.2	0.34
	30-60 minutes	120	94.5	
	Over 60 minutes	34	89.5	
Total		1297	95.9	

Process of declaring full immunization district

Of the 8 districts covered by the survey, only Bardiya had not been formally declared as full immunization district at the time of this study though all except three of its municipalities (Baniyabhar, Gulariya and Mungragadhi) had already been. Bardiya is excluded from the findings described below. The survey teams collected information from district level and local key informants and checked records (bar a few exceptions noted below) to note and verify the process and stakeholder engagement in the full immunization declaration. Relevant tables showing verification data by district are given in Annex III.

Table 12: Date of full immunization declaration of the surveyed districts (in BS and AD)

District	Date of FID in BS	Date of FID in AD
Bardiya	Not declared	Not declared
Gulmi	30 – 12 – 2071	13 – 04 – 2015
Kailali	26 – 08 – 2074	12 – 12 – 2017
Kanchanpur	09 – 04 – 2072	25 – 07 – 2015
Lalitpur	15 – 01 – 2074	28 – 04 – 2017
Manang	25 – 12 – 2073	07 – 04 – 2017
Mustang	12 –08 – 2072	28 – 11 – 2015
Ramechhap	02 – 11 – 2074	14 – 02 – 2018

All districts had carried out key activities as outlined in the Full Immunization Guidelines 2014 prior to full immunization declaration:

- District level introductory seminar
- District Immunization Coordination Committee (DICC)meeting
- Work-planning and division of responsibilities
- Verification of municipality survey records
- Verification of the survey report, review and decision for declaration of municipality

DICC and DHO representatives, health workers and FCHVs were present in the verifications of the municipality declaration in all districts (except for absence of DICC representatives and FCHVs in Gulmi district). Central (DoHS) and / or regional (RHD) level representatives were present in all verification of the district declaration (except Kailali). Similarly, WHO and/or UNICEF representatives were present in all, except Gulmi.

All districts had a sustainability plan after the declaration (though survey team was not able to access documents in Ramechhap). They had planned or done the following key activities for sustainability:

- Annual verification of municipality household survey
- Annual verification of municipality declaration decisions
- Celebration of annual FID day
- Inclusion in the annual program/plan of local body

All districts had FID and sustainability plan included in the annual program/plan of local bodies. Local bodies in all (except Kanchanpur) had provided financial resources to the FID activities, while only three districts (Kanchanpur, Mustang and Ramechhap) had annual budget allocated by the local body (endorsed by the district council) for immunization and FID activities in the current fiscal year.

Process of declaring full immunization municipality

The survey teams collected information from 92 health facilities in the eight surveyed districts (distribution of covered facilities by district is given in the table 13 below). They interviewed local key informants and stakeholders and checked records (bar a few exceptions noted below) to note and verify the process and stakeholder engagement in the full

immunization declaration of that particular municipality. Relevant tables showing verification data for the health facilities by district are given in Annex III.

Table 13: Health facilities surveyed by district

S.N.	District	Number of Health Facility Surveyed
1	Bardiya	18
2	Gulmi	13
3	Kailali	27
4	Kanchanpur	14
5	Lalitpur	10
6	Manang	1
7	Mustang	1
8	Ramechhap	8
	Total	**92**

All surveyed health facilities in the eight districts had carried out key activities as outlined in the Full Immunization Guidelines 2014 (bar a few activities not carried out by one or two health facilities in some districts):

- Local (municipality) level introductory seminar
- Health Management Committee (HMC) meeting
- Work-planning and division of responsibilities
- Household survey
- Verification of the survey report
- Review and approval of survey report and decision for declaration of municipality

Health workers and FCHVs were involved in 91.1% and 97.8%, respectively, of the household surveys in the surveyed municipalities. District level team had verified the full immunization status in 96.7% of the surveyed municipalities. They had also conducted a smaller sample of household survey in all (except Mustang district) as part of the verification process. 89.1% of the surveyed municipalities had FID included in the local body's program/plan and were provided an average of Rs. 53,000 worth of financial or physical resources to support the FID process. 63% of the surveyed health facilities had a sustainability plan after the declaration. They had planned or done, to a varying degree, the following key activities after the FID for sustainability:

- Annual household survey (46.7%)
- Annual verification/endorsement of municipality declaration decisions (40.2%)
- Celebration of annual FID day (34.1%)
- Inclusion in the annual program/plan of local body (56.5%)

Less than half of the surveyed facilities (43.5%) had annual budget allocated for this fiscal year by local bodies for sustainability of full immunization status. The average amount allocated was Rs. 63,000.

Qualitative Findings

Informants

A total of 40 people were interviewed in the study. In-depth interview with one mother of a 12-23 months old child and key informant interview with four informants (health worker, district health supervisor, local government representative and FCHV) was conducted in each of the eight study districts. The study team also checked the records and documents related to full immunization in each district.

Qualitative data collected in the study has been analyzed based on the views shared by different stakeholders and findings are highlighted under two themes – enablers and barriers for immunization. Detail findings by each category of informants are given in Annex IV.

Enablers

- Immunization is widely accepted. Mothers are generally aware of the types of available vaccines and their schedule, and the benefits of immunization. It's not easy to find a (zero dose) child who has not received any vaccines in the communities.
- Though male household heads usually make health related or health seeking decisions, mothers of young children are usually supported by their husband and family to take decisions regarding immunization of their children.
- FCHVs play a vital role in information dissemination and awareness raising.
- FCHVs are satisfied with the role they play in ensuring all children in their communities are fully immunized, and also with the appreciation they receive from their communities.
- Mothers learn about immunization from their peers and neighbors also. Health workers are regarded as a reliable source of information.
- Mothers usually have positive experience at immunization sessions. They appreciate supportive and non-discriminating behavior of health workers, and the health advice they receive from them in these sessions. They also like that immunization services are free.
- Immunization is widely available, even in remote communities, thanks to the outreach clinics. Health workers and FCHVs usually follow up if certain children do not come for vaccination as per schedule.
- Mothers trust the immunization services provided in the public facilities. They rarely go to a private facility for immunization services.
- Immunization / full immunization is increasingly included in local bodies' plans and resource allocations.

> ***'My family members understand the value of immunization, so I have not faced any issues regarding immunization. My husband gives his views and encourages me'*** [A mother, Kanchanpur]
>
> ***'Immunization helps to prevent diseases. It gives energy to fight against diseases. It makes them*****(children)** ***good and keeps healthy'*** [A mother, Gulmi]
>
> ***'FCHV tells us about immunization. She counsels frequently. She informs us about all health services'*** [A mother, Gulmi]
>
> ***'I am inspired from friends for immunization'*** [A mother, Mustang]
>
> ***'Health workers behave well in immunization center. They treat everybody equally'*** [A mother, Bardiya]

Barriers

- Mothers harbor some fear about adverse events following immunization. Many of them have experienced their child having some adverse events, though mostly minor and self-recovering.
- Traditional thinking, illiteracy and socio-cultural views and practice in certain community groups (e.g. Madhesi, Muslims, Dalit) also negatively affect full vaccination of children.
- Mothers find it difficult to take their children for vaccination if their immunization session is more than an hour away.
- In remote and hill/mountains, it's difficult for health workers to conduct out-reach sessions. They have to walk long hours. Staff capacity is limited. Even where roads are available, they do not get sufficient resources for transportation / fuel for motorbikes.
- Some children in border areas or of parents working in India miss vaccination when they travel. Some of them report being immunized in India, but is difficult to verify.
- Sometimes mothers are asked to come next time due to shortage of vaccines. Vaccine shortage, though not very frequent, results in delay in vaccinating children. In some cases, this may also result in children missing a particular vaccine altogether if they don't come next time for the same vaccine.
- Reasons of vaccine shortage:
  - Difficulty in transportation: no or poor road access, difficult terrain, rains/flood/snowfall affecting access
  - Broken cold chain equipment
  - Lack of storage capacity
  - Delayed procurement
  - Poor stock-keeping practice

> ***'There is always fear of fever and inflammation (after vaccination), but I haven't stopped immunization of my child. It should not be stopped. I am aware of its benefit to my child's health'*** [A mother, Gulmi]
>
> ***'It takes about one hour to reach immunization center. I want an immunization center nearby'*** [A mother, Gulmi]
>
> ***'Some groups like Madhesi, Muslim and Dalit, still do not know the importance of immunization. However, compared to past, level of awareness regarding the need and importance of routine immunization has increased'*** [A DPHO]
>
> ***'During the monsoon, our district face challenges; health workers as well as service seekers face difficulties to visit health facilities'*** [A DPHO]

7. DISCUSSIONS

This section discusses the key findings in relation to the objectives of this study, and also highlight implications and recommendations to improve the access, quality and effectiveness of immunization services and full immunization program.

The household survey covered a representative sample of 12-23 months old children in purposively selected eight out of the thirteen low performing districts (based on DPT coverage and drop-out rates). It followed the older definition of full immunization coverage (Full Immunization Guidelines, first edition, 2014) to be consistent with the definition used by the districts in full immunization declaration.

This study found very high rates of immunization coverage of the 12-23 months old children in the study areas for most vaccines in the national immunization schedule. The coverage rates for basic vaccines (BCG, DPT, OPV and Measles) – individually and collectively (as full immunization) – are higher than the national average reported in the NDHS 2016 as well as (for individual vaccines only) in the 2016-17 Annual Report of the DoHS. The drop-out rates are also minimal and well below the acceptable maximum in the national guidelines. The newly introduced vaccines, MR2 and JE, are yet to reach the coverage levels of basic vaccines. A reason for this could be because these are given at or after 12 months of age, whereas for over three decades and until some years ago the vaccination program covered vaccines given within 9 months of age only.

High coverage is essential to achieve individual as well as herd protection. However, the vaccines need to be administered as per the prescribed schedule, on the prescribed week or month or as close to it as possible, to realize optimal benefits. It's discouraging that more than three quarters of children received basic vaccines behind the schedule. This study however did not look at how far behind the schedule these children were vaccinated in, and this could be an area to study in further depth. As Nepal has been able to achieve high immunization coverage levels, strategies should be reviewed, based on further in-depth studies, to ensure that all vaccinated children benefit optimally from immunization.

Proper planning, timely procurement and distribution, effective storage, stock-keeping and cold chain is essential to minimize drop-out or missed cases due to unavailability of vaccines at scheduled immunization sessions. In the context of newly restructured state, procurement, storage and distribution (supply chain management) of vaccines cut across all tiers of government – federal, state/province and local. It is highly important to clarify roles and responsibilities of and to ensure coordinated action amongst these three levels for an uninterrupted and effective supply chain of vaccines at the immunization clinics and sessions.

Adverse events following immunization have the potential to create fear among mothers which can negatively impact on vaccination uptake. Awareness raising at mass as well as individual levels are important (i) to increase the understanding of common adverse events following immunization and reassure mothers, and (ii) to enable them to recognize potentially severe ones to ensure appropriate and timely care seeking. It's also essential to ensure immunization service providers counsel the mothers, following the guidelines properly, while rendering the service.

The study validated the full immunization coverage rates for these districts and verified the processes followed, stakeholders' engagement and decision-making by the surveyed districts that had been declared full immunization districts.

The household survey showed that over 95% of the children were fully immunized in the study districts. Though only one of the eight study districts had 100% coverage, remaining districts individually had over 90% coverage, which is above the WHO and national standards of effective vaccination coverage rates. Children of illiterate mothers and of Muslim community are less likely to be fully immunized. Targeted efforts are required to reach the left out groups and ensure 100% coverage in these districts.

The study districts and municipalities were found to have largely followed necessary steps as per the Guidelines for full immunization declaration. All districts and most of the municipalities had sustainability plans and resources allocated by local bodies, and were undertaking key activities as per the

IMPLICATIONS and RECOMMENDATIONS in a nutshell:

- In line with the restructured state functions, Ward and Municipality authorities are responsible for ensuring immunization services. **Sufficient resource allocation and aggressive technical support and capacity building of the local authorities is paramount** to ensure sustained full immunization at all local levels
- Health and local authorities, together with development partners and stakeholders, **need to analyze why districts / municipalities are not able to maintain full immunization coverage and rigorously follow the sustainability plan**, mainly resource allocation, micro planning and annual surveys to detect and vaccinate missed or dropped-out children
- The drive for full immunization declaration has created a positive enabling environment at local levels. **Continuous follow up and supervision from higher levels (State and Federal) is crucial** to ensure the drive is maintained to sustain the achievements
- **Targeted efforts are required to reach the left out groups** (e.g. children of illiterate mothers, children of certain caste/ethnicity) and ensure full immunization coverage in these districts
- **Repositioning or expanding outreach sessions may be necessary** to take immunization session closer to remote and less accessible communities. However, workload and additional costs (e.g. for transport) on health workers and FCHVs need to be carefully considered
- Strategies should be reviewed, based on further in-depth studies on when children are vaccinated, to **ensure that all children are vaccinated as per the national schedule** and benefit optimally from immunization
- **Proper planning, timely procurement and distribution, effective storage, stock-keeping and cold chain is essential** to minimize drop-out or missed cases due to unavailability of vaccines at scheduled immunization sessions. In the context of newly restructured state, it is highly important to **clarify roles and responsibilities of and to ensure coordinated action amongst the three levels of government** for an uninterrupted and effective supply chain of vaccines
- **Awareness raising about adverse events following immunization** at mass as well as individual levels are important (i) to increase the understanding of common adverse events and reassure mothers and families, and (ii) to enable them to recognize potentially severe ones to ensure appropriate and timely care seeking. It's also essential to **ensure immunization service providers counsel the mothers, following the guidelines properly**, while rendering the service.

plans. However, since not all districts have been able to maintain 100% full immunization coverage, health and local authorities need to analyze the situation and rigorously follow the sustainability plan, mainly micro planning and annual surveys to detect and vaccinate missed or dropped-out children. To achieve and sustain full immunization, specific community groups and excluded populations with higher proportions of missing or drop-out children must be reached with targeted strategies. More needs to be done to take immunization session closer to remote and less accessible communities. This may mean repositioning or expanding outreach sessions. However, workload and additional costs (e.g. for transport) on health workers and FCHVs need to be carefully considered.

With the recent elections and establishment of three tiers of government – federal, state / province and local – in line with the 2015 Constitution, the governance context of Nepal has changed. In line with the restructured state functions, Ward and Municipality authorities (local government) are responsible for ensuring immunization services. Sufficient resource allocation and aggressive technical support and capacity building of the local authorities is paramount to ensure sustained full immunization at all local levels.

The drive for full immunization declaration has created a positive enabling environment at local levels. However, there is a risk of complacency, as evidenced by the varying degree of implementation of FID sustainability plans in many municipalities. Without concerted efforts, the gains can be lost quickly. Continuous follow up and supervision from higher levels (State and Federal) is also crucial to ensure the drive is maintained to sustain the achievements.

8. CONCLUSIONS

This study has been able to ascertain immunization status of 12-23 month old children and also determine full immunization status of the study districts. Encouragingly, the study has shown high levels of coverage of basic vaccinations as well as full immunization. The health and local authorities have meticulously followed the process, as per national guidelines, for full immunization declaration of the study districts and municipalities. Continued and concerted efforts are needed to sustain the gains. Authorities at different levels (central, state, district and local) and stakeholders, including partners such as UNICEF and WHO, need to carefully analyze enablers and barriers, and act on them – building on enablers and tackling barriers, both at strategic and tactical levels– to ensure sustained full immunization of all districts and municipalities of the country.

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