

**STUDY ON DETERMINANTS OF LOW
IMMUNIZATION COVERAGE IN FOUR VDCs
OF HUMLA DISTRICTS
(December 2003-February2004)**

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Summary

Humla is a most far district from capital of Nepal with the difficult access. Airline service from Nepalgunj is the only way to the access. Next gate is 7 days walk from Surkhet or Achham district. It is the District with lowest immunization coverage in the country. Uncertainty started with the approval of research proposal. Fund release was in first December, with the start of winter season and condition of short time period. For me both of these factors are obstacles. But I was trying to my best to meet the condition. Anyway I managed to fly Simikot on the 6th December.

Launthi with lowest EPI coverage but unfeasible was excluded from the study. Being feasible (within two days distance) and relatively less conflict affected area, I selected 4 VDCs of North and west from Simikot -Hepka, Khagalgaun, Muchu, Dandafaya as study area purposively. I divided this into 18 clusters according to village and selected 8 clusters randomly. This were Dhinga, Hepka, Chaunganfaya, Dharapori, Kermi, Chyaduk, Yalbang, Yangar villages.

Objectives of my study are to find relation of various factors with immunization status, estimate vaccine coverage in the area and find determinants of low immunization. Only 81 children were studied though nearly 91 children of target group (13-24 month) were estimated in sample clusters. The number was small due to lack of small population in the study VDCs (Minimum 834 Khangalgaun to Maximum 1626 Muchu)

It was found that the immunization coverage of the community was BCG-83%, DPT1-74%, DPT2-62%, DPT3-48%, and Measles-59%. NID coverage -102%. In the same way completely immunized children were 43%, partially immunized children were 40% and not immunized children were 16%. Dropout is higher- 28% for BCG vs Measles and 35% for DPT1 vs DPT3. However no one

in the community was able to show immunization card of their children, as it was not provided to them.

No any socio-demographic variable is associated with immunization though coverage is higher for female than male and more farmers have immunized their children than that of other occupation.

Nearly all have listened about immunization in general. But more than 90% don't know about specific immunization BCG, DPT, Measles, Polio and proper age for immunization. More than 95% belief that immunization protects from all diseases.

There is no fixed date and time for clinic. Only 35 % people get information on time however time of clinic is perceived convenient for majority of respondent. Clinic run irregularly for 53% of respondent and even very irregularly (*Kahile Kanhi matra*) in 30% clusters. Entire people perceived behavior of health worker and counseling after immunization is either good or medium but not poor.

More than 95% respondents had access to EPI clinic in their own residential village or within the walking distance of 1 hour (one way). In these aspect clinics are accessible but during rainy season (Jestha to Asoj) people especially mother of infant migrate to high altitude "*Lekha*" and clinics become inaccessible. Nearly 47% children suffered from high fever or severe pain or abscess for prolonged period (more than one week) after immunization.

Odd Ratio is high for timely information not provided(6.91), clinic irregularity (6.57), distance of health institution more than one hour(4.69) and perceived side effect present (3.82). Main reason for non-immunization is given seasonal migration in the same VDCs in warm season, date not known and fear of pain/adverse effect. This study was done in only four VDCs and methodologically can't be generalized for the whole district. However clinic regularity, health worker punctuality, management pattern, seasonal migration, are similar in the entire district. From this perspective this result may reflect whole district problem.

List of abbreviations

EPI	-Expanded Program on Immunisation
BCG	-Bacillus Calmette Guirene.
DPT	-Diphtheria , Pertusis , Tetanus.
NID	-National Immunization Day
OPV	-Oral Polio vaccine.
DHS.	- Department of health Service.
DHO	-District health Office.
PHCC	-Primary Health Care Centre.
HP	-Health Post.
SHP	-Sub Health Post.
FCHV	-Female Community Health Volunteer.
TBA	-Trained Birth Attendant.
VHW	-Village health worker.
MCHW	-Maternal and Child Health worker.
ANM	-Auxullary Nurse Midwifery.
AHW	-Auxullary Health Worker.
HA	-Health Assistant.
WHO	-World Health Organization.
UNICEF	-United Nation Children' Fund.
MOH	-Ministry Of Health.
HMG	-His Majesty the Government.
SLTHP	-Second Long Term Health plan.
VDC	-Village Development Committee.

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1.Introduction

A. Background

EPI is a priority program of HMG Nepal It is one of the most cost effective health interventions. Vaccine preventable diseases (VPDs) are routinely reported in Nepal .The immediate objective of EPI program are to eliminate neonatal tetanus to reduce measles morbidity and mortality and to eradicate Poliomyelitis.The EPI was introduced in Nepal from 1978 following the successful completion of smallpox eradication efforts .By 1989, the six standard antigens were being provided in all 75 districts of the country¹. In 1993,the Expanded program in Immunization was reduced from vertical project to a divisional section within a child health division in the Department of Health service².

Incomplete case reporting and inaccurate coverage reporting in Nepal tends to overestimate the impact and success of the immunization program. Coverage surveys have shown that coverage is routinely over-reported^{3,4,5}.

During that period micro- planning was introduced at district level and below. An extensive cold chain system was developed and some 15000 monthly outreach clinics were established conducted by village health worker (VHW) .The same system has been in operation to the present and ninety percent of infant immunization is conducted through the outreach clinics. In 1993 to implement the new health policy, the MOH was reorganized and all the priority programs were integrated into primary health care services. Under the eighth five year plan (1991-1996) sub-health posts were established in 3199 village development committee areas, each was staffed with three health staffs-AHW-1,VHW-1 and MCHW-1.These sub-health post ,along with 739 health post and 180 primary health care centers currently in operations have greatly access to basic health services for the rural populations² . In addition, over 3000 female maternal and child health workers (MCHWs) have been trained and are intended to serve in or near their communities based at health posts along with the VHWs mentioned above. Some 46,597 female community health volunteers are also

involved in health promotion and provision of basic health services for mothers and children¹.

Since immunization services are an integral part of primary health care maximum effort should be made to utilize immunization .In their efforts to achieve or maintain high immunization coverage countries should focus on areas and population groups with lower coverage. Survey data shows that around 10% Of the target population is not reached at all through routine immunization program. These unreached children are among the most vulnerable as they are marginalized and poorest of the poor. For universal coverage these children must also be reached ⁶.

The ninth five year plan has continued in the direction set by the eighth five year plan with further development and extension of health services with the recognition that access to health care is a basic human right and a crucial element in poverty alleviation. The burden of contagious disease, malnutrition and maternity diseases is 68%of the total burden of disease in Nepal. These diseases are the causes 50% total death rate. On the basis of burden of disease, implementation capabilities, equity consideration, program directed to the poor, marginalized, vulnerable and disadvantaged groups and resource availability EPI is one of the first priority program⁸.

In 1997,HMG/Nepal collaborated with the external development partners and national stakeholders in developing the second long-term health plan, for the period1997-2017. The vision is that health services are available to every one in rural as well as urban areas .To achieve this, The SLTHP aimed to ensure provision of Essential health care services to all population group, deploy technically competent and socially responsible health care providers throughout the country particularly in the under serviced areas. There are division and centers in the department of health service which are responsible for supporting priority public health interventions as well as immunization services .MOH has also revised national immunization policy providing a long term vision and operational strategies to improve routine immunization and control of vaccine preventable diseases².

The overall goal of national immunization program is to reduce child mortality and morbidity occurring due to vaccine preventable diseases^x. Target of it is achieving 90% coverage by 2005, Polio eradication by 2005, and Neonatal Tetanus elimination by 2005; reduce measles mortality by 95% and morbidity by 90% by 2005⁸.

For achieving these targets vaccine to the infants for routine immunization will be provided from health facilities once every month as a special immunization day. Similarly monthly outreach sessions will be conducted at 3-5 places in each VDC on date/time/places as decided by the DHO together with the community. Difficult to reach area will be covered through campaign-style approaches⁸.

Instead of these many constrain are their leading to low coverage of DPT and measles coverage nationally and very low coverage of all the immunization in rural and remote areas. Humla has the lowest coverage. Burden of disease (BOD) analysis confirms the need to focus on infectious diseases, maternal and prenatal conditions and nutritional deficiencies. Based on recent estimates, these represent 69% of BOD in Nepal. They are the major causes of illness and contribute more than 50% of total mortality. In children under five, infectious diseases (particularly diarrhea, measles and pneumonia) along with perinatal conditions account for 80 % of all deaths.

B. Study district

Humla district is one district between 75 districts of Nepal and situated in Karnali Zone well known for its backwardness. It is stretched through 5,655 square kilometre areas and elevated up to 7337 m height. Simikot is its headquarter, which is at the highest altitude among other district headquarters. Politically the district is divided in 27 VDCs without any municipality .It represents only one election constituency⁹.

Demographic characteristics:

Total population -40595, sex ratio -1.07, under 14 population -40.1%, elderly population -6.4%, annual growth rate -1.7%, number of household-6, 953, Average household size-5.84 and population density-7 only¹⁰.

Educational characteristics:

- Both sex literacy-26.6%, male literacy-40.66% and female literacy-11.52%.
- Gender disparity prevails in literacy.
- Literacy rate decline with age group for both females and males.
- The net enrolment rate is 18 for the district: 10 for girls and 25 for boys.

Drinking water and sanitation

- 60% households have access to protected systems such as public taps.
- 60% household have access to water within 10 minutes.
- 12% household have latrine facilities.
- Children from 72% household and adult from 25% households don't wash hands after defecation.
- 61% households dispose household wastes within 50 feet of their houses. Household with access to toilet facilities-18.12%, population with access to safe drinking water 58.64%, No of hospital -1, no of health post -10, no of sub health, post -17.

Social characteristics:

Population of Chhetri is 22%, Sherpa 7.26%, Thakuri 10.11%, Kami/damai/Sharki 4.88%, Brahmin and Brhamin is 3.25%. Major language is Nepali and main religion is Hindu and Buddhist. In addition the service level is very low in the district with only one set of telephone and one airport as a means of transportation

Economic Characteristics

- 72% of the population (above 15years) stated agriculture and 6% wage ;about as their primary occupation.
- 93% are owner operators.
- 1% households neither have their own land nor have rented others land.
- 905 households are marginal land operators.
- 17% household have year round food sufficiency.

- 99% households have stone, mud and wood roofs.
- 64% households are vulnerable.

These are all about the study district Humla ¹¹.

2.Statement of the Problem

A. Study District context

It is already mentioned that EPI is first priority program of HMG and it is one element of primary health care⁷. Though national and inter-national target for EPI is to raise more than 90%, Humla has very lower EPI coverage 50%, 28%and 45% respectively which is of grave concern. Again this data are as per Annual Report of DHS, the actual coverage may be further less. Measles outbreak is reported frequently but due to lack of surveillance the actual data for vaccine preventable diseases incidence for the district are not available. The immunization coverage of the last five years is given below according to Annual Report of DHS. It shows the miserable condition of EPI in the district.

	2001	2000	1999	1998
BCG	41.2	95.2	37.2	37.2
DPT	31.1	59.9	21.5	21.5
MEASLES	31.8	67.0	36.4	36.4

It portrays that immunization is lowest in the countryand much gap exists between target and present situation.

B. National Context

National coverage is 90 % only for BCG .DPT is near about to meet the target and it stands 80%, measles is further lower just 75% till 2002. In Nepal vaccine preventable disease kills nearly 18% of children and 13% of them is by measles only⁵. The major burdens of disease are peri-natal conditions and infectious diseases in developing countries including Nepal. Among infectious diseases diarrhea, pneumonia and

measles are major killers. Measles, diphtheria, tetanus and Pertusis are major killers of children. In 1997 clusters of outbreak were reported throughout the country. Measles incidence was 40 cases per 100,000 in 1996 and 50 cases per lakh in 1997. Recently more cases are reported ⁶.The outbreaks are due to 85% vaccine efficacy and pockets of unreached children existing there. Incidence of vaccine preventable diseases in Nepal since 1980, only reported cases¹².

	1981	2000	1999	1998
Diphtheria	20	15	268	390
Measles	254	93	9397	10849
Neonatal tetanus	48	8	134	327
Pertusis	10	15	6021	5908
Tetanus	102	-	305	440

C. Global context

Globally measles alone kill almost 8,00,000 lives though availability of inexpensive and highly effective vaccine is there. Similarly 20,000 babies and 30,000mothers die from maternal and neonatal tetanus.

The unimmunised often contain high proportion of low or uneducated groups. Conventional method of health communication may not be effective in reaching them with immunization message. Globally around 20% of children remain unimmunized .It is estimated that every year as many as 3.7 million children mostly in African and Asian don't receive estimated dose of vaccine. Sub-saharan African countries have the lowest coverage in immunisation where only half % children are vaccinated .It is much more expensive in terms of efforts and resources to reach this last 20 .5 in term of resources and efforts. Global prevalence of major vaccine preventable diseases is tabulated here:

It seems that the vaccine preventable diseases in the world are significantly reduced after introduction of EPI program in 1980 but the problem is still persistent in African countries and Asia countries where EPI coverage is also lower¹³.

3.Literature Review

Though the immunization program has made significant progress over the years, vaccine preventable diseases still cause morbidity and child death. Major constraints in the immunization program have been identified -limited staff at the central level, inadequate refresher training, less release of funds, weak system for vaccine logistic and cold chain management, poor supervision, incomplete data and competing priorities like NIDs. Injection safety has been a major concern of the MOH lately. An assessment has been carried out recently with support from WHO and UNICEF. The MOH is committed to improve the routine immunization. National immunization Policy exists, providing a long -term vision and operational strategies to improve the e national immunization program. It takes into account recent development into immunization strategies and current limitation of the program. The revised strategy for immunization program has focussed on the following areas: increasing the accessibility for the services, improving the quality of the services, promoting safe injection practices etc.

3.1 National Immunization Coverage

The Demography and Health survey 2001¹⁴ mentions the coverage was 82.9% for BCG, 70.6% for DPT3, 63.6% for measles and 60.1% for all the children who were vaccinated by 12 months of age. Coverage for first dose of DPT was 83% but this drops to 77% for the second dose and further 71 %for the third dose. Another study “BCHIMES”¹⁵ found coverage of BCG-86.8%, DPT- 65.4%, Measles - 81.8% and overall- 54.5%. Urban rural coverage was 65 and 53

percent respectively. Children of Far- western and Mid-western Mountain receive less immunization than rest of country.

EPI coverage survey ³ found that percent of fully immunized children was-64.6, partially immunized children was 27.1 and not immunized at all was 8.3. Antigen wise coverage was -86% for BCG, 75.9% for DPT, 70.2% for OPV and 73.1% for measles. Overall of the target population, 91.7% have been vaccinated with at least one antigen but only 64.4 percent completed the recommended series of vaccination by the age of one. The dropout for DPT1 and DPT3 was 12.6%and between BCG and measles was 15.3%.

Nepal Family Health Survey 1996 ⁵ has mentioned that 73 % of children received the BCG vaccine by 12 months of age. Coverage for BCG is 76% and DPT/ Polio is 77%. Coverage declines after the first dose, as drop out rates are higher in Nepal. Coverage falls to 65% for the second and 51% for the third for DPT and polio. Only 57% of children were vaccinated against the measles. Overall 43% of children had all the recommended vaccination before their first birthday.

3.2 Socio-demographic characteristics

Demographic and health survey, EPI coverage survey and Nepal family health survey all show that there is low immunization on female child than male child. Research of **Nirupam S and et al** on sex bias in immunization coverage¹⁶ in an urban area of U.P. found gender disparity. Except for measles, significantly higher vaccination coverage was observed for male children as compared to females for every vaccine. pv study in a semi-urban village panchayat in Nepal by **Ahluwalia IB and et al.**¹⁷ found mean number of vaccinations for males was significantly greater than that for females. Male children were twice as likely to have received vaccines as females. Children born at a hospital were more likely than those born at home to have been vaccinated. More than 70% of the women felt that vaccinations were good preventive measures.

Next factor is education as most of the studies explored that illiterate is less likely to immunize their children compared to literate. A study of **Brugha RF and et al¹⁸** about role of fathers in immunization shows father's education positively associated with immunization.. Another cross sectional study was done by **Dhadwal D and et al.¹⁹** in Shimla accepted that increasing maternal education was associated with complete immunisation. **Kamau N, Esamai FO²⁰** also prescribed significant association of education with immunization. However study of **Waldhoer T and et al²¹** from University of Vienna didn't found any significant role of education on immunization. **Roden j²²** studied on child immunisation levels in Sydney mentions that most significant factors associated with partial immunisation were found to be the socioeconomic and educational status of the children's fathers and itinerancy. EPI vaccination in Nepal by **Jha N and et al²³** shows that there is positive relationship between immunization coverage and educational level of the respondents Study of **Waldhoer T and et al²¹**, found children of Austrian mothers have the best immunization coverage, followed by children whose mothers are from 'other countries', 'not stated', and 'former Yugoslavia'. The immunization rate increases with the mother's increasing age. It is lower if the father is unemployed. Parents of partially immunised children were significantly more likely than parents of totally immunised children to consider that serious side-effects to immunisation do occur.

Ram B Jain and his friend ²⁴ revealed that income and race were not statistically significantly associated with under-immunization. Order of birth, mother's age, and availability of shot card were associated with under-immunization in both urban and non-urban areas. Inter-state mobility was associated with increased under-immunization rates in urban areas but not in non-urban areas. Mother's education, marital status, number and type of providers were associated with under-immunization in non-urban areas.

3.3 Knowledge/Attitude and immunization

Study by **Kamau N, Esamai FO**²⁰ also explored the attitude on immunisation was positive (74.4%). **Wilson T**²⁵ studied in rural USA that knowledge of communicable diseases and vaccines, misperceptions about communicable diseases and vaccines, past experiences were also significant factors for immunization status. **Bosu WK, and et al**²⁶ investigated major factors hindering attendance were poor knowledge about immunization. The research of **Gedlu E, Tesemma T.** determines the extent and nature of immunization of children and mothers in rural Ethiopia. 91.7% believed that immunization prevented disease. 3.9% believed that immunization cured disease. 3.4% believed that immunization made symptoms milder. Many knew that vaccines prevented measles and pertussis²⁷. Another research Pondicherry, India found mothers had a fair knowledge regarding need for immunization but poor knowledge regarding the diseases prevented and doses of the vaccines²⁸. Mothers expressed favorable attitudes and satisfaction regarding the program in a study in Rajasthan, India. Though many were aware of the importance of vaccination in general, specific information about importance of completing the schedule and knowledge about vaccine preventable diseases other than poliomyelitis was very limited²⁹. **Bukenya GB, Freeman PA** found 87% did not know why children should be immunized. Moreover only 13% believed immunizations could prevent disease. Further 86.6% could not list any of the diseases that immunizations target. 11.9% did correctly report measles, tuberculosis, polio, and pertussis. On the other hand, 3 (1.5%) mothers incorrectly believed immunizations protect against malaria, diarrhea, and malnutrition. However the relationship between lack of knowledge and no completion of immunization was not significant³⁰.

3.4 Influence of Health care providers on immunization

Bukenya GB, Freeman PA³⁰ found staff attitude significantly associated with non-completion of immunization on their study in an urban settlement of

Papua New Guinea. 76.8% reported very rude behavior on the part of the health staff. 15.5% went so far to say that the health staff often reacted aggressively towards them. Only 7.7% reported kind of behavior. Mothers who perceived health staff attitudes as negative tended not to return to the clinic with their children for the 3rd dose. Emphasis in the national immunization program should be on changing health staff attitudes leading to improvements in the social interaction between patients and health staff.

Wilson T detected two findings unique to his study -the importance of relationships with health care providers and the challenge of competing tasks. These findings, combined with the other factors identified, reinforced the importance of rural health care providers' maintaining a strong relationship with clients, providing accurate and timely information, and ensuring a readily accessible health care system. **Bosu WK, and et al**²⁶ found the major factors hindering attendance were poor knowledge about immunization, lack of suitable venues and furniture at outreach clinics, financial difficulties, long waiting times, transport difficulties, poorly motivated service providers and weak intersectoral collaboration.

The research of **Gedlu E, Tesemma T.**²⁷ included lack of knowledge, unawareness of the need for second and third doses and measles protection, and a belief that disease is better than immunization. Other common reasons were social problems and lack of time.

3.5 Side/Adverse effect of immunization

Research by **Singh MC**²⁸ in Pondicherry, India mothers had commonest side reactions reported were fever (36%) and pain at injection site (33%). Contraindications listed by mothers were mild cold (41%), mild fever (24%) or loose stools (14%). Health workers were the major source of information and 76% knew the use and maintenance of immunization cards.

Study by **Manjunath U, PareekRP²⁹** displayed obstacles, misconceptions/beliefs among the mothers of partially immunized children and lack of information among not at all immunized group were the main reasons of non-immunization.

3.6 Service factor and immunization status

Quality health care is a care that is needed and delivered in a manner that is competent caring, cost effective and timely and minimize risk and achieves achievable benefits. Service factors seems to have great influence in any service utilization by the target population. The quality service should focus on maximum benefit, reduced adverse effect, timely service, standard maintenance, injection safety, and affordable and accessible and efficient service. Similarly punctuality of staff and continuity of service with increased community participation in clinic management should be focused to maintain quality of service. Proper Immunization clinic should be safe, clean with sufficient space and arrangement for instrument. Counseling is also vital part for quality service.³¹

Research by **Page D, Meires J, Dailey A.** investigated that semiannual auditing or tracking system are significant in increasing immunization coverage. This was followed by availability of discounted immunizations and the use of an immunization tracking system. Factors that were not found to contribute included clinic type and the remaining 15 practice standards³². **Bosu WK and et al** study found the main factors motivating mothers to attend were the perceived benefits of immunization for disease prevention, its impact on socioeconomic development, the relatively low cost of disease prevention, and the need for vaccination cards for school entry. The major factors hindering attendance were poor knowledge about immunization, lack of suitable venues and furniture at outreach clinics, financial difficulties, long waiting times, transportation problems, poorly motivated service providers, and weak intersectoral collaboration. The timing of immunization sessions, length of advance notice to

the community, attitude of service providers, and fear of side effects generally did not deter attendance.

3.7 Reason for non immunization

EPI coverage survey reveals that revealed that 47.7% of them dropped out due to lack of services, 32.2% due to lack of information, 6.5% due to lack of motivation. Research of **Gedlu E, Tesemma T.** found 22.8% various obstacles such as child sickness and health institution related problems. A population-based study of **Ardythe L. and et al**³³ detected commonly reported problem was clinic waiting time (12%). The second most common problem was difficulty obtaining a timely appointment (10%). Some of the other problems reported were taking time away from work, office hours, cost, and transportation, with the frequency varying by type of usual provider. Household risk factors included teenage mother, African-American ethnicity, and not finding the child's immunization record at home. Research in North India³⁴ found major reasons for non-immunization of the children were: migration to a native village (26.4%); domestic problems (9.6%); the immunization center was located too far from their home (9.6%); and the child was unwell when the vaccination was due (9%). Twelve per cent of mothers could not give any reason for non-immunization. The lack of awareness and fear of side effects constituted a small minority of reasons for non-immunization. A study by **Coetzee N,**³⁵ and friends explored three factors had a significant association with incomplete measles vaccination: less than 6 months' residence in the area, having been born outside Cape Town, and home delivery. The mothers' level of education and children's age was not associated with measles vaccination status.

3.8 Card retention rate and recall bias

Ramakrishnan and et al³⁶ mention less than 50% of mothers has immunization cards with them and more than 70% of the cards did not have complete information. The sensitivity of the recall method was 41.3% and the specificity

was 79.5% when the complete immunization status was considered. Mother's age emerged out as a significant determinant in the agreement of two methods. Maintenance of immunization cards was very poor. They concluded of obtaining immunization status through recall survey is not sensitive.

4.Rationale / Justification

Humla is the distinct with lowest EPI coverage in Nepal. Frequent outbreak of measles is reported in the district. This research will provide information that could be utilized by local managers and health authorities. It can help local and district health personnel to make improvement in immunization status. It has identified the factor for low coverage and will help ultimately to take appropriate measure to reduce the gap. Ultimately this study will help government program to run successfully and achieve the objective of tenth five-year plan.

5.Research Objectives

1.General Objective

To identify reasons for lower utilization of immunization services in Humla district and estimate current EPI coverage in the study area.

2.Specific Objective

- To estimate current EPI coverage in the study area.
- To To identify relationship of socio-demographic characteristics with vaccine utilization.
- To assess knowledge of mothers about EPI shedule, benefit of immunization and clinic.
- To assess quality of care and its relation with service utilization (accessible and available).

3. Research Questions

- What is the immunisation coverage of each antigen?
- What is relation of socio-demographic characteristics with immunization utilization?
- What is knowledge of mothers about immunization shedule, its benefit and clinic date.
- What is the quality of care of EPI service?
- What are the reasons for non-utilization of immunization services?

6. Research Design and Methodology

6.1 Study Types

It is a cross-sectional, descriptive, quantitative study based on non-experimental design.

6.2 Study Variables

1. Dependent variable

Utilization of Immunization Service

2. Independent Variables:

a. Socio-demographic characteristics

(age of mother ,education of mother and father, occupation of father, sex of child)

b. Knowledge.

About EPI schedule, benefit of immunization, EPI clinic

c. Quality of care,

(Service regularity, distance of service, clinic management and health worker performance)

6.3 Operational definition:

Non-utilization of immunization service: Not received any dose of vaccine.

Partial utilization of immunization service: It is taking of at least one of these antigens-BCG, DPT, Measles, Polio, by the children of respondent mother before 12 month is completed.

Fully immunized: Children who has received one dose of BCG, three dose of DPT, three dose of Polio and one dose of Measles before first birthday.

Socio-demographic characteristics:

Age of mother: completed years by the mother of study child.

Ethnicity: ethnic group in which child belongs. He/ she may belong to Brhamin, Chhetri, Thakuri, Thapale, Lama or Schedule group.

Sex of child: Male or female characteristics of child

Educational status: It may be illiterate –any respondent who cannot read and write or literate –any respondent who can at least read and write.

Occupation: Agriculture, business, job or any other activities where parent of study child is engaged for livelihood.

Knowledge;

Knowledge on immunization in general – respondent mentions that he has listened about immunization and how many times to immunize child in total.

Knowledge on immunization schedule-respondent can mention all type of vaccine under EPI and proper age for each vaccine Knowledge will be assessed with these questions

1. Do you know BCG vaccine?
2. Do you know DPT vaccine?
3. Do you know measles vaccine?
4. What is age for BCG?
5. What is age for DPT?
6. What is age for Measles

Good knowledge-can exactly mention more than four questions.

Poor knowledge –can exactly mention 1-4 question

No knowledge – can't mention any question exactly

Knowledge on benefit of immunization: Respondent can mention name of diseases prevented from each vaccine.

Knowledge on date, time and place of immunization- respondent can mention date, time and place of immunization where EPI clinic is running regularly.

Quality of care

It includes quality of care for immunization service perceived by respondent on the following aspect:

Availability of immunization service: it is assessed in term of clinic punctuality – clinics runs every month at fixed date (regular available), clinic runs in one or two month but date not fixed (irregularly available), clinic runs in gap of more than two month (very irregular) and clinic never runs.

Clinic management – clinic site fixed with basic structures,(clinic site) mothers are informed date/time of immunization or any change on it before at least one day (timely information) and timing of running clinic is favorable for maximum of people (time convenience).

Health worker performance: three aspects of health worker- behavior and counseling for immunization perceived by community as good, medium or poor.

Accessibility: Availability of EPI clinic and health institution in the community

Good access - distance of health institution and clinic within or less than one hour of walking from respondent's household.

Poor access - distance of HI/ clinic more than one hour of walking from respondent's household

Effect of immunization: it is effect seen or perceived on child after immunization other than long-term health benefit. It may be side effect commonly seen in child or adverse effect, which should not appear commonly.

6.4 Study Site

The study site was based on 4 VDCs of Humla district -Dandafaya, Hepka, Khangalgaun and Muchu, which have lower coverage of immunization. The district Humla was selected as the immunization coverage of the district is very low as compared to the national average and lowest among all the district of Nepal.

6.5 Study Population

The target population of the study:

- Children of age 12 month to 23 month.
- Respondent will be their mothers or if absent their main care- taker or chief of household.

6.6 Sample size

Due to small population in the study VDCs (1000 to1500) hence small number of child it was not possible to get large sample. Number of 13-24 month children was just 4-6 per ward. It seems not more than 100 children in my clusters that include 19 wards. However as all were not present at the time of interview, only 81 children were interviewed.

6.7 Sampling Frame and Sampling Process

- a. Population from the list of VHW.
- b. Unit of analysis children below 2 years and above one year.
- c. First out of 27 VDCs of Humla district, four above mentioned VDCs with lower EPI coverage were selected purposively.
- d. Than four VDCs were divided into 18 clusters, one cluster for each village, and 8 clusters were selected randomly.

6.8 Tools and Techniques for Data Collection

Data needed for the study were collected basically from different sources. To meet the research objective both quantitative as well as qualitative information were needed. For both the data following instrument was designed:

- Structured and semi structured questionnaire for mother or caretaker were developed.
- Secondary data was also analyzed from DHO for the collection of information regarding coverage of vaccine, no of clinic run, etc.

6.9 Validity and Reliability of the Research

- Pre-testing and appropriate modification of questionnaires.
- Orientation to the enumerator prior to the data collection.
- Questionnaire was asked in local languages.
- Enumerators were chosen from same community and with health background.
- Appropriate supervision by researcher was done. Guidance and supervision from research guide.
- Editing of data on the same day was done.

6.10 Data Management

- Data were edited each day at evening.
- Coding was done for computer purpose.
- Entry and Analysis was done SPSS version 10 in computer for percentage calculation and chi-square test.

6.11 Data Analysis

- Data entry, processing and analysis was done in SPSS statistical software.
- Descriptive analysis was done by frequency, percentage, chi-square test and odds ratio.

6.12 Outcome of the Research

The research identified the associated factor for low immunization service utilization in the study area and has estimated the current EPI coverage.

6.13 Dissemination of Research Results

The research result will be expressed in research report and one-one copy will be provided to related institution and authorities DPHO, RHSD, DHS, etc. Findings will be published in local and regional news papers.

6.14 Ethical Consideration

Ethical Issues:

- Written and verbal consent was taken from concerned local authorities.
- Respondents were explained the purpose and objective of the study in clear and understandable term.
- Verbal consent was taken before introducing questionnaire.
- Confidentiality was maintained if necessary.

7.FINDINGS

Data were collected from 81 Household in four VDC of Humla district. The VDCs were purposively selected because these VDCs have the lower coverage in Humla .The respondent were mother of children born between 058-03-30 and 059-03-30.Children of these age group were exposed to the EPI clinic run 058-04-01 to 060-03-30 that is fiscal year 058/059 and 059/060 to be immunized during first year of life. It was managed that only mothers should be

included as respondent because other member can't remember detail of immunization. That is why 93% of respondent were a mother however remaining were close relatives.

7.1 Socio-demographic characteristics of respondent

On the basis of ethnicity, only two categories of caste were involved in interview as the clusters selected contains main bulk of these caste though some number of schedule caste are also present in the area. The percent of Thakuri and Lama is 29.6 and 70.4 respectively.

Table1: Socio-demographic characteristics of respondents

Characteristics		Number	Percentage
Ethnicity	Thakuri	24	29.6
	Lama	57	70.4
Total		81	100
Sex of child	Male	51	63
	Female	30	37
Total		81	100
Education of father	Illiterate	63	77.8
	Literate	18	22.2
Total		81	100
Education of mother	Illiterate	72	88.9
	Literate	9	11.1
Total		81	100
Occupation	Farm	70	86.4
	Other	11	13.6
Total		81	100

Although my plan was to categorize educational status on the basis of illiterate, primary, secondary and above, I must merge it into only two categories illiterate and literate due to small number of literate people in the community. The number of illiterate and literate fathers is 63 (77.8%) and 18 (22.2%) respectively. The number of illiterate mother is 72 and literate 9 that is 88.9% and 11.1 % respectively. Number of study child were 51(63%) male while 30 ((37%) were female.

By occupation, almost all respondents 86% (n-70) are involved in agriculture and only a few14%(n-11) is engaged in business and job as the

community itself has the population of same structure. So variable occupation is labeled as farmer and others only

7.2 Card retention rate

Immunization card is important to immunized children for various reasons. It is found in study that card retention rate is non-existence (zero) in the study area. According to response of respondent, health workers do not distribute cards. Some of them have receipt card of NID only. It may have affected my study either by recall bias or false response. National immunization coverage survey 1998 found card retention rate 12.4% of family for Terai, 21.4% for Hill/Mountains and overall national rate 17.2% .DHS 2001 has 16% rate.

7.3 Immunization status

A child is considered fully immunized if s/he receives one dose of BCG, 3 doses of DPT, 3 doses of OPV and one dose of measles before the first birthday. According to sample size, total 81 mothers were interviewed in four VDCs of study area. Immunization status is found that 43.2 % are completely immunized, 40.7 % have received one or more than one vaccine however they have not completed all the five vaccine. Remaining 16% have never vaccinated their children. NID coverage seems very good as 102% have received polio in National Immunization Days.

Table 2: Immunization status

Immunization status	Number	Percent
Fully immunized	35	43.20
Partially immunized	33	40.74
Not immunized	13	16.05
Total	81	100

7.4 Immunization status by type of vaccine

It is found that coverage for BCG is 82%, which is somehow satisfactory however gap exists between target and study area coverage. Measles coverage is nearly 60%, which is very low as compared to national average however it is better than DPT3 as people are aware and cautious due to frequent outbreak of measles. Coverage for each antigen is as follows-

Table 3: Immunization status by vaccine

Vaccine	Number	Percent
BCG	67	82.71
DPT1	60	74.07
DPT2	50	61.73
DPT3	39	48.15
Polio 1	60	74.07
Polio2	50	61.73
Polio3	39	48.15
Measles	48	59.26

7.5 Dropout Rate

Both BCG vs Measles dropout and DPT1 vs DPT3 dropout seem high as compared to national average. The percent of BCG vs measles dropout is 28.36 where as percent of DPT1 vs DPT3 dropout is 35.

Table 4: BCG-Measles and DPT1-DPT3Drop-out rate

Indicator	Number	Percentage
BCG-Measles	19 (67-48)	28.36
DPT1-DPT3	21 (60-39)	35.0

7.6 Immunization status by socio-demographic characteristics

Ethnicity

The percent of immunized is 50.0 and 40.4 for Thakuri and Lama respectively. The percent of partially or not-immunized children is 50.0 and 59.5 respectively in Thakuri and Lama. The prevalence of full-immunized children is greater among Thakuri than Lama. Thakuri are 1.48 times more likely to be fully immunized than Lama children (OR 1.48, CI 0.51-4.30).

Education of father

Although my plan was to categorize educational status on the basis of illiterate, primary, secondary and above, I must merge it into only two categories illiterate and literate due to small number of literate people in the community. The number of illiterate and literate fathers was 63 and 18 respectively. Percentage of immunized children is 46.0 and 33.3 where as partial or non-immunized percent is 54.0 and 66.7 respectively.

Table 5: Immunization status by socio-demographic characteristics (n=81)

Socio-demographic characteristics	Full immunized % (n=35)	Partial or not immunized % (n=46)	Odds ratio (confidence interval)
Ethnicity			
Thakuri(n=24)	50.0	50.0	0.68
Lama (n=57)	40.4	59.5	(0.23-1.96)

Father's education			
Illiterate (n=63)	46.0	54.0	-
Literate (n=18)	33.3	66.7	
Mother's education			
Illiterate (n=72)	43.1	57.9	1.06
Literate (n=9)	44.4	55.6	(0.19-5.37)
Occupation			
Farm (n=70)	43.1	56.9	-
Others (n=11)	36.4	63.6	
Sex of child			
Male (51)	35.0	65.0	2.40
Female (30)	56.7	43.3	(0.87-6.71)
Total	43.21	56.8	100

Education of mother

The number of illiterate mother is 72 and literate 9 respectively. Immunized children among illiterate mothers are 43.1% and literate mothers are 44.4% where as partially or not immunized children are 57.9 and 55.6% among illiterate and literate mothers respectively. Although there is higher percent of immunized child among literate, that is not significant. (OR 1.06 and CI 0.19-5.3)

Sex of child

Number of study children were 51(63%) male while 30 ((37%) were female. Male children are 35.0% completely immunized and 65.0% partially or not immunized. Similarly female children are 56.7% completely immunized and 43.3% partially or not immunized. Here completely immunized percentage is higher among female child than male child. Female child are 2.40 times more likely to be immunized than male child (OR 2.40 and CI 0.87-6.71).

Occupation of father

Almost all respondents 86% (n-70) are involved in agriculture and only a few 14%(n-11) is engaged in business and job as the community itself has the population of same structure. So variable occupation is labeled as farmer and others only. Children of farmers are 43.1% completely immunized and 56.9 % partially or not immunized. Children of other occupational categories are 36.4% completely immunized, 63.6% partially or not immunized. So status seems better among farmers than other categories but it may be due to small number in other categories.

7.7 Immunization status by Knowledge of Respondent

Another variable assessed in the research is knowledge. Knowledge is found somehow common among most of the respondent. Knowledge in general, knowledge of EPI schedule, knowledge on benefit of immunization and knowledge on date and time of immunization clinic were assessed.

Knowledge in general

In general almost all know about immunization program and their child should be vaccinated.

Knowledge on benefit of immunization

Knowledge on benefit of immunization is something else than what should be. Entire respondent say that immunization prevents from all diseases. Due to this concept they have good motivation toward immunization.

Knowledge on date/time of immunization

No any respondent can mention exact date of immunization clinic, as there is no fixed date for it. It is up to health worker who conducts clinic (specially VHW).

Knowledge on specific immunization

Specific knowledge about every antigen and proper age for each antigen is virtually non-existence. About 92.52%(n=72) have no knowledge on specific antigen however 7.41% (n=6) have some knowledge (incomplete knowledge) on it. No any respondent have good knowledge on specific immunization. Generally mothers and caretakers should have knowledge on specific antigen, proper age for each vaccine and disease it prevents.

Table 6: Immunization status by knowledge of respondent on specific vaccine (n=81)

Knowledge	Full immunized % (n=35)	Partially or not immunized % (n=46)	χ^2 and p-value
No (n=75)	42.7	7.3	0.01
Poor (n=6)	50.0	50.0	>0.05
Total	43.2	56.8	(0.936)

Proportion of fully immunized children is slightly greater among respondent who have some knowledge on specific vaccine than those of no knowledge at all. However there is no association between knowledge and immunization status.

7.8 Immunization status and Quality of care

Basic things for quality immunization service are -accessible, available, fixed date / time for clinic and punctual running of clinic. Similarly continuity of service, community participation and meeting national standard of service are also its component. To maintain quality of service we should focus on:

- Management of immunization clinic.

- Safe and effective immunization.
- Counseling, information and education to guardians.
- Needle safety.

However it was not possible for me to investigate these all aspects. That's why only following aspects of quality of care were included in the study

A. Immunization status by clinic management

In this part of the study three aspects were investigated in the research- situation of immunization clinic site, Clinic regularity timely information of immunization date and convenience of immunization time. All these aspects of management are expressed here in terms of respondent's perception.

Place of immunization clinic:

The entire respondent in the study area say that no any site is fixed and immunization is run everywhere. Most commonplace for immunization is terrace, open place or roof. (*Thada or Pand* in local language) as 98% (79 out of 81) respondent said it. Remaining 2% are not sure on it because they had not immunized their children.

Table 7: Immunization status by management of immunization clinic (n=81)

Clinic management	Fully Immunized % (n=35)	Partial or not Immunized % (n=46)	Odd ratio (Confidence Interval)
Clinic regularity			
Regular (n=14)	78.6	21.4	6.57
Irregular (n=67)	35.8	64.2	(1.50-39.28)
Timely information			
Yes (n=21)	76.2	23.8	6.91
No (n=60)	31.7	68.3	(1.99-27.08)
Time convenience			
Yes (n=62)	47.7	52.3	3.29
No (n=19)	28.6	71.4	(0.87-15.27)
Total	43.2	56.8	

Clinic punctuality

HMG ministry of health is committed to deliver immunization service at the village level in a regular basis. Almost in every VDC of Nepal, 3-5 EPI clinics per month should be running for this purpose. In Humla district too, it is tried to manage it but punctuality of staff is very questionable.

In aggregate 14 (17.54%) of respondent said clinics run almost regular, 41(53 %) of respondent said that gap between two clinics is more than one month (once in two/three month ” *dui tin mahinama*”) and nearly 26(30%) said clinics run very irregularly (only sometimes ”*kahile kanhi maatra*”). However no one said clinics never run. Fully immunized children are 78.6% among regular and 35.8% among irregular. On the other hand partially or not immunized are 21.4% and 64.2% respectively for regular and irregular. It seems that clinic regularity is significantly associated with immunization status. Children where clinic run regularly, are 6.57 times more likely to be completely immunized than that of clinic running irregularly.(OR 6.57 and CI1.50-39.28).

Timely information:

Generally the date of immunization clinic is not informed in time, health worker run clinics on their favorable time/date and inform about it in the same day after reaching in the village. Total of 21(22%) respondents get information on time and remaining 60(88%) didn't get timely information. Among respondents who get information on time, 76.2% have immunized their children against 31.7 % who didn't get it. Where as partially or non-immunized children are 23.8% and 68.3% respectively among informed and non-informed respondent respectively. Timely information is significantly associated with immunization status. Timely informed children are 6.91 times more likely to be immunized than not informed. (OR 6.91and CI 1.99-27.08)

Time convenience:

One positive aspect is that majority of community people feel that time of immunization (generally 10.00am) is convenient. However among people who feel time is convenient are 3.29 times more likely to complete vaccination of their children than those of not feeling time convenient (OR 3.29 and CI 0.87-15.27)

B. Immunization status by Health worker performance

Another aspect assessed in study is health worker performance. In this topics three aspect of health worker performance –behavior and counseling after immunization perceived by respondent are assessed in terms of good, medium and poor.

Study found that both behavior and counseling are either good or medium but not poor.

Behavior

Respondents were requested to grade health personnel's behavior with them during immunization activities. Majority of them perceived behavior medium (82.35 %) and 16.18% perceived good. Percent of respondent to perceive poor

behavior is very minimum (1.47). Among respondent who feel behavior medium, proportion of fully immunized children is lesser than those who feel medium. That is it has no role on deciding whether to immunize or not their children. There is no any association between behavior and immunization status ($p=0.15$)

Table 8: Immunization status by health worker performance (n=68)

Health worker performance	Full Immunized % (n=35)	Partial or Not immunized % (n=46)	χ^2 and p-value
Behavior			
Good (n=11)	27.3	72.7	2.03 0.15(>.05)
Medium (n=57)	56.1	43.9	
Counseling			
Good (n=60)	48.3	51.7	.08 0.297(>.05)
Medium (n=8)	75.0	25.0	
Total	43.2	56.8	

Counseling

Respondents were requested to grade counseling of health worker about activities to be followed after immunization into good, medium or poor. Around 88% of them found counseling is good whereas only 11.76% found it medium. There was no one to say counseling is poor. However it seems that they counsel just on activities to manage immunization effect not on overall immunization because community has poor knowledge on immunization. Although percent of fully immunized children is higher among respondent who perceive medium than those who perceive good (75% vs 48.3%) there is no any association ($p=0.297$).

7.10 Immunization status by distance of health institution or immunization clinic

Distance is one of major factor affecting for utilization of every health services.

Two factors were assessed;

- Distance of health institution from respondent's permanent household
- Distance of immunization outreach clinic from respondent's permanent household.

Distance of health institution

Table 9: Immunization status by distance of health institution or immunization clinic from respondent's permanent residence (n=68):

Distance from permanent residence of respondent to	Full Immunized % (n=35)	Partially or not immunized % (n=33)	Odds ratio (confidence interval)
Health institute			
< 1hr (n=41)	61.0	39.0	4.69 (1.64-13.69)
>1 hr (n=40)	25.0	75.0	
Immunization clinic			
Less than 1hr. (n=74)	44.6	55.4	2.01 (0.30-22.23)
More than 1 hr. (n=7)	28.6	71.4	
Total	43.2	56.8	

Regarding distance of distance of health institution, nearly half of respondent are within one hour of walking distance from health institution. Proportion of fully immunized children is very high (61%) among these people as compared to those of access more than one hour (25%). People who have access of health institution within one hour of walking distance are 4.69 times more likely to fully immunize their children than those of having access more than one hour (OR 4.69 and CI 1.64-13.69).

For EPI clinics more than 90% respondent have access within one hour of distance (two ways). Therefore community has good access to EPI clinic. This is due to outreach clinics in village level. However people having access of EPI clinic within one hour are twice likely to complete immunization a compared to those of access more than one hour (OR 2.01 and CI 0.30-22.23).

Impact of seasonal migration on accessibility;

Although EPI clinics are accessible to their permanent residence these become inaccessible during four month (June to August) as they migrate to temporary residence in high altitude. These residences are at the distance of more than two hour (one way) albeit these are in the same VDC. Especially mother of newborn migrate there due to the concept that sun (high temperature) affects newborns.

7.11 Immunization status by perceived adverse effect following immunization (AEFI)

Perceived side effect following immunization was also assessed for the child who is immunized at least once. It is to be remembered that side effect are expected and normal after any immunization. Adverse effect is severe form of side effect, which normally should not appear if immunization is safe. It seems in this study that 47% among total who immunized at least once say that their child suffered from severe pain or abscess or high fever for few days to many days. Some of them even say that it remained for months. (*Barkha Bhari Jaro Aayo/ Dukhyo*)

Mothers who perceive severe adverse effect after immunization are 3.82 times more likely to stop immunization than those of perceiving normal effect of immunization (OR 3.82 and CI 1.25-11.94).

Table 10. Adverse effect following immunization perceived by mothers (n=68)

Perceived adverse effect	Fully Immunized % (n=35)	Partially Immunized % (n=33)	Odds ratio (Confidence interval)
Normal (n=36)	66.7	33.3	3.82 (1.25-11.94)
Severe (n=32)	34.4	65.6	
Total	51.5	48.5	

7.12 Perceived reasons for drop out from immunization

Respondent perceive that main reason for drop out is the seasonal migration (54.54%) within the native village. Second perceived reason is fear of pain and fever that constitutes nearly 21%. Subsequent perceived reasons are date and time not known (12.12%); work busy (6.06%). Other reasons for non-immunization are work migration outside district, belief on local Devta etc (6.33%).

Table: 11 Reason for dropout perceived by respondent

Perceived Reason	Number	Percent
Seasonal migration	18	54.54
Fear of pain/fever	7	21.21
Date & time not known	4	12.12
Work busy	2	6.06
Others	2	6.33
Total	33	100

7.13 Perceived reasons for non-immunization

Respondent perceive that main reason for drop out is the seasonal migration (53.84%) within the native village. Second perceived reason is fear of pain and fever that constitutes nearly 23.08%. Seasonal migration is the third reason (15.38%) followed by work busy 7.69%.

Table12: reason for non-immunization perceived by respondent

Perceived Reason	Number	Percent
Fear of pain/ fever	7	53.84
Date and time not known	3	23.08
Seasonal migration	2	15.38
Work busy	1	7.69
Total	13	100

No any special rumor against immunization

In many communities there is special rumor attached with immunization, vaccine or other health programs. However in my study area of Humla District, there is no any specific humor attached with vaccine or immunization that affects immunization program significantly.

8.Discussion

Immunization is one of the priority programs of HNG ministry of health. Immunization is started in Nepal since 1979 and was launched in all district since 1985. In 1990 national coverage was around 80 %. But in this remote district it never met the target. It can be seen from Annual report that rate is very low for many years.

EPI coverage of the district is lowest in the country till this year. In the district, District Health Office and UNICE are trying best to raise the coverage. In this effort micro planning has been done in July 2001. Similarly auto disposable syringe have been supplied from one year. Regular training has been provided to village health workers. Performance has been increased but many things are still to be done.

8.1 Card retention rate:

The first concern revealed in this study is that card retention rate of study area is virtually non-existence. Whenever mothers were asked to show immunization card, most of them responded that they were not provided it. Some of mothers show receipt card of NID. So it can be concluded that card retention rate is non-existence. Immunization program guideline of HMG, MOH mentions that card should be provided for every child, as it is proof of immunization. Card should be provided and encouraged to keep safe for three reasons

- To be admitted in educational institution,
- To travel outside country,
- To show proof if required for any provision.

In addition, having no card in the hand of respondent may have affected my study as they could have lied due to fear of immunization or there may be bias in recall.

The reason behind non-retention of immunization card is that they are not provided it. It seems that health authorities are not so much concerned with card as it's supply and distribution is not effective. It may be that they underscore importance of card.

8.2 Immunization status

Immunization status in the study area is good as compared to district average of same period. However it is very low if compared with national average and MOH target. National average for immunization coverage of that fiscal year is BCG-94%, DPT3-80.3% and measles 75.6%(annual report of MOH). This study finds BCG coverage 83%, Measles vaccine coverage 60%, DPT1 74%, DPT2 61% and DPT3-48%. It seems that initially people are motivated to immunize their children but the trend falls heavily till DPT3. Measles coverage is good than DPT3. It can be due to lack of proper mechanism to retain this motivation and immunization trend and strengthening quality of care is needed for this. However motivation toward measles vaccine is again increased which is due to two reasons- single dose and frequent outbreak of measles in the community. DPT is most badly affected vaccine in the community as there is very high drop out of DPT1-DPT3. Seasonal migration, long gap between two clinics or adverse effect all have direct impact on DPT due to its three-dose vaccine as they can miss any of three doses. Next implication of high DPT1-DPT3 dropout is that this trend can hamper introducing HBV vaccine, which is scheduled to be started soon.

8.3 Socio demographic factors

This research tried to find association of immunization status with socio-demographic characteristics. However only five socio-demographic variables were selected for study- Ethnicity, sex of child, education of father and mother, occupation of father. Economic status and number of family were excluded from the study considering sensitive situation in the field.

Ethnicity

Regarding caste the study area was habitant of two major castes Thakuri and Lama though few number of Dalit was also present. Unfortunately selected cluster didn't include Dalits. Completely immunized children among Thakuri are 50% against Lama children 40.4%. This may be due to lower proportion of seasonal migration among Thakuri population. Study of Ram B Jain and et al in urban and nonurban area found no association among race and immunization.

Sex of child

Another factor assessed is sex of child. Immunized children among male are 35.0% against 56.7% for female child where as non-immunized or partial immunized children are 65% and 43.3% respectively. This seems contradictory to most of the literature that show higher coverage among male. Study of Ahluwalia and et al, Nirupam S and et al found significant higher coverage among male. Therefore contractory finding in this study may be due to no gender discrimination among Lama community. Smaller size of female children in the sample may also have influence in the study.

8.4 Knowledge on immunization

All of the community people have listened about immunization and they have motivation that immunization is good thing. However that much of the people don't have specific knowledge on specific antigen and proper age for immunization. Generally care taker or mother should have following knowledge (must know) about immunization (as per national immunization program guideline of MOH)-

- Immunization schedule, date, place and time of clinic.
- Specific vaccine and disease it can prevent.
- Why children are immunized.
- Probable side effect and its management.

This study finds that 92% respondents don't have knowledge on EPI schedule at all but 7 % have some knowledge on it. No one has complete knowledge so we can conclude that they have not got necessary knowledge. What they have is cumulative knowledge from all sources for many years. It may be that no one has tried to do focus group discussion, counseling or other special technique to provide knowledge to the mothers. However knowledge is not significantly associated with immunization status (P value 0.936). Most of the literature show knowledge associated with immunization but not all. Bruga RF and et al, Dhadwal D and et al, Jha N and et al have found association in their study. In this study, it may due to very small proportion of the literate people in the sample and study area as well that no association was found.

8.5 Quality of care

“The quality of technical care consists in the application medical science and technology in a way that maximizes its benefits to health without correspondingly increase its risks. The degree of quality care is therefore, the extent to which the care provided is expected to achieve the most favorable balance of risk and benefits.” - **Dr. Avedis Donabedia,1980.**

“Proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question and that have the ability to produce an impact on mortality, disability and malnutrition.”-**Roemer and Aguilar, 1998**

These are some definitions of quality of care. Similarly quality of immunization service includes accessibility, availability, punctuality and so on. According to national guideline for immunization program basic things for qualitative immunization service are-accessibility of immunization service, timely service, effective service, achieves the need of community, should be in need of community and meets national standards, service should be punctual, community

participation in planning, implementation and monitoring. In this study only following aspect is assessed regarding quality of care considering the feasibility-

- Clinic management- place managed, timely information and time convenience.
- Service availability –in term of clinic regularity.
- Health worker performance –behavior and counseling.
- Prevalence of adverse effect.

A. Clinic management factor

This study investigated three aspect of clinic management- place managed, clinic regularity, timely information and time convenience. When place for immunization was asked in the study, entire respondent (100%) say that it is just terrace (Thada) or Pand or corridor. This place doesn't meet criteria of proper place for immunization as mentioned in national guideline. However it is not only the case of Humla as per my personal experience this exists in most part of our country. Study of Bosu WK and et al found lack of suitable venues and furniture at outreach clinics was one of major factors hindering clinic attendance.

Next question was about timely information of clinic that is information before two or three days. Timely informed people are nearly 7 times more likely to be immunized than not informed people (OR6.91, CI1.99 to27.08). EPI coverage survey 1998 found that 32.8% dropped out due to lack of information. However study of Bosu WK and et al found length of advance notice didn't deter attendance. In the study area, information on clinic is disseminated when clinic is to be started in the village in the same day. This exists in distant lying villages or outreach clinics. However majority of respondent say that time for clinic is convenience for them. Clinic generally starts in office time.

B. Service availability factor

To provide immunization service to the maximum number of people at their doorstep, MOH has managed outreach clinics to be run regularly every month. Village health workers are deployed especially for that purpose. They are supported by FCHV in every ward. This study tried to explore availability of immunization service in the community. This was assessed in term of perceived regularity of immunization clinics. In the study area also 3 to 5 clinics are scheduled per VDC however punctuality is not satisfactory. In the clusters where clinic run regularly, people are 6.5 times more likely to immunize their children (OR 6.57, CI 1.50-39.28). Generally immunization clinics of health institution proper (SHP/HP) are run regularly. It may be due to feasibility and staff availability as AHW/MCHW can vaccinate children there even if VHW is not present. Immunization clinics that take hours from health institution are hampered from VHW's absence, leave or training in headquarters. In total 17.54% respondents say clinics run regularly, (52.63%) respondents say clinics are run in the interval of two or three-month and 29.82% of respondent say that clinics are run very irregularly. In places where clinics are run irregularly and infrequently there is no fixed date for clinic and community people have no idea of immunization day. They get notice on it in the same day of clinic run. Even the gap of two or three is also not maintained in the winter season. In Muchu VDC of the district health worker are absent for six month and other remaining three VDC this gap in the winter is around four month. So many children miss the opportunity and many drop out during that period.

C. Health worker performance factor

As per literature in many studies health worker performance is also major factor hindering service utilization. So this factor was also assessed in this study. Two aspect behavior and counseling of health worker performance were assessed in

terms of perception of community as good, medium or poor. Both of these aspects were perceived either good or medium not poor. However counseling may be insufficient if compared with standard criteria.

8.6 Distance of health institution

Accessibility being one of major factor in any service utilization; it was also assessed in this research. A study in urban Verginia by Ardetya L and et al shows association of distance with non-immunization. Accessibility to immunization clinic and health institution was included in the study. As per government policy of providing immunization service at village level through outreach clinics 3 to 5 clinics are run in every VDCs throughout the country. Similarly every VDC have one health institution. Same structure exists in Humla district also albeit service is not regular.

This study found that outreach immunization clinics were within the one-hour walking distance from permanent residents of more than 90% of respondents. However due to nature of seasonal migration, these clinics become inaccessible (more than two hour of walking distance) during five months of summer season for more than 60 % of respondents. This is one factor responsible for missing immunization. On the other hand distance of health institution is significantly associated with non-immunization which may be indirect association of irregularly running in the far lying clusters from health institution.

8.7 Prevalence of Adverse effect

Fear of adverse effect is limiting factor for immunization. Research of sing MC in Pondechery India find the significant role of side effect in dropout. Prevalence of adverse effect and its association with immunization is investigated in this study. In case of immunization, adverse effect following immunization (AEFI) includes-Toxic shock syndrome, Sepsis, Severe local reaction, Injection site

abscess, Lymphadenitis, Any death following immunization, Any hospitalization following immunization according to national guideline of immunization. Most of AEFI is due to lack of immunization safety. AEFI is also indicator of quality of immunization service. In this study among the total respondent (68-immunized and partial immunized) children of 53% were normal and remaining developed one or more than one symptoms of severe pain, abscess and high fever. However shock or death didn't occur. Some respondents even say that their children suffered for more than a month. People who perceive adverse effect are 3.82 times more likely to drop from immunization. So proportion of AEFI is very high in the study area indicating that further research and special focus is needed.

Reasons for this may be –use of unsterilized needle, careless in vaccination or lack in skill update. Due to various reasons problem of proper sterilization still exists in the study area. Similarly technical skill of staff (specially VHW) is not updated though some theoretical training is given occasionally.

8.8 Reason for drop out or non immunization

Respondents mention mainly four reasons for dropout or non-immunization. Seasonal migration is main cause for both non-immunization and dropout. From June to October more than 60% mothers migrate at higher altitude of same VDCs with their newborn child. They migrate for the purposes of farming, cattle rearing and protecting their child from sun or Aulo. They have concept that during June-Oct. high temperature or sun affects their newborn child in the permanent residence “*Gham Lagchha*”. However these permanent residences are not situated in low altitude (more than 3 thousand meter) and this is not the Malaria endemic area. It may be their imported idea from South part of district or other neighboring districts. This finding is similar to the finding of Ardythe L. and et al in North India. Similarly next reason is fear of pain or fever. As already mentioned in adverse effect, prevalence of adverse effect is very high. It may have imparted threat on people. Next reason for it may be insufficient counseling or education.

Third and fourth reasons are no information on time and service not available. As clinics are not run regularly there is no fixed date for clinic. On the other hand information on clinic is not disseminated in time. Other reasons are migration outside district for work, divorced family, etc. Immunization coverage survey 1998 mentions child may get sick, no time, post too far main reason for non immunization or drop-out in Hills. Whereas 18% dropped/ didn't immunized due to other various reasons.

9.Overview of Secondary Data analysis in District Health Office, Humla

Secondary data regarding immunization coverage were analyzed to overview district trend according to region and month. District trend has increased since some year due to increased effort of district health office and NGO/INGO working in the district. However it is not satisfactory and many is still to be done to met the objective.

- District coverage of BCG-64.17%

- District coverage of DPT3-43.48%
- District coverage of Measles -50.02%
- Top five HP with lowest coverage(in %)

HP→	Launthi	Muchu	Hepka	Lali	Dandafaya
BCG	9.22	31.82	48.94	50	60.53
DPT3	1.02	34.09	55.32	46.43	47.37
Measles	8.19	9.09	46.81	55.36	53.95

Launthi health post has the lowest coverage of all five antigen. It is situated in 48KM south of Headquarter Simikot.

- Monthly coverage trend –

Monthly coverage trend portrays that coverage is minimum in Shrawan to Mangshir. Bhadra observed very minimum coverage that year. Aagain the trend decreases in Magh/Falgun.

Monthly trend of immunization coverage:

mont	01	02	03	04	05	06	07	08	09	10	11	12
BCG	138	202	173	95	15	55	56	20	154	46	39	15
DPT3	103	50	215	33	5	38	33	20	94	45	53	25
Meas	129	95	128	30	18	33	52	13	138	46	38	27

- Target population –

BCG -1623 infants

DPT3 -1642 infants

Measles -1642 infants

- Number of clinic in the district allocated -948

- Numberof clinic run in the year -538

It seems that although 948 clinics are allocated to be run during one year, only 538 clinics (nearly 56%) were run in the fiscal year 059/060. However

problem faced to run clinic and reason of low coverage may be different in various region within district.

10. Conclusion and recommendation

10.1 Conclusion

- **Card retention rate is zero.** No any mother can show immunization card albeit some have NID card.
- **Immunization status:** BCG coverage is somehow satisfactory but lacks target; similarly due to frequent outbreak of measles its antigen coverage is higher than DPT3 but not satisfactory (60%). But DPT coverage is initially better but decreases drastically till third dose (49%) which is worse. Completely immunized proportion is very low(43%)
- **Knowledge:** It is good thing that generally all people have concept of immunization but nearly all have no knowledge on specific immunization. Similarly they have misconception that immunization frees from all type of diseases
- **Quality of care :** Health care service is the major factor for the low coverage of immunization

-Clinics are not run regularly, run at two to three months gap. No one in the study area can say fixed date of immunization.

-Information on immunization date is not provided in time that's why many people miss opportunity.

-In the winter season clinics are not run at all for three to six month.

-Time convenience, no cost, good behavior of health personnel are positive aspects of quality of care.

- Seasonal migration is another major cause responsible for low utilization of immunization service. In the summer season (Barkha) more than fifty percent of people especially mothers of newborn children are migrated to higher altitude of some VDCs affecting immunization coverage significantly.
- Another major cause is severe and prolonged effect of immunization on child after immunization. Nearly half of immunized children suffer longer than expected period from severe pain, swelling and fever.
- After micro planning in the district, coverage is towards positive trend but lots are to be done.
- Supervision, monitoring and survey is lacking from district health office to improve efficiency of health care service and responsibility and accountability of health personnel.

10.2 Recommendation

1. Immunization Service Regularity.

Regularity is the main theme of quality of care. So effort to run immunization clinic in regular basis should be initiated. There should be a fixed date in every month for each EPI clinic.

2. Effective AD syringe supply or sterilization

Threat for pain and other unwanted effect should be minimized. For this provision of auto-disposable syringe in all the clinic should be done or proper sterilization of needle should be done in each sterilization session. Performance appraisal and training is also required.

3. Special campaign

As seasonal migration is another important reason for low utilization of service, special campaign like NID are needed to deliver service in the migrated place at least once during the season. Or other information campaign or awareness campaign could also help the migrated population during the season.

4. Supervision and monitoring

Supervising and monitoring seems minimum in the field causing rampant service delivery system and massive irregularity. Therefore regular supervision, monitoring and taking action on the findings is urgent need in the district.

5. Regular assessment, survey or research.

Survey and research is virtually non-existence in the district regarding any programs. Even child health division was uninterested while I approached with this research though Humla has lowest coverage in the country. So research activities should be strengthened and findings should be implemented for improving quality of care and service utilization.

6. Incentive for good workers.

Incentives for good performances and discouraging for poor performances should be initiated. Few VDCs, like synda, have very good immunization coverage due to staff devotion. Special incentives are required for workers who provide service in the winter season.

7. Special management for winter season.

There is long gap during winter season for EPI clinics. Respondent feel that EPI clinics are not run for four/five month during winter season as health personnel take leave to escape snowfall. So special incentive, local manpower recruitment or other special provision should be done.

8. Supportive environment should be created.

FCHV, who are backbone of any health program success have been discouraged and cheated. They are not getting biannual review training though budget has been managed for that. Similarly they complain that special allowance during NID or such occasion are not paid or underpaid. Therefore, DHO must ensure biannual review training and allowance payment in special health programs.

Annex 1

Limitation of the study

1. Study depends only on verbal respondent because cards were not provided to them.
2. Field situation was very sensitive and threatening.
3. Due to start of winter season health workers were on leave and we cannot validate data with registers.

Generability of the study

Although the study was carried out only in four VDCs, technically it may not represent whole district. However pattern of seasonal migration, quality of care and service irregularity are some how same throughout the district.

Annex 2

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Annex 3 Questionnaire

We are going to carry on researchon reasons for low immunization coveragein these VDCs. For this we need your support specially in information. This is questionnaire sheet and would you please participate in providing answers what you know about immunization.

- 1.Respondent
- 2.Age of respondent
- 3.Ethnicity

- Date
family size
Ward /cluster no

1.Immunization status

4.Age/sex of child						
5.Name of child						
	Yes or No (Y /N)	Date	Card/history/both (C/H/B)	Side Effect		
6.BCG						
7.DPT1						
8.DPT2						
9.DPT3						
10.Polio1						
11.Polio2						
12.Polio3						
13.Measles						
14.Polio in NID1st						
15.Polio in NID 2nd						
16.Immunization status	Completely immunized		Partially immunized	Not immunized		

Family description

	17.Education			18.Occupation		
	Illiterate	Secondary	Tertiary	Farm	Business	others
Father						
Mother						

19.Do you know about immunization?

- Yes
- No

20. Knowledge on immunization shedule

- a. How many times to vaccinate children.....
- b. What is the age for vaccination of DPT1?.....
- c. What is the age for vaccination of DPT2?.....
- d. What is the age for vaccination of DPT3?.....
- e. What is the age for vaccination of measles?.....

21. Knowledge on benefit of immunization

- It prevents from target diseases.
- It prevents from all diseases
- It does no benefit.
- Others.....

22. Knowledge on time and date

- a) What is the immunization clinic date?
- b) What is clinic time.

Quality of Care

23. Availability of service.

- Clinics run regularly once in a month.
- Clinics run in an interval of more than one month.
- Clinics run rarely.
- Clinics never run.

Health worker performance

25. Health worker behavior

- Good
- Medium
- Poor

26. Health workers counsel after immunization.

- Good
- Medium
- Poor

Clinic management

27. Clinic site.....

28. Clinic time.....

29. Information on clinic is provided in time

- Yes
- No

Accessibility

30. Distance of clinic from permanent residence-

- Less than 1 hour
- More than 1 hour

31. Distance of health institution from permanent residence....

- Less than 1 hour
- More than 1 hour

32. Why you don't take child for immunization

- Don't feel need
- Time and place not known,
- Fear of pain/ adverse effect.
- Busy
- Others.....

33. Why you dropped child from immunization

- Don't feel need
- Time and place not known,
- Fear of pain/ adverse effect.
- Busy

□ Others

34. Any comment regarding immunization or service provider.

34. Any recommendation regarding immunization or service provider.