

375

897

**DETERMINANTS OF LOW EPI COVERAGE
IN FOUR VDCs OF HUMLA**



NHRC Library
Accession No. 250
Call No.

2003

Report Submitted To
NEPAL HEALTH RESEARCH COUNCIL

Ram Shahpath Kathmandu

Submitted By
BRISH SHAHI, MPH.
RODIKOT-5 HUMLA,
Chief Investigator

ACKNOWLEDGEMENT



First of all, I would like to express my sincere appreciation and deepest gratitude to NHRC and staffs of NHRC for their encouragement and funding to conduct this study.

Nirbhay Kumar Sharma, Chetana Thapa And Sushan Man Shrestha have supported me in various aspect.

I am grateful to community people for kind cooperation. Kunga Chhiring Lama of Hepka, Ram Bdr Budhthapa, AHW of Hepka, Shadananda Achary , VHW of Synada VDC, FCHV Banchkala Shahi of Dharapori 5, and Tundu Pasang of Dhinga 2 ward, Lundup Lama of Chydang ,napu Lama of Kermi 2 have helped me a great. I am also grateful to all my enumerators for their effort during the data collection. I am indebted and grateful to the respondent of study VDCs for their participation as interviewer providing their views and ideas managing their valuable and scarce time.

I am grateful District Health Office, Humla including all the staff specially Dr Roshan Pokhrel, DHO, Upendra Dhungana HA, Gombu Lama, Amarsing Shahi(AHW) and statistical Assistant for their great help during my study. Similarly Bhagawan Shrestha of UNICEF also provided lots of information to me.

I am indebted to my research guide Dr Sarad Raj Onta, Dr Ananda Ballabh Joshi from Institute of Medicine for their regular valuable help during the process of this study.

I am indebted and grateful to the respondent of study VDCs for their participation as interviewer providing their views and ideas managing their valuable and scarce time.

Summary



Accession No.
Call No.

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. Same day I started rapport building and coordination and secondary data review. I reviewed district profile of district health office.

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.

This all includes 19 wards. Though I had planned 30-cluster sampling in my study, it was impossible to do so because of the various circumstances. Objectives of my study is 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 (834 Khangalgaun to 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%. 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. This abnormal result (as compared to literature) may be due to small proportion of sample in this group.

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 -Auxillary Nurse Midwifery.
- AHW -Auxillary 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.

Nearly all have listened about immunization in general. More than 90% know to immunize their child five times. 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.

Quality of care : Immunization site is not fixed anywhere however it is national trend. There is no fixed date and time for clinic. Only 35 % people get information on time however time is convenient for majority. Clinic run irregularly in 53% clusters and even very irregularly (Kahile Kanhi matra) in 30% clusters. Only few percentage of (7%) perceive punctuality of health worker is good however majority of them perceive they behavior is not poor (99%) and counsel in good manner after immunization(88%). However it seems that counseling is not sufficient as they lack proper knowledge.

Accessible; More than 95% respondent had access to EPI clinic in their own residential village or within the walking distance of ½ hour(one way). In these aspect clinics are accessible but during rainy season (Jestha to Asoj) people specially 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).

Chi square test shows that not providing information on time, distance of health institution from permanent residence of respondent, irregularity of clinic and adverse effect are significant for non-immunization or drop out.

Main reason for non-immunization is given native seasonal migration, date not known and fear of pain/adverse effect. This study was done in only four VDCs and 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.



1. First Page.....	i
2. Acknowledgements.....	ii
3. summary.....	iii
4. abbreviations.....	v
5. Contents.....	vi
6. Tables.....	vii

Chapter 1

1.1 Introduction.....	1
1.2 Profile of study district.....	3
1.3 Problem statement.....	5
1.4 Literature review.....	7
1.5 Rational and justification.....	11
1.6 Research objectives.....	12
1.7 Research design and methodology.....	13
1.8 Operational definitions.....	13
Study site.....	15
Study population.....	15
Sample size.....	15
Sampling technique.....	16
Tool and technique of Data collection.....	16
Validity and Reliability.....	16
Limitation of Study.....	16
Data management.....	16
1.9 Ethical consideration.....	17
1.10 Work Plan.....	18

Chapter 2.

Findings.....	19
Card retention rate.....	19
Immunization status.....	19
Socio-demographic characteristic of respondent.....	21
Knowledge.....	23
Quality of care.....	24
Reason for non-immunization or dropout from immunization.....	30
Discussion.....	32
Overview of secondary data analysis.....	40
Conclusion and recommendation.....	42
Recommendation.....	43



Annex

Reference.....405
Questionnaire.....49

List of Tables

1. Table no 1 immunization status.....19
2. Table no 2 antigen coverage.....20
3. Table no 3 Socio-demographic Characteristics.....22
4. Table no 4 Chi-square test of socio-demographic characteristics.....23
5. Table no 5 Knowledge.....23
6. Table no 6 management of immunization clinic.....25
7. Table no 7 Immunization clinic regularity.....27
8. Table no 7 Health Worker Performance.....28
9. Table no 8 Chi-square test.....28
10. table no 10 Accessibility29
11. Table no 11 Side/adverse effect30
12. Table no 12 reason for non immunization30

1.Introduction

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 program⁷.

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 diseases⁸. 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.

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 are 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 household 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.

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.

antigen	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 country and much gap exists between target and present situation.

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.

Antigen	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

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 30,000 mothers 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 immunisation 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.

4.Literature Review

Though the immunisation program has made significant progress over the years, vaccine preventable diseases still cause morbidity and child death. Major constraints in the immunisation 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 immunisation. National immunisation Policy exists, providing a long -term vision and operational strategies to improve the e national immunization program. It takes into account recent development into immunisation strategies and current limitation of the program. The revised strategy for immunitation program has focussed on the following areas: increasing the accessibility for the services, improving the quality of the services, promoting safe injection practices etc.

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 1996⁵ 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.

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 friends**¹⁸ 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 FO**²⁰ also prescribed significant association of education with immunization. However study of **Waldhoer T and et al**²¹ from University of Vienna didn't found any significant role of education on immunization. **Roden j**²² 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 al**²³ shows that there is positive relationship between immunization coverage and educational level of the respondents Study of **Waldhoer T and et al**²¹, 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 friend²⁴ 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.

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.

Immunization Service providers

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.

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, PareekRP**²⁹ 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.

Service Factor and immunization utilization

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.

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.

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.

5.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 identify 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.

6. Research Objectives

1. General Objective

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

9. Research Design and Methodology

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

9.1 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,

Accessible and available

Clinic management and health worker performance

Operational definition:

Utilization of immunization service: It is taking of at least one of these antigen-BCG, DPT, Measles, Polio, by the children of respondent mother before 12 month is completed.
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 can not 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.

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-punctuality, 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.

9.2 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. Cluster villages in the sample are- Hepka(ward 4,5,6,7,), Dyinga 1and 2 of Hepka VDC. Chauganfaya 7,8,9 and Dharapori of Dandafaya VDC, Kermi 1,2,3 and Chyaduk 4of Khagalgaun VDC and Yangar and Yalbang of Muchu VDC.

9.3 Study Population

The target population of the study was:

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

9.4 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.

9.5 Sampling Frame and Sampling Process including Criteria for Sample Selection

- 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 devided into 18 clusters, one cluster for each village, and 8 clusters were selected randomly.

9.6 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:

A -structured and semi structured questionnaire for mother or caretaker were developed.

D - Secondary data was also analyzed from DHO for the collection of information regarding coverage of vaccine, no of clinic run, etc.

9.7 Validity and Reliability of the Research.

- Pre-testing and appropriate modification of questionnaires.
- Orientation to the enumerator prior to the data collection.
- Questionnaire were asked in local languages.
- Enumerator 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.

9.8 Limitation of the Study

- As the study is concerned with only four VDC it may not represent whole district population however it hits most effected VDCs.
- Confines its study to analysis of children who take immunization within one year only.
- Study district is very remote, field season was at the start of winter, and field situation was very sensitive.
- Can't meet health personnel in in the field(HP/SHP) as they had already left the area for home leave.

9.9 Data Management

- Data were edited each day at evening.

- Entry and Analysis was done in SPSS version 10 in computer for frequency, crosstab, percentage calculation and chi-square test.

9.10 Plan for Data Analysis

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

9.11 Outcome of the Research

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

9.12 Plan for 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.

10. Ethical Consideration

Ethical Issues:

- Respondents were explained the purpose and objective of the study in clear and understandable term.
- Verbal consent was taken before introducing questionnaire.
- Respondent were not pressed to give answer and they will be left independent on their wish.
- Participant were assured that the information they provide would be maintained confidentiality if required.

11. Work Plan

(should include duration of study, tentative date of starting the project and work schedule /

Gantt chart)

	Nov	December	January	February
<i>Literature Review</i>				
<i>Proposal Development</i>				
<i>Departure to field</i>				
<i>S .Data analysis/sampling</i>				
<i>Orientation to enumerator</i>				
<i>Pre-testing of questionnaire</i>				
<i>Modification of tools</i>				
<i>Data collection</i>				
<i>Data management/Analysis</i>				
<i>Report writing</i>				

12.FINDINGS

The 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 mothers however remaining were close relatives.

1.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.

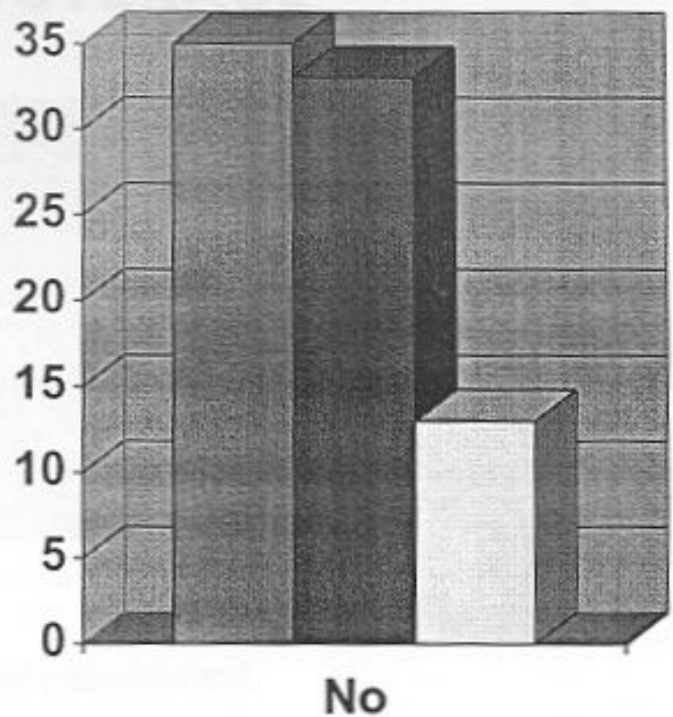
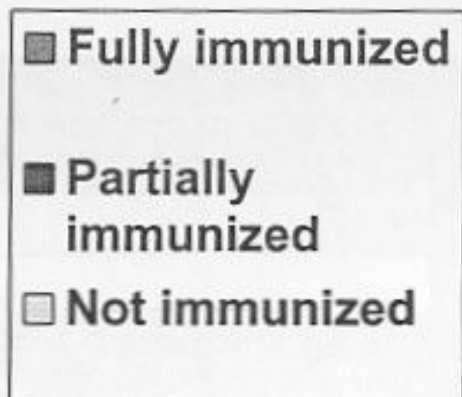
2.Immunization status.

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 no.1 Immunization status

S.N.	Immunization status	No	%
1	Fully immunized	35	43.20
2	Partially immunized	33	40.74
3	Not immunized	13	16.05
4	Total	81	100
5	Immunized in NID	80	98.75

VACCINATION COVERAGE

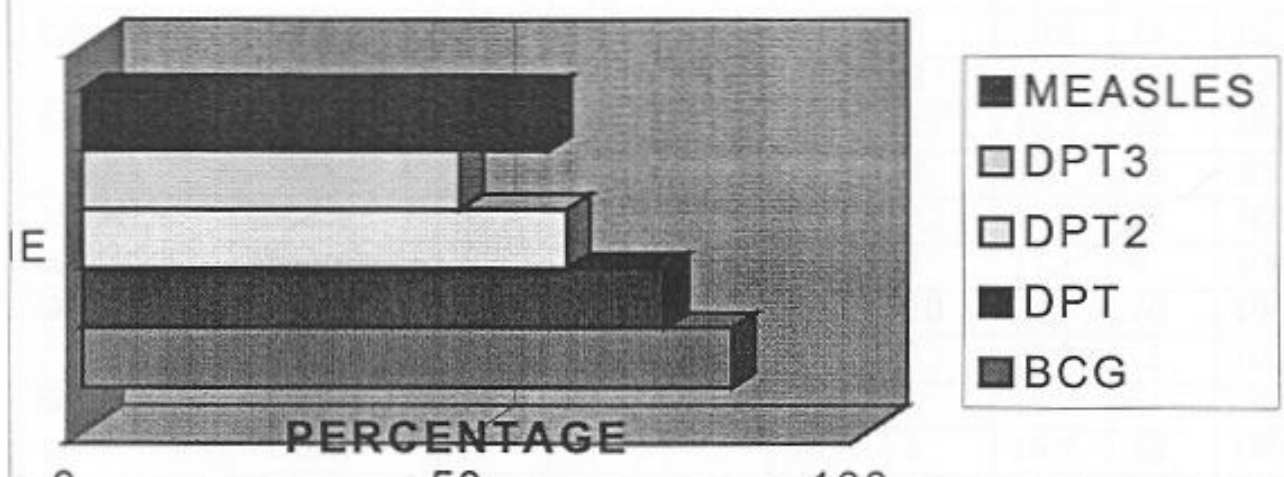


It is found that coverage for BCG is 82%, which is somehow satisfactory however gap exists between target and study area coverage. Measles coverage is nearly 60%, which is very low as compared to national average however it is better than DPT3 as people are aware and cautious due to frequent outbreak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

Table no.2 Antigen coverage

S.N.	Imm. Status -study area findings		District average	
	Antigen	No		%
1	BCG	67	82.71	64%
2	DPT1	60	74.07	
3	DPT2	50	61.73	
4	DPT3	39	48.15	43.48%
8	Measles	48	59.26	

VACCINATION COVERAGE



3. Socio-demographic characteristics of respondent.

Ethnicity

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 immunized is 50 and 40 for Thakuri and Lama respectively. The percent of not-immunized children is also in similar proportion 20 and 14 among this caste. However partial immunized percent is very high among Lama (45%) than Thakuri (29%). There is no association of ethnicity and immunization status (χ^2 value 1.972 and p value 0.373)

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 respondent was 63 and 18 respectively. Percentage of immunized children is 46 and 33 where as non-immunized percent is 17 and 11 respectively. Similarly partially immunized children are 23% to illiterate father against 10% to literate fathers. (χ^2 value 2.121 and p value 0.346)

Mothers Education

The number of illiterate mother is 31 and literate 4. Immunized children are 43% and 44%, partially immunized children are 40% and 44% where as not immunized children are 16 %and 11% to illiterate and literate mothers respectively. Although there is higher percent of immunized child among literate, that is not significant. There is no association of mother's education and immunization status (χ^2 value 1.192 and p value 0.909)

Table no 3-socio demographic characteristics

Socio-demographic variables		Immunized		Partial		Not imm.		Total	
		No	%	No	%	No	%	No	%
Ethnicity	Thakuri	12	50	7	29.2	5	20.8	24	100
	Lama	23	40.4	26	45.6	8	14.0	57	100
Father's ed.	Illiterate	29	46	23	36.5	11	17.5	63	100
	Literate	6	33.3	10	55.6	2	11.1	18	100
Mother's education	Illiterate	31	43.1	29	40.3	12	16.7	72	100
	literate	4	44.4	4	44.4	1	11.1	9	100
Occupation	Farm	31	43.1	29	40.3	10	14.3	70	100
	Others	4	36.4	4	36.4	3	27.3	11	100
Sex of child	Male	18	35.3	25	49	8	15.7	51	100
	Female	17	56.7	8	26.7	5	16.7	30	100
	Total	35	43.2	33	40.7	13	16.0	81	100

Sex of child

Number of study child were 51(63%) male while 30 ((37%) were female. Male children are 35% completely immunized, 49% partially immunized and 16% not immunized. Similarly female children are 56% complete immunized, 27% partially immunized and 17% not immunized. Here both completely immunized and not immunized percentage is higher among female child than male child. There is no association of sex of child and immunization status(χ^2 value 4.325 and p value 0 .115)

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 44% completely immunized, 41 % partially immunized and 14% not immunized. Children of other occupational categories are 36% completely immunized, 36% partially immunized and 27% not immunized. So status seems better among farmers than other categories but it may be due to small number in other categories. There is no significant association of ethnicity and immunization status(χ^2 value 1.197 and p value 0 .550)

Table 4: chi-square test

Variables	Chi-square	Degree of freedom	Ass. Signi.
Ethnicity	1.972	2	.373
Father's education	2.121	2	.346
Mothers' education	0.192	2	.909
occupation	1.197	2	.550
Sex of child	4.325	2	.115

Knowledge

Another variable assessed in the research is knowledge. Knowledge it 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 was assessed.

Table no:5 knowledge of respondent

Knowledge	Immunized		Partial		Not imm.		Total	
	No	%	No	%	No	%	No	%
Knowledge in general								
Yes	35	100	33	100	13	100	81	100
No	0	-	0	-	0	-	0	-
Knowledge on schedule								
No	32	91.43	31	93.94	12	92.31	75	92.52
Poor	3	8.57	2	6.06	1	7.7	6	7.41
Good	0	-	0	-	0	-	0	-
Total	35	100	33	100	13	100	81	100
Knowledge on benefit of immunization								
Every respondent mother perceive about benefit of immunization that it prevents their children from all type of diseases								

It is found that nearly all the people in the study area know immunization in general (100%). But specific knowledge about every antigen and proper age for each antigen is virtually non-existence. About 92.52% have no knowledge on

specific antigen however 7.41% have some knowledge (incomplete knowledge) on it. No any respondent have good knowledge on immunization. Generally mothers and caretakers should have knowledge on specific antigen, proper age for each vaccine and disease it prevents.

Similarly knowledge on benefit of immunization is also 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. No one 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).

4. 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. Clinic management

In this part of the study three aspects were investigated in the research- situation of immunization clinic site, 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.

- **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 21 respondents (22%) get information on time and remaining 60 didn't get timely information. Seventy six percent of respondents who get information on time have immunized their children against 19% who didn't get it. Where as partially immunized and non-immunized children are 50% and 18% among non-informed respondent against 14% and 9 % percentage respectively. Timely information is significantly associated with immunization status (χ^2 value 12.759 and p value 0 .002)

- **Time convenience:**

One positive aspect is that majority of community people feel that time of immunization (generally 10.00am) is convenient.

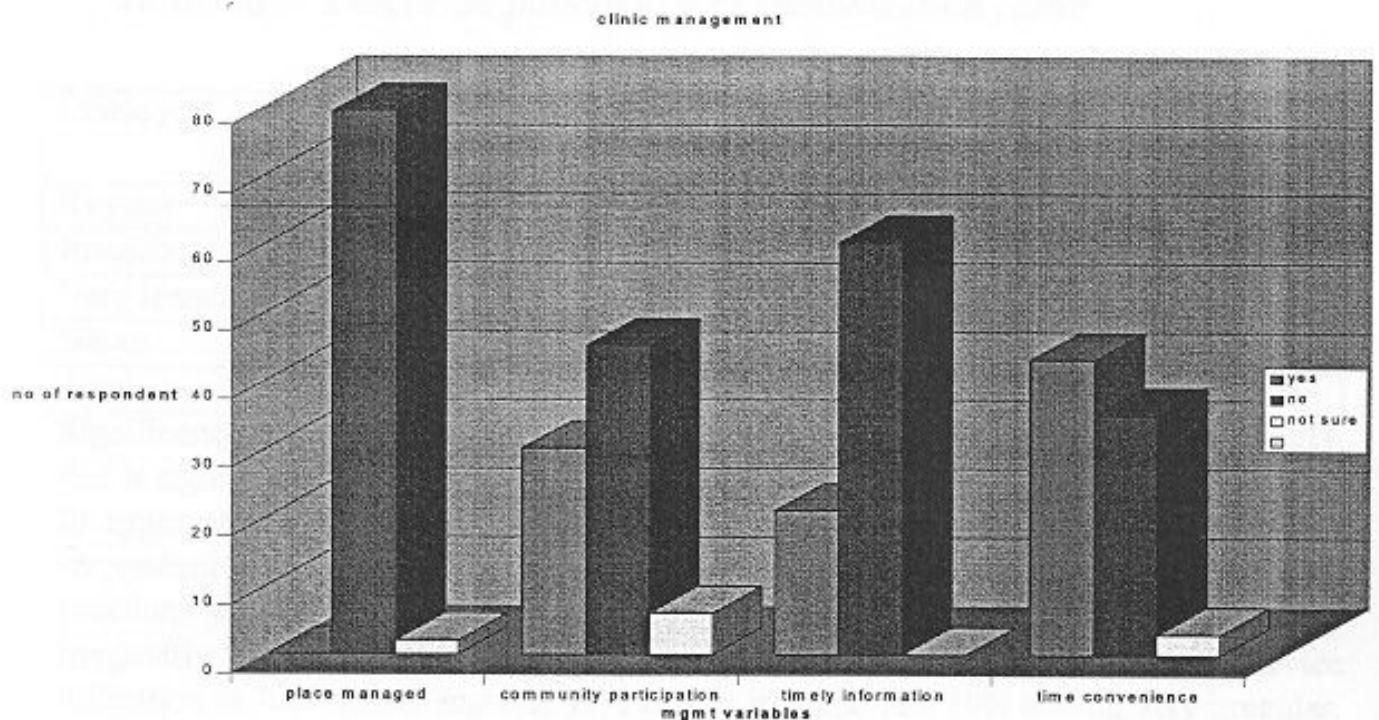
Table no 6, Management of immunization clinic.

Clinic mgmt variables		Immunized		Partial		Not imm.		Total	
		No	%	No	%	No	%	No	%
Place managed	Yes	0	-	0	-	0	-	0	0
	No	35	44.3	33	41.8	11	13.9	79	100
	Not sure	0	-	0	6.06	2	100	2	100
Timely information	Yes	16	76.2	3	14.3	2	9.5	21	100
	No	19	31.7	30	50.0	11	18.3	60	100
	Not sure	0	-	0	0	0	-	0	0
Time convenience	Yes	31	47.7	26	40.0	8	12.3	65	100
	No	4	28.6	7	50.0	3	21.4	14	100
	Not sure	0	-	-	-	2	100	2	100
Total		35	43.2	33	40.7	13	16	81	100

Table of Chi-square test for clinic management

	Chi-square value	Degree of freedom	P value
Timely Information	12.759	2	0.002
Time convenience	12.581	4	0.014

Diagram no. for clinic management



5. 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. Punctuality is generally disturbed in three ways

1. Intentional absent
2. Training and meetings
3. Winter season.

Some health workers, who don't feel responsibilities, intentionally remain absent in the health institution or field. Weak management of District Health Office further encourages them. Next hampering factor for punctual running of clinic is training or seminar in the district as HP / SHPs are very far (two to five days) and there is no means of travel. Next major reason of staff absenteeism in the field is winter season when they leave workstation for at least four month (December to March). Limi VDC and Muchu VDC of the study area are worse affected in winter season where snow covers nearly six month and health personnel remain absent in that period.

Punctuality perceived by the community is tabulated as follows.

Table no:7. Perceived punctuality of immunization clinic

Clinic run	Immunized		Partial		Not imm.		Total	
	No	%	No	%	No	%	No	%
Regular	11	78.6	2	14.3	1	7.1	14	100
Irregular	19	46.3	18	43.9	4	9.8	41	100
Very irregular	5	19.2	13	50.0	8	30.8	26	100
Never	0	0	0	0	0	0	0	0
Total	35	43	33	100	13	16.0	81	100

Significance test shows chi-square value 15.871, degree of freedom 4 and p value .003. that is significant association.

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 30% (n-26) said clinics run very irregularly (only sometimes "*kahile kanhi maatra*"). Full immunization service utilization is 78% among regular, 46% among irregular and 19% among very irregular. On the other hand partially immunized are 14.3%, 43% and 50% respectively for regular, irregular and very irregular. Trend of no utilization is 7% for regular 9% for irregular 30% for very irregular. However no one said clinics never run. It seems that punctuality of clinics is positively correlated with the distance from health institution. Clinic regularity is significantly associated with immunization status (χ^2 value 12.759 and p value 0 .002)6. Health worker performance

Health worker performance

Another aspect assessed in study is health worker performance. In this topics three aspect of health worker performance perceived by respondent of immunized children and partially immunized children was assessed by closed questionnaire-

- **Punctuality:** We can conclude that punctuality of health worker is medium as it is found that majority of respondent (55.88 %) perceive that. Percent of community to perceive poor punctuality is also significant (38.23).
- **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)

Table no 7. Health worker performance

Health worker performance		Immunized		Partial		Total	
		No	%	No	5	No	%
Punctuality	Good	2	50	2	50	4	100
	Medium	18	47.4	20	52.6	38	100
	Poor	15	57.7	11		26	100
Behavior	Good	3	27.3	8	72.7	11	100
	Medium	31	55.4	25	44.6	56	100
	Poor	1	100	0	-	1	100
Counseling	Good	29	48.3	31	51.7	60	100
	Medium	6	75.0	2	25.0	8	100
	Poor	-	-	-	-	-	-
Total		35	51.5	33	48.5	68	100

Table no:8 chi square test

<i>variable</i>	<i>Chi-square</i>	<i>Degree of freedom</i>	<i>Assym. Sig.</i>
<i>Punctuality</i>	<i>.662</i>	<i>2</i>	<i>.718</i>
<i>Behavior</i>	<i>.718</i>	<i>2</i>	<i>.145</i>
<i>counselling</i>	<i>2.010</i>	<i>1</i>	<i>.156</i>

Punctuality: We can conclude that punctuality of health worker is medium as

- **Counseling:** Respondents were requested to grade counseling of health worker about activities to be followed after immunization into good, medium or poor. 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.

Table no 9, chi-square test for health worker performance.

Accessibility

Another major factor affecting for utilization of every health services is accessibility. Here accessibility in terms of walking distance is assessed. Two factors were assessed;

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

Table no: 10.Distance of health institution from respondent's permanent residence:

Walking distance (two way)		Immunized		Partial		Not imm.		Total	
		No	%	No	%	No	%	No	%
Distance of Health institute	Less than 1hr	25	61.0	13	31.7	3	7.3	41	100
	1 hr –2 hr	7	33.33	10	47.6	4	19.0	21	100
	More than 2 hr	3	15.8	10	52.6	6	31.6	19	100
Distance of imm. clinic	Less than 1hr	33	94.29	30	90.91	11	84.61	74	91.36
	1hr –2 hr	2	5.71	3	9.09	2	15.39	7	8.64
	More than 2hr	0	-	0	-	0	-	0	-
Total		35	100	33	100	13	100	81	100

Chi-square test for accessibility of health institution shows chi-square value 13.420, degree of freedom 4 and p value .009.

Here generally 50 %of respondent are within one hour of walking distance from health institution. For EPI clinics more than 90% respondent have access within one hour of distance (two ways). Therefore community has good access to EPI clinic. But access to health institution is variable. Access to health institution is indirectly associated with immunization service utilization.

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.

Side effect or 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 are severe form of side effect which normally should not appear if immunization is safe. It seems 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*)

Table no 11.side effect following immunization perceived by mothers

Perceived side effect		Immunized	Partially immunized	Total
Normal	Count	24	12	36
	Percentage	66.7	33.3	100
Severe	Count	11	21	32
	Percentage	34.4	65.6	100
Total	Count	35	33	68
	Percentage	100	100	100

Chi-square test shows chi-square value 13.420 degree of freedom 4 and p value 0.009.

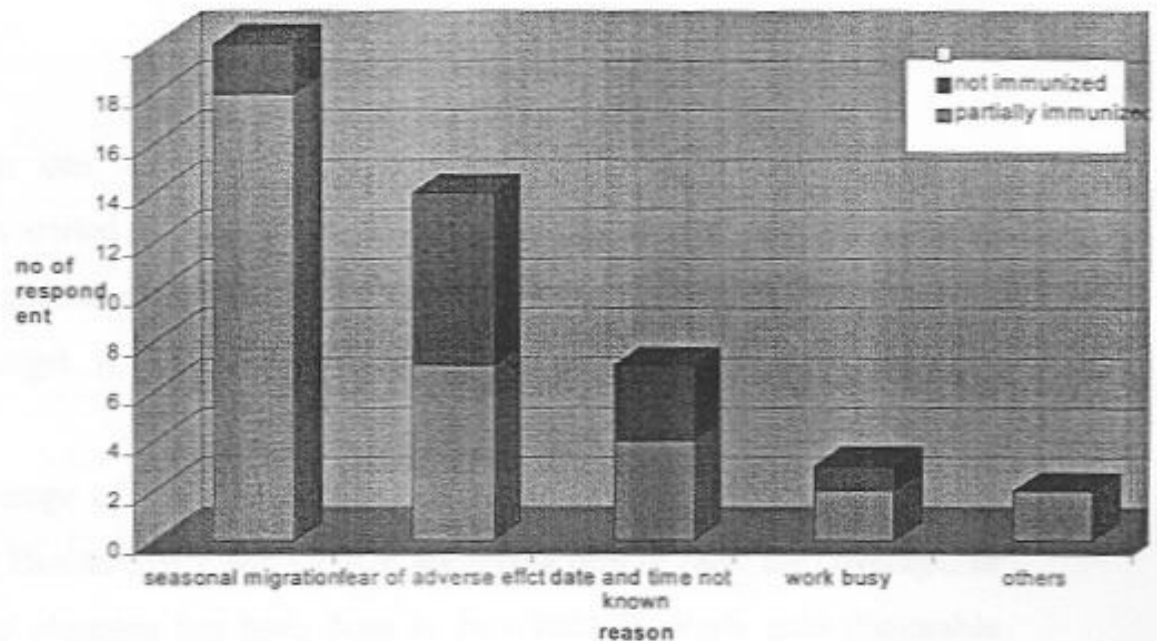
Reasons for not immunization or drop out from immunization

Study reveals that main reason for drop out is the local seasonal migration (54.54%) where as main reason for non-immunization is fear of pain and fever (43.48%). Lack of information about date and time of clinic is third reason for both non-immunization (15.21) and dropout. Work busy follows fourth position for non-immunization. Other reasons for non-immunization are work migration outside district, belief on local Devta etc.

Table no.12 reason for non-immunization.

Reason	Partially immunized		Not immunized		Total	
	No	%	No	%	No	%
Seasonal migration	18	54.54	2	15.38	20	43.48
Fear of pain/fever	7	21.21	7	53.84	14	30.43
Date & time not known	4	12.12	3	23.08	7	15.21
Work busy	2	6.06	1	7.69	3	6.52
Others	2	6.33	0	-	2	4.35
Total	33	100	13	100	46	100

reason for not immunization



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.

Measles Epidemic in the study area

Many episodes of measles epidemics in the study area have been happened in the past but it has subsidized recently. Latest outbreak was in Limi VDC in 2002 with large death toll but unnoticed in district level and national level. Next recent outbreak was in Hepka VDC in 2001 with some death toll. In other region outbreak was some years ago.

Discussion

Immunization is one of the priority programs of HNG ministry of health. Immunization is started in Nepal since 1979 and was started in all districts 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.

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

- A) To be admitted in educational institution,
- B) To travel outside country,
- C) 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.

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.

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. 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. The percentage of Lama and Thakuri was 72 and 29 respectively in the sample where as percentage of completely immunized child is 50 and 40.

Another factor assessed is sex of child. Immunized percentage among male is 35 against 56 for female child where as non-immunized percentage is nearly same (15 and 16) between both sexes. But reverse happens for partial immunization 49% for

male and only 26 percent for female. This study is unique in that percentage of completely immunized female child is higher than male. Many studies reveal male child immunized more against female child. This may be due to small number of female in the sample than male. However sex of child is not significantly associated with immunization status ($p=0.115$).

3. Knowledge on immunization

All of the community people have listened about immunization and they have motivation that immunization is good thing. Similarly more than 90 % can say five vaccines are needed for their children. But some 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. It is lacking from the side of health institution. But knowledge on immunization is not associated with its utilization.

4. Quality of care

“the quality of technical care consists in the application of medical science and technology in a way that maximizes its benefits to health without correspondingly increasing 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 Donabedian, 1980.

“Proper performance (according to standards) of interventions that are knowing 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-

- 1) Accessibility of immunization service.
- 2) Timely service.
- 3) Effective service.
- 4) Achieves the need of community.
- 5) Should be in need of community and meets national standards.
- 6) Service should be punctual.
- 7) 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 run.
- Health worker performance –punctuality, behavior and counseling.
- Prevalence of adverse effect.

Clinic management factor

This study investigated three aspect of clinic management- place managed, 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. No any respondent was there to say that there is fixed clinic. Only two people whose children were not immunized were not sure

about place of immunization. However it is not only the case of Humla as per my personal experience this exists in most part of our country.

Next question was about timely information of clinic that is information before two or three days. About 76 percent of immunized respondent accepted that information is timely disseminated to them where as this percentage was only 14 and 9 for partially immunized and not immunized respondents respectively. EPI coverage survey 1998 found that 32.8% dropped out due to lack of information. This factor is strongly significant with immunization status (p value 0.002). Generally 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.

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 total about 78% respondents who accept clinics are run regularly have their children immunized completely. Number of completely immunized children is reduced to 46% among those who stay in the catchments area of irregular clinics (say clinics run in two or three months) and 19.9% among residents in catchments area where clinics run infrequently (say only sometime or "*kaile kanhi*"). 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 infrequently that is 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.

Regularity of immunization clinic is strongly associated with immunization status ($\chi^2=15.871$ and p value 0.0030). Immunization coverage study 1998 reveals 47.7 % dropped out due to lack of services.

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. Three aspect punctuality, behavior and counseling of health worker performance were assessed in terms of perception of community as good, medium or poor.

It shows that perceived health worker performance is either good or medium except punctuality. Good behavior to the patient is a positive aspect in the study. Talking about counseling, though most of the respondents have perceived it good it may be incomplete counseling in actual. They may have counseled about management of side effect from immunization but counseling should also include time –

- Time, date and place of next immunization.
- Specific vaccines and disease prevented by each vaccine.
- Why children should be immunized and importance of immunization card.

But as already mentioned respondent have no knowledge on specific immunization, proper benefit from immunization.

Accessibility factor

Accessibility being one of major factor in any service utilization; it was also assessed in this research. 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 entire respondent. 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 percent of respondents. This is one factor responsible for drop-out or non immunization.

Prevalence of Adverse effect;

Fear of adverse effect is limiting factor for immunization. Prevalence of adverse effect and its association with immunization is investigated in this study. Generally immediate non-beneficial effect of immunization, as in all type of drugs, is either side effect or adverse effect. Side effect is expected effect and normally may appear but adverse effect is not expected and severe. 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. Most of AEFI is due to lack of immunization safety. AEFI is also indicator of quality of immunization service. In this study respondents were categorized into two values -1.normal who didn't develop any effect or developed just side effect 2. Adverse effect -who developed one or more than one above mentioned symptoms. 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. Percentage of partially immunized children is 33 among normal against 66 among AEFI. Adverse effect is significantly associated with immunization status ($\chi^2 = 7.072$ and p value 0.008) 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.

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. 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.

Overview of Secondary Data analysis in District Health Office

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 are launthi, Muchu, Hepka, Lali and dandafaya.

Table :Five VDCs with lowest immunization coverage

	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

Lauthi 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:

	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
- Measles -1642 infants
- DPT3 -1642 infants
- No of clinic in the district allocated -948
- No of 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.

Conclusion and recommendation

Conclusion

- 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 concept that immunization frees from all type of diseases.
 - Card retention rate is zero. No any mother can show immunization card albeit some have NID card. Therefore they have nothing to prove that their children are immunized There is room for skeptics that their history of Immunization or immunization records are exact.
 - BCG coverage is 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 satisfactory but decreases drastically till third dose (49%) which is worse.
 - Health care service is the number one 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.
- There is no fixed place or proper place for immunization. It is run everywhere where it is available.
- In the winter season clinics are not run at all for three to six month in the study area.
- Time convenience, no cost, good behave of health personnel are positive aspect of quality of care.
- Seasonal migration is also major cause responsible for low utilization of immunization service. In the summer season (Barkha) more than fifty percent of people especially mother of newborn children are migrated in higher altitude of same 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.

Recommendation

- 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 is strongly recommended

- 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.

- 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.

- Staff training

To minimize unwanted effect of immunization, increasing technical skill of health worker can be important. For this assessing training need and providing necessary training is required.

- 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.

- 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.

- Incentive for good workers.

Incentives for good workers and penalty for poor workers should be initiated. Many health workers spend majority of time outside the work side and even they are treated similarly. Special incentives are required for workers who provide service in the winter season.

- 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.

- 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.

Financial Data Sheet *

BUDGET

Budget Items

- | Personnel | Person(s) x Rate x Duration | Total (NCRs.) |
|---|--|---------------|
| (Include Researchers, Field Supervisors, Clinicians, Secretary, Data Manager etc.) | | |
| | Researcher-1*3*11,000 = 33,000 (field and other allowance) | |
| | Enumerators 8*5*500 = 20,000 | |
| • Consumable and Expendable Supplies
(Include Stationery, Photocopying, Photographic films, Cassette Tapes & Batteries etc.) | | |
| | Stationary-2000.00 | |
| | Photocopy-2000.00 | |
| | Others-1000.00 | |
| | Field / Community related Costs (if relevant) | |
| • Travel Cost within the Country (if relevant)
(Include airfare, Bus fare, Vehicle hiring, Fuel etc.) | | |
| | Airfare-10,000.00 | |
| | Busfare-1000.00 | |
| | Others-1000.00 | |
| • Report Writing (Include Printing and Binding)= Rs 6000.00 | | |
| • Refresher in presentation) =Rs.2000.00 | | |

GRAND TOTAL:

Rs.78,000.00(rupees seventy three thousand only)

Reference

1. His Majesty's Government of Nepal, Ministry of Health, Department of health service, Annual Report 1997/1998, 1998/1999, 1999/2000, 2000/2001.
2. Vandelaer, J.: Evaluation of the Expanded program of immunization in Nepal, April 1998, WHO, Document SEA/EPI/135
3. Department of health service, Child Health Division / UNICEF / WHO EPI Coverage Survey 1998. Department of Health Service, New-Era, Demographic and Health Survey, Jan-Sep 2001, pg 155-158.
4. National Planning Commission, CIET, New-Era and UNICEF, national Multi Indicator survey, Nepal, 1995. Nepal Family Health Survey 1996,
5. National Planning Commission, CIET, New-Era and UNICEF, Nepal Family Health Survey 1996,
6. Ministry of health, Department of health Service, Child Health division, National Immunization Program, 2001, Multi-Year Plan of Action 2002-2005.
7. His Majesty the Government, National Planning Commission, 10th five year Plan.
8. EPI section, Child Health Division, Department of health Service, Strategic Guidelines for National Immunization Program of Nepal.
9. District Development Committee, Simikot Humla, 2049, Periodic District Development Plan, Humla, 2059-2064, District Profile Analysis.
10. District Development Committee, Simikot Humla 2049, Periodic District Development Plan, Humla, 2059-2064, District Profile Analysis.
11. Ministry of Local Development, National Planning Commission, UNICEF, Decentralized Planning for the Child Program 2001, Summary of Baseline in Humla.
12. WHO, Vaccine and Biological Society, Vaccine and Biological World Summary 2000.
13. WHO 14th Advisory Committee, World EPI Report, 2001.
14. Department of Health Service, New-Era, Demographic and Health Survey, Jan-Sep 2001, pg 155-158.
15. Survey. January 2001, UNICEF, NPC, CBS Between Census Household Information Monitoring and Evaluation Survey 2000, pg 143-147.

16. U.P.Nirupam S, Chandra R, Srivastava VK. Upgraded Department of Social and Preventive Medicine, KG's Medical College, Lucknow .Sex bias in immunization coverage in an urban area. *Indian Pediatrics*. 1990 Apr; 27(4): 338-41.
17. Ahluwalia IB, Helgerson SD, Bia FJ.Ohio Department of Health, Lyndhurst Immunization coverage of children in a semi-urban village panchayat in Nepal, 1985.*Social Science Medicine*.1988; 26(2): 265-8
18. Brugha RF, Kevany JP, Swan AV.Department of Public Health and Policy, London School of Hygiene and Tropical Medicine, UK. An investigation of the role of fathers in immunization uptake *International Journal of Epidemiology*, 1996 Aug25(4) 840-45.
19. Dhadwal D, Sood R, Gupta AK, Ahluwalia SK, Vatsayan A, Sharma R. Indira Gandhi MedicalCollege, Shimla, Himachal Pradesh. Immunization coverage among urban and rural children in the Shimla hills. *Journal of Communicable disease* 1997 Jun 29.
20. Kamau N, Esamai FO.Determinants of immunisation coverage among children in Mathare Valley, Nairobi. *East African Medical Journal* 2001 Nov 78(11) pg590-60421.
21. Waldhoer T, Haidinger G, Vutuc C, Haschke F, Plank R.Department of Epidemiology, University of Vienna, Austria. The impact of Sociodemographic Variables on Immunization Coverage of Children. *European Journal of Epidemiology* 1997 feb;13(2) 145-49.
22. Roden J.Child immunisation levels in Sydney's Western Metropolitan Region: parental attitudes and nurses' roles.*Australian Journal of Advanced Nursing*,1992,Mar-May;9 (3) :18-24
23. Jha N, Kannan AT, Paudel IS, Niraula S.Department, Dharan, Nepal-EPI vaccination in Nepal. *Southeast Asian Journal of Tropical Medicine and Public Health*.2001 Sep; 32(3): 547-52
24. Ram B. Jain, Ali H. Mokdad, Lawrence E. Barker, and Susan Chu. National Immunization Program, Centers for Disease Control, Clifton Road, Atlanta, GA, USA Risk Factors for Under-Immunization in Urban and Non-Urban Areas, 1999.
25. Wilson T.,Factors influencing the immunization status of children in a rural setting.University of Missouri-Kansas City School of Nursing, Kansas City, MO USA.*Journal of Paediatric Health Care*,2000 May-Jun;14(3):117-21

26. Bosu WK, Ahelegbe D, Edum-Fotwe E, Bainsan KA, Turkson PK. Health Research Unit, Regional Health Administration, Ghana. Factors influencing attendance to immunization sessions for children in a rural district of Ghana. *Act Trop* 1996 Dec 68(3) 259-67.
27. Gedlu E, Tesemma T. Gondar College of Medical Sciences, Ethiopia. Immunization coverage and identification of problems associated with vaccination delivery in Gondar, northwest Ethiopia. *East. African Medical Journal* 1997, Apr 74(4).pg 239-41
28. Singh MC, Badole CM, Singh MP. Department of Community Medicine, Jawaharlal Institute of Post-graduate Medical Education and Research, Pondicherry. Immunization coverage and the knowledge and practice of mothers regarding immunization in rural area. *Indian Journal of Public Health* 1994 Jul-Sep 38(3):103-7
- Tesemma T. Gondar College of Medical Sciences, Ethiopia. Immunization coverage and identification of problems associated with vaccination delivery in Gondar, northwest Ethiopia. *East. African Medical Journal* 1997, Apr 74(4).pg 239-41.
29. Manjunath U, Pareek RP. Management Group, Medical Center, Birla Institute of Technology and Science (BITS), Pilan -Maternal knowledge and perceptions about the routine immunization programme--a study in a semiurban area in Rajasthan. *Indian Journal of Medical Science* 2003 Apr 57(4) 158-63.
30. Bukenya GB, Freeman PA, Department of Community Medicine, Faculty of Medicine, University of Papua New Guinea, possible reasons for non-completion of immunization in an urban settlement of Papua New Guinea. *PNG Medical Journal* 1991 Mar 34 (1)22-5.
31. HMG, MOH, Department of health Service, CHD, National Immunization Program Guideline for District Level Managers. 2060.
32. Page D, Meires J, Dailey A. Department of Community Health and Family Medicine, University of Florida Health Science Center, Jacksonville, USA. Factors influencing immunization status in primary care clinics.
33. Ardythe L. Morrow, Jorge Rosenthal, Hassan D. Lakkis, Jeanne C. Bowers, Frances D. Butterfoss, R. Clinton Crews, and Barry-A Population based Study of Access to Immunization Among Urban Virginia Children Served By Public, Private, and Military Health Care Systems. *PEDIATRICS* Vol. 101 No. 2 February 1998, p. 5

34. Tesemma T. Gondar College of Medical Sciences, Ethiopia. Immunization coverage and identification of problems associated with vaccination delivery in Gondar, northwest Ethiopia. East. African Medical Journal 1997. Apr74(4).pg 239-41.
35. Page D, Meires J, Dailey A. Department of Community Health and Family Medicine, University of Florida Health Science Center, Jacksonville, USA. Factors influencing immunization status in primary care clinics.
36. Ramakrishnan R, Rao TV, Sundaramoorthy L, Joshua V. ICMR Institute for Research in Medical Statistics, Mayor Ramanathan Road, Chennai 600 031, India - Magnitude of recall bias in the estimation of immunization coverage and its determinants.

Questionnaire

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 NID 1st						
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						
No of family						

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

A) It prevents from target diseases.

B) It prevents from all diseases

C) It does no benefit.

D) 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 a interval of more than one month.
- Clinics run rarely .
- Clinics Never run.

Health worker performance

24. Health worker is pontual (good) (medium) (poor)
25. Health worker behavior
26. Health workers counsel after immunization.

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.....

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

32. Why you don't take child for immunization

A, Don't feel need

B, time and place not known.

C, fear of pain/ adverse effect.

D, Busy

E, others.....