Final Report

Determination of Maternal, Neonatal and Infant Mortality in Khotang, Panchthar, Taplejung and Tehrathum Districts

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Executive Summary

Background and Objective: Although Nepal has achieved progress in reducing maternal, neonatal and infant deaths over the years, more need to be done to improve attributing factors including access to health facilities, utilization of maternal and neonatal health services, institutional delivery, and socio-economic status. In the absence of comprehensive registration of deaths and causes of deaths, the accurate measure of maternal, infant and neonatal deaths are difficult. Therefore, the objective of this study was to determine maternal mortality ratio, neonatal and infant mortality rate in Khotang, Panchthar, Taplejung and Tehrathum districts.

Methods: A retrospective study was conducted to enumerate maternal, neonatal, and infant deaths on the past three years preceding the survey. The survey team prepared the list of the health facilities to be covered for survey with the help of District Health Office. A team of research assistants organized a meeting with health workers of the health facility, FCHVs, teachers, local leaders and religious leaders, traditional healers, traditional birth attendants in a health facility. In a meeting, the survey team enlisted all deaths of women aged 15-49 years and neonatal and infant death events of the district retrospectively within last three years, July 15, 2013 to July 15, 2016. The team covered all wards of the VDC (the coverage area of health facility) to collect information of death events. The identified/reported death cases were listed with all the basic information. Then the deaths were validated by the survey team as maternal, neonatal and infant deaths at the household level. The survey team visited each household with deaths as reported by key informants in the meeting along with FCHV of respective ward. During validation, household head and husband/father/mother of the deceased were interviewed.

Findings:

Neonatal mortality rates per 1000 live births in FY 2072/073 were 19.29 in Khotang, 28.81 in Taplejung, 13.77 in Panchthar and 21.13 in Terhathum. Infant mortality rates per 1000 live births in FY 2072/073 were 28.35 in Khotang, 38.31 in Taplejung, 19.09 in Panchthar and 24.09 in Terhthum. In total 748 infant deaths in four districts, 68.7% were delivered at home and 31.3% were delivered at health facility. Among total 748 infant deaths in four districts, 426 (57.0%) deaths were during early neonatal period (within 7 days of birth) and, 75.9% infant deaths were in neonatal period. Perinatal asphyxia (24.9%), neonatal sepsis (16.6%), pneumonia (12.6%), prematurity and complications (12.3%), sepsis (8.6%), and low birth weight with complications (5.1%) were the most common causes of neonatal/infant deaths.

In FY 2072/073, MMR per 100,000 live births was 237 in Taplejung, 127 in Terhthum, 116 in Khotang and 90 in Panchthar. Among total maternal deaths, 24 (46.2%) deaths were during child birth, 22 (42.3%) deaths were within post partum period and 6 (11.5%) deaths were during pregnancy. Regarding place of maternal deaths, 31 (59.6%) deaths took place on the way to hospital. Similarly, 11 (21.2%) maternal deaths occurred at health facility and 10 (19.2%) maternal deaths occurred at home. Among maternal deaths, 30 (57.7%) were due to post partum haemorrhage, 4 (7.7%) were due to obstructed labour, 3 (5.8%) were due to pre-eclampsia and 3 (5.8%) were due to eclampsia.

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Conclusions: The district health system should be strengthened for proper surveillance and reporting of death events including from the community since there are many deaths outside of the health facilities. Post partum haemorrhage, obstructed labour, pre-eclampsia and eclampsia targeted response activities should be available in health facilities for reducing maternal deaths. It is important to decrease patient delay including decision making for seeking care. Every delivery should be attended by skilled birth attendant. Neonatal/infants death prevention activities should address birth asphyxia, neonatal sepsis, still birth, pneumonia, prematurity and complications, sepsis and low birth weight with complications. Capacity of different level health workers should be strengthened to response timely and provide quality of maternal and neonatal care in respective areas.

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Abbreviations

DHO   District Health Office

FCHV   Female Community Health Volunteers

HDI   Human Development Index

HMIS   Health Management Information System

HP   Health Post

IMR   Infant Mortality Rate

MICS   Multiple Indicators Cluster Survey

MMR   Maternal Mortality Ratio

MoHP   Ministry of Health and Population

NDHS   Nepal Demographic and Health Survey

NMR   Neonatal Mortality Rate

PHCC   Primary Health Care Center

UNDP   United Nations Development Programme

UNICEF   United Nations Children's Fund

VDC   Village Development Committee

WHO   World Health Organization

1. Introduction

1.1 Background

Nepal has achieved significant reduction in Maternal Mortality Ratio (MMR) from 539 per hundred thousand live births in 1996 to 281 per hundred thousand live births in 2006 (NDHS, MOHP 2006). Population Monograph of Nepal (2014) uses the 2011 census as a basis to estimate a Maternal Mortality Ratio of 480 per hundred thousand live births. So, there are discrepancies in estimating and reporting MMR in Nepal from different surveys and studies (Pokhrel, 2014). The incompleteness of civil registration data, the low institutional delivery rate (35.3%) and low delivery by SBA rate (36%) (NDHS, MOHP 2011) also contribute to making estimations of maternal mortality difficult in Nepal as they contribute to underreporting and misclassification of deaths.

In the absence of comprehensive registration of deaths and causes of deaths, the accurate measurement of maternal mortality ratios are difficult. Thus surveys, censuses and models have to be used to estimate maternal mortality. In Nepal, three nationally representative surveys Nepal Fertility, Family Planning and Health Survey 1991, Nepal Family Health Survey 1996 and Nepal Demographic and Health Survey 2006 used the Sisterhood method whereas the interagency team (WHO, UNICEF, UNFPA, the World Bank and UNPD) used reproductive-age mortality studies (RAMOS) to identify maternal deaths (Pradhan, 2014). However, there are variations exist in estimates of maternal mortality (Curtis et al., 2015). The first maternal mortality study conducted in Nepal in 1998 revealed maternal mortality ratio of 539 per 100,000 live births (whereas it was reported as 229 per 100,000 live births in 2008 among eight study districts (Subedi et al., 2009).

Therefore, there is the need to explore other methods that can provide data on MMR as well as provide information on the cause of death. Country context specific survey methods are essential as the best approach in the absence of vital registration data. Different studies used variety of methods and sources to obtain maternal and neonatal deaths. Health facility and community sources were mainly used for the purpose (Mgawadere et al., 2016; Koffi et al., 2015). In Nepal, previous surveys are based on sampling of geographical and ecological administrative units, and further information collection through sisterhood and RAMOS to identify deaths. However, these methods may lead to sampling bias since death events are rare and death case might be in other villages than in the selected sampled cluster. In such case there will be under-estimation of MMR, NMR. Demographic and health survey samples district and sub-district to select the clusters. Therefore, information from DHS cannot provide districtwise MMR and NMR. Census is appropriate for rare events survey but it is not feasible to conduct regularly because of costs and time. Therefore, virtual census collecting information from all households through key informants can be more appropriate and reliable methods for determination of deaths.

According to the NDHS 2011, the neonatal mortality rate in Nepal was 33 deaths per 1,000 live births and the post-neonatal rate for the same period was 13 deaths per 1,000 live births. This indicated that for a Nepali child who survives the first month of its life, the risk of dying is reduced by two-fifths in the remaining 11 months of the first year of life (MOHP, 2011). In Khotang, the neonatal mortality rate was 1.6 per 1000 live births in 2014, 3.2 per 1000 live birth in 2013 and 1.3 per 1000 live birth in 2012, these figures shows variations in different years. In Panchthar district, the neonatal mortality rate was 6.0 per 1000 live births in 2012, 3.6 per 1000 live births in 2013 and 5.4 per 1000 live births in in 2014. In Taplejung the neonatal mortality rate was 0.8 per 1000 live births in 2012, 1.6 per 1000 live births in 2013 and 2.8 per 1000 live births in 2014. The neonatal mortalities show in increasing orders in respective years (DoHS, 2012, 2013, 2014). In Tehrathum, neonatal mortality rate was 0.6 per 1000 live births in 2012 and 2.7 deaths in 2014. No neonatal deaths have been reported in 2013. In 2015, there were no maternal death reports from Khotang, Panchthar and Tehrathum districts; however, Taplejung reported one maternal death. In case of neonatal mortality rate per 1000 live births, Taplejung (17.4) reported highest followed by Tehrathum (5.0), Khotang (3.6) and Panchthar (2.9) in 2015 (DoHS, 2015).

These neonatal deaths estimates need to be interpreted with caution as the live births are estimates but the neonatal deaths are reported counts from health facilities. The reported maternal mortality are depicted in Table 2 from Khotang, Panchthar, Taplejung and Tehrathum districts respectively. The maternal deaths in the districts varies upto 195.5 per 100 000 live births.

Infant mortality is often used as a broad indicator of social development or as a specific indicator of health status in a country (MOHP, 2011). According to NDHS 2011, the infant mortality rate in Nepal was 46 per thousand live births in the reference period of 2006 to 2010.

Monitoring of child mortality rates is used in measuring a country's progress towards Millennium Development Goal 4 which calls for a reduction of two-thirds in child mortality by 2015 (NDHS, MOHP 2011). Infant mortality is often used as a broad indicator of social development or as a specific indicator of health status in a country (MoHP, 2011). According to NDHS 2011, the infant mortality rate in Nepal was 46 per thousand live births in the reference period of 2006 to 2010. Nepal Multiple Indicator Cluster Survey (NMICS) in 2014 revealed neonatal and infant mortality as 23 and 33 per thousand live births respectively (CBS, 2014).

According to Nepal Multiple Indicator Cluster Survey 2014, the four ANC coverage was 59.5%, skilled birth attendant at delivery was 55.6%, institutional deliveries was 55.2%, postpartum health check up for newborn was 57.6%, and postnatal health check up for mother was 57.9% (CBS, 2014). All of these indicators were below 60% indicating the potential contributing factors to death.

Monitoring of child mortality rates is used in measuring a country's progress in health. Millennium Development Goal 4 targeted for a reduction of two-thirds in child mortality by 2015 (MoHP, 2011) and it was achieved. Sustainable development goals (SDG) 3, has targeted

to reduce the MMR to less than 70 per 100 thousand live births and reduce preventable deaths of newborn and children to less than 1 percent by 2030 (National Planning Commission, Nepal, 2015). Similarly, Nepal Health Sector Strategy (2015-2020) has also implied maternal mortality ratio (MMR) per 100,000 live births, under five mortality rate and neonatal mortality rate per 1000 live births as among goal level indicators. MMR has been targeted to 125 per 100,000 live births by 2020 as compared to 190 of 2013 as baseline. Similarly, under five mortality rate and neonatal mortality rate per 1000 live births have been targeted to 28 and 17.5 by 2020 as opposed to 38 and 23 of 2014 reported in NMICS (MoHP, 2015).

One Heart World-Wide is implementing interventions to contribute to reduce maternal, neonatal and infant mortality in Dhading, Sindhupalchowk and Bhojpur districts. Additional Khotang, Panchthar, Taplejung and Tehrathum have been selected for the expansion of the similar intervention in these districts. All these districts have been selected because of poor access to health facilities, low utilization rates of maternal and neonatal health services, high proportion of home delivery, and poor socio-economic status. Human development index (HDI) was also poor in these districts. This study provides baseline information for the project to evaluate the project annual progress and outcome at the completion of the project.

Table 1: Maternal and neonatal deaths, 2012-2015 (Annual Report DoHS, 2068-2072)

Years	Khotang		Panchthar		Taplejung		Tehrathum	
	Maternal deaths (In 100000 live birth)	Neonatal deaths (In 1000 live birth)	Maternal deaths (In 100000 live birth)	Neonatal deaths (In 1000 live birth)	Maternal deaths (In 100000 live birth)	Neonatal deaths (In 1000 live birth)	Maternal deaths (In 100000 live birth)	Neonatal deaths (In 1000 live birth)
2068/069	2 (31.6)	8 (1.3)	5 (85.7)	35 (6.0)	0 (0.0)	3 (0.8)	1 (29.9)	2 (0.6)
2069/070	3 (63.5)	15 (3.2)	1 (21.1)	17 (3.6)	6 (195.5)	5 (1.6)	0 (0.0)	0 (0.0)
2070/071	2 (44.4)	7 (1.6)	2 (46.9)	23 (5.4)	1 (55.5)	8 (2.8)	0 (0.0)	6 (2.7)
2071/072	0 (0.0)	16 (3.6)	0 (0.0)	12 (2.9)	1 (34.2)	51 (17.4)	0 (0.0)	11 (5.0)

Table 2: Demographic information related to maternal and child health 2012-2015 (Annual Report DoHS, 2068-2072)

Districts	Year	Total population	Under one year Population	Married female pop 15-49 years	Expected live birth
Khotang	2068/69	274678	6013	52361	6314
	2069/70	205854	4501	39245	4723
	2070/71	199242	4332	38403	4505
	2071/72	**193385**	4282	41483	4416
Panchthar	2068/69	243835	5550	47476	5832
	2069/70	197791	4504	38514	4732
	2070/71	187917	4082	39201	4261
	2071/72	**193593**	4135	42525	4202
Taplejung	2068/69	161528	3696	31353	3887
	2069/70	127615	2922	24771	3069
	2070/71	124630	2710	24784	2815
	2071/72	**128499**	2857	27595	2927
Tehrathum	2068/69	135265	3184	27141	3344
	2069/70	100037	2356	20071	2472

	2070/71	98015	2129	20590	2220
	2071/72	**101209**	2147	22489	2192

1.2 Objective of the Survey

The major objective of the survey is to determine maternal mortality ratio, neonatal and infant mortality rate in Khotang, Panchthar, Taplejung and Tehrathum Districts.

1.3 Definitions

Maternal deaths: The WHO defines maternal death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (International Classification of Diseases, 2010 p.156).

Maternal mortality ratio (per 100 000 live births): Maternal mortality ratio is calculated as the number of maternal deaths during a given time period per 100,000 live births during the same time period (WHO 2014).

Neonatal deaths: The death of a newborn within 28 days of delivery is considered as neonatal deaths.

Neonatal mortality rate (per 1000 live births): The number of neonatal deaths per 1000 live births.

Infant deaths: The death of a child between birth and their first birthday is considered as infant deaths.

Infant mortality rate (per 1000 live births): The number of infant deaths per 1000 live births.

Child deaths: The death of a child between one year of age and five years of age is considered as child deaths.

Child mortality rate (per 1000 live births): The number of child deaths per 1000 live births.

Live birth: The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live birth.

2. Methodology

2.1 Survey Design

A retrospective study was conducted to enumerate maternal, neonatal, and infant mortality. Maternal and infant deaths on the three years preceding the survey (July 15, 2013 to July 15, 2016) were collected from the survey. Maternal Mortality Ratio (MMR) per 100,000 live births was calculated. Likewise, the Neonatal Mortality Rate per 1000 live births, Infant Mortality Rate per 1000 live births were calculated from the identified number of neonatal and infant mortality.

2.2 Survey Districts

This survey was conducted in Khotang, Panchthar, Taplejung and Tehrathum districts. One Heart World-Wide has been implementing the Network of Safety for Women and Newborns Projects in these districts where the maternal and neonatal indicators are relatively poor.

2.3 Data Collection

The data on total number of live births were collected from secondary sources district level census data, district health office, HMIS, health facility based records and FCHV registers as per the relevancy.

The survey covered all of the households of the district through interviewing and gathering information from local health facilities, Female Community Health Volunteers (FCHVs), community leaders, teachers and religious leaders. Since death events are rare, survey through sampling of clusters and households may lead to sampling errors. Therefore, we covered all households gathering female deaths between 15-49 years, neonatal and infant deaths information in the health facility meeting and then visited those households with deaths related to pregnancy, delivery or within 42 days of delivery to validate them. This information was collected from health facilities staff, FCHVs, community leaders, teachers and religious leaders, who had realistic information during the meeting. Further, FCHVs promote health and healthy behavior of mothers and community people for the promotion of safe motherhood, child health, family planning and other community based health services with the support of health personnel from the HPs, and PHCCs. FCHVs are in close contact with mothers from the

beginning of pregnancy upto post natal period. Therefore, FCHVs along with teachers, local leaders, and religious leaders were the key sources of information on maternal and infant deaths. We selected those teachers, religious leaders, local leaders who are the most knowledgeable of maternal, neonatal and infant deaths in their community. Religious leaders are involved in the death rituals in the community. Similarly, school teachers and local leaders have also knowledge on each and every death events in the community.

The teams of nurses/public health personnel prepared the list of the health facilities to be covered for survey with the help of District Health Office. A team of nurses/public health personnel organized a meeting of health workers of the HP, FCHVs, teachers, local leaders and religious leaders, traditional healers, traditional birth attendants in a health facility. In case FCHVs of some ward could not attend the meeting, those FCHVs were contacted through mobile phones to get information of maternal and neonatal deaths in their ward. Further, other informant except FCHV included in the meeting provided the information. In a meeting, the survey team enlisted all female deaths between 15-49 years, neonatal and infant death events of the district retrospectively within last three years, July 15, 2013 to July 15, 2016 through contacting key informants like local health workers, female community health volunteers, teachers, local leaders, traditional healers and religious leaders who involved in the rituals of the death. The team covered all wards of the VDC (the coverage area of health facility) to collect information of death events.

The identified/reported death cases were listed with all the basic information like name, address and other contact details. Three different lists of the maternal, neonatal and infant deaths of the entire VDC according to ward number and year of death were prepared. Then the deaths were validated by the survey team at the household level. The survey team visited the each household with deaths as reported by key informants in the meeting along with FCHV of respective ward.

Separate standard tools for the maternal and neonatal/infant were developed and used for the validation of identified/reported death through key informants. During validation, household head and husband/father of the deceased were interviewed. Further, during household interview for validation, the respondents were asked about the occurrence of any deaths around their house.

A final list of validated death cases was prepared which was used for the mortality ratio/rate calculations (Maskey et al. 2011; Qomariyah et al. 2010; Mir et al. 2014).

2.4 Cause Assignments of Maternal, Neonatal and Infant Deaths

Consultant Gynaecologist from Institute of Medicine, Tribhuvan University reviewed the completed forms and assigned the cause of deaths for each maternal death case. Similarly, consultant pediatrician from Kanti Children's Hospital reviewed the completed neonatal and infant deaths and assigned the cause of deaths for each neonatal/infant deaths.

2.5 Survey Team

The survey team consisted of a team leader, epidemiologist (research coordinator), data analyst/biostatistician, administration and finance officer, field research assistants (nurses/public health personnel) and data entry personnel.

In addition to their academic background, field research assistants were selected based on substantial prior experiences in survey research. Field research assistants were given a 2-day training/orientation sessions, which concentrated on conducting meeting with key informants and detail review of the validation tools.

2.6 Supervision and Monitoring Plan of the Survey

During data collection, close contact between the PHIDReC, One Heart central Office and the field teams was maintained. Supportive supervision visits were done by PHIDReC staff for the first ten days. Supervision was done by One Heart World-Wide central level staff and district level staff. Regular communication was maintained by One Heart World-Wide through emails and/or mobile phones.

2.7 Ethical Considerations

The proposal had received ethical approval from Nepal Health Research Council (NHRC). Before enrolling the selected subject for interview, written consent was obtained as per national ethical guidelines.

2.8 Data Management and Analysis

Collected data were checked for consistency and completeness. Database was prepared into SPSS version 21 and data were entered and cleaned before analysis. Before entering data, training was provided to data entry persons so as to ensure consistency and quality. After completing the entry, data cleaning was performed. Data were analyzed using SPSS version 21.

The identified numbers of maternal deaths were utilized for calculating the Maternal Mortality Ratio (MMR) per 100,000 live births. Likewise, the neonatal and infant mortality rates per 1000 live births were calculated from the identified number of neonatal mortality.

Descriptive tables of immediate causes of deaths from data collected through validation tools, age, sex, geographical region specific deaths were prepared.

3. Results

3.1 Neonatal and Infant Mortality

Among the infant deaths, majority were in neonatal period in all four districts. Although less live births in the district, neonatal and infant deaths were high in Taplejung district. Still birth accounted 0.8% in Khotang, 24.2% in Taplejung, 18.1% in Panchthar and 1.7% Terhathum in FY 2072/73. Among infant deaths in FY 2072/73, 67.5% in Khotang, 57% in Taplejung, 59% in Panchthar, and 86.2% in Terhathum were neonatal deaths.

Table 3: Yearwise still birth, neonates and infants deaths in four districts

Year	Death category	Khotang No. (%)	Taplejung No. (%)	Panchthar No. (%)	Terhathum No. (%)
2070/71 (2013/2014)	Still birth	1 (2.0)	6 (9.2)	4 (14.3)	1 (3.4)
	Neonatal death	40 (81.6)	50 (76.9)	14 (50.0)	26 (89.7)
	Other infant death	8 (16.3)	9 (13.8)	10 (35.7)	2 (6.9)
2071/72 (2014/2015)	Still birth	2 (2.7)	23 (26.4)	11 (22.4)	1 (2.7)
	Neonatal death	56 (74.7)	47 (54.0)	28 (57.1)	27 (73.0)
	Other infant death	17 (22.7)	17 (19.5)	10 (20.4)	9 (24.3)
2072/73 (2015/2016)	Still birth	1 (0.8)	36 (24.2)	19 (18.1)	1 (1.7)
	Neonatal death	83 (67.5)	85 (57.0)	62 (59.0)	50 (86.2)
	Other infant death	39 (31.7)	28 (18.8)	24 (22.9)	7 (12.1)
	Total deaths	247	301	182	124

Neonatal and infant mortality rates per 1000 live births in FY 2072/073 were relatively higher in Taplejung and low in Panchthar. In FY 2071/072, neonatal mortality rates per 1000 live births were 12.68 in Khotang, 16.06 in Taplejung, 6.66 in Panchthar and 12.32 in Terhthum. Similarly, infant mortality rates per 1000 live births in FY 2071/072 were 16.53 in Khotang, 21.87 in Taplejung, 9.04 in Panchthar and 16.42 in Terhthum.

Similarly, neonatal mortality rates per 1000 live births in FY 2072/073 were 19.29 in Khotang, 28.81 in Taplejung, 13.77 in Panchthar and 21.13 in Terhathum. Infant mortality rates per 1000 live births in FY 2072/073 were 28.35 in Khotang, 38.31 in Taplejung, 19.09 in Panchthar and 24.09 in Terhthum.

Table 4: Neonatal and infant mortality rates in four districts

Districts	Year	Live births*	Neonatal deaths	Neonatal mortality rate per 1000 live births	Infant deaths	Infant mortality rate per 1000 live births
Khotang	2070/71 (2013/14)	4505	40	8.88	48	10.65
	2071/72 (2014/15)	4416	56	12.68	73	16.53
	2072/73 (2015/16)	4303	83	19.29	122	28.35
Taplejung	2070/71	2815	50	17.76	59	20.96

	(2013/14)					
	2071/72 (2014/15)	2927	47	16.06	64	21.87
	2072/73 (2015/16)	2950	85	28.81	113	38.31
Panchthar	2070/71 (2013/14)	4261	14	3.29	24	5.63
	2071/72 (2014/15)	4202	28	6.66	38	9.04
	2072/73 (2015/16)	4503	62	13.77	86	19.09
Terhthum	2070/71 (2013/14)	2220	26	11.71	28	12.61
	2071/72 (2014/15)	2192	27	12.32	36	16.42
	2072/73 (2015/16)	2366	50	21.13	57	24.09

*(*Source: Annual Reports, 2014-16, Department of Health Services, Nepal)*

Majority of deaths were reported by FCHVs in all districts. Few of the deaths were reported by teachers and religious persons. Health workers from health facilities (VHW, MCHW) also reported some of the neonatal and infants deaths. HA, AHW did not report any deaths during the meeting.

Table 5: Persons reporting of still births, neonatal and infant deaths in four districts

Death reported by	Khotang		Taplejung		Panchthar		Terhthum		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
FCHV	230	93.1	291	96.7	173	95.1	119	96.0	813	95.2
Teacher	5	2.1	4	1.3	2	1.1	2	1.6	13	1.5
Religious person	0	0.0	1	0	0	0	1	0.8	2	0.2
VHW/MCHW	3	1.2	0	0	3	1.8	1	0.8	7	0.8
Doctor	8	3.2	5	1.7	4	2.2	1	0.8	18	2.1
Nurse/ANM	1	0.4	0	0	0	0	0	0	1	0.1
Total	247	100.0	301	100.0	182	100.0	124	100.0	854	100.0

Among death cases excluding still birth, majority of neonate/infant death cases were delivered at home. However, significant percentage of neonate/infant deaths 28.8% in Khotang, 24.6% in Taplejung, 43.2% in Panchthar, 34.7% in Terhthum were delivered in health facilities. In total 748 infant deaths in four districts, 68.7% were delivered at home and 31.3% were delivered at health facility.

Table 6: Place of delivery of dead neonates/infants in four districts

Place of delivery	Khotang		Taplejung		Panchthar		Terhthum		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Health facility	70	28.8	58	24.6	64	43.2	42	34.7	234	31.3
Home delivery	173	71.2	178	75.4	84	56.8	79	65.3	514	68.7

Total	243	100.0	236	100.0	148	100.0	121	100.0	748	100.0

Among total 748 infant deaths in four districts, 426 (57.0%) deaths were during early neonatal period (within 7 days of birth). Similarly, 75.9% infant deaths were in neonatal period.

Table 7: Age at death according to delivery status excluding still births

Age at death (days)	Khotang		Taplejung		Panchthar		Terhthum	
	Institutional delivery	Home delivery	Institutional delivery	Home delivery	Institutional delivery	Home delivery	Institution al delivery	Home delivery
<7	41 (58.6)	94 (54.3)	39 (67.2)	99 (55.6)	39 (60.9)	44 (52.4)	27(64.3)	43 (54.4)
8-15	4 (5.7)	20 (11.6)	6 (10.3)	21 (11.8)	5 (7.8)	7 (8.3)	8 (19.0)	9 (11.4)
16-28	4 (5.7)	16 (9.2)	1 (1.7)	16 (9.0)	1 (1.6)	8 (9.5)	3 (7.1)	13 (16.5)
29-90	11 (15.7)	22 (12.7)	6 (10.3)	23 (12.9)	12 (18.8)	10 (11.9)	3 (7.1)	9 (11.4)
91-180	6 (8.6)	12 (6.9)	4 (6.9)	11 (6.2)	5 (7.8)	9 (10.7)	1 (2.4)	3 (3.8)
181-270	0 (0.0)	7 (4.0)	2 (3.4)	6 (3.4)	2 (3.1)	5 (6.0)	0 (0.0)	2 (2.5)
>270	4 (5.7)	2 (1.2)	0 (0.0)	2 (1.1)	0 (0.0)	1 (1.2)	0 (0.0)	0 (0.0)

Among total 180 dead infants aged greater than one month in four districts, 14 (7.8%) had low birth weight (<2.5kg).

Table 8: Birth weight of dead infants aged greater than one month

Birth weight status	Khotang		Taplejung		Panchthar		Terhthum	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Birth weight unknown	10	15.6	37	68.5	19	43.2	8	44.4
Normal birth weight	48	75.0	13	24.1	22	50.0	9	50.0
Low birth weight (1.5-2.5 kg)	3	4.7	3	5.6	3	6.8	1	5.6
Very low birth weight (<1.5kg)	3	4.7	1	1.9	0	0.0	0	0.0
Total	64	100.0	54	100.0	44	100.0	18	100.0

Among total 568 dead neonates of four districts, 118 (20.8%) had low birth weight.

Table 9: Birth weight of dead neonates

Birth weight status	Khotang		Taplejung		Panchthar		Terhthum	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Birth weight unknown	42	23.5	136	74.7	51	49.0	29	28.2
Normal birth weight	84	46.9	28	15.4	30	28.8	49	47.6
Low birth weight (1.5-2.5 kg)	38	21.2	11	6.0	14	13.5	20	19.4
Very low birth weight (<1.5kg)	14	7.8	7	3.8	9	8.7	5	4.9
Total	179	100.0	182	100.0	104	100.0	103	100.0

Perinatal asphyxia (24.9%), neonatal sepsis (16.6%), pneumonia (12.6%), prematurity and complications (12.3%), sepsis (8.6%), and low birth weight with complications (5.1%) were the most common causes of neonatal/infant deaths (Table 10).

Table 10: Causes of neonates/infants death in four districts

Causes	Khotang		Taplejung		Panchthar		Terhthum	
	N	%	N	%	N	%	N	%
Perinatal asphyxia	60	24.7	59	25.0	35	23.6	32	26.4
Neonatal sepsis	42	17.3	48	20.3	15	10.1	19	15.7
Pneumonia	29	11.9	30	12.7	23	15.5	12	9.9
Prematurity and complications	34	14.0	19	8.1	22	14.9	17	14.0
Sepsis	23	9.5	17	7.2	9	6.1	15	12.4
Low birth weight with complications	11	4.5	7	3.0	13	8.8	7	5.8
Hypothermia	6	2.5	16	6.8	6	4.1	2	1.7
Sudden Infant Death Syndrome (SIDS) aspiration	5	2.1	10	4.2	5	3.4	3	2.5
Septicemia	3	1.2	0	0.0	10	6.8	3	2.5
Congenital anomaly	6	2.5	4	1.7	1	0.7	0	0.0
Congenital malformation	5	2.1	1	0.4	1	0.7	2	1.7
Aspiration pneumonia	1	0.4	5	2.1	0	0.0	3	2.5
Congenital Heart Disease	2	0.8	3	1.3	0	0.0	1	0.8
Severe jaundice	3	1.2	1	0.4	1	0.7	1	0.8
Sudden Infant Death Syndrome (Asphyxia related)	4	1.6	0	0.0	0	0.0	2	1.7
Malnutrition	0	0.0	3	1.3	2	1.4	0	0.0
Meningitis	2	0.8	1	0.4	1	0.7	0	0.0
Diarrhea	2	0.8	2	0.8	0	0.0	0	0.0
Umbilical hemorrhage	3	1.2	0	0.0	0	0.0	0	0.0
Neural tube defect obstructed labour etc.	0	0.0	3	1.3	0	0.0	0	0.0
Hydrocele, hypoglycemia, animal bite	0	0.0	1	0.4	2	1.4	0	0.0
Unknown cause	2	0.8	6	2.5	2	1.4	2	1.7
Total	243	100.0	236	100.0	148	100.0	121	100.0

3.2 Maternal Mortality

In FY 2071/072, maternal mortality ratio per 100,000 live births was 239 in Taplejung, 136 in Khotang. Similarly in FY 2071/72, MMR was 71 and 91 per 100,000 live births in Panchthar and Terhthum districts respectively.

Similarly, in FY 2072/073, MMR per 100,000 live births was 237 in Taplejung, 127 in Terhthum, 116 in Khotang and 90 in Panchthar (Table 11).

Table 11: Maternal mortality ratio in four districts

Districts	Year	Live births*	Maternal deaths	Maternal mortality ratio per 100,000 live births
Khotang	2070/71 (2013/14)	4505	4	88.79
	2071/72 (2014/15)	4416	6	135.87
	2072/73 (2015/16)	4303	5	116.20
Taplejung	2070/71 (2013/14)	2815	1	35.52
	2071/72 (2014/15)	2927	7	239.15
	2072/73 (2015/16)	2950	7	237.29
Panchthar	2070/71 (2013/14)	4261	3	70.41
	2071/72 (2014/15)	4202	3	71.39
	2072/73 (2015/16)	4503	9	199.87
Terhthum	2070/71 (2013/14)	2220	2	90.09
	2071/72 (2014/15)	2192	2	91.24
	2072/73 (2015/16)	2366	3	126.80

*(*Source: Annual Reports, 2013-15, Department of Health Services, Nepal)*

Among total 52 maternal deaths, 29 (55.8%) were in the age 20-34 years. Maternal deaths in less than 20 years of age and more than 35 years of age were 9 (17.3%) and 9 (17.3%) respectively (Table 12).

Table 12: Age at death of the mother

Age at death (years)	Khotang (n=15)	Taplejung (n=15)	Panchthar (n=15)	Terhthum (n=7)
<20	2 (13.3)	4 (26.7)	1 (6.7)	2 (28.6)
20-34	7 (46.7)	7 (46.7)	10 (66.7)	5 (71.4)
≥35	3 (20.0)	2 (13.3)	4 (26.7)	0 (0.0)
Age unknown	3 (20.0)	2 (13.3)	0 (0.0)	0 (0.0)

Among total maternal deaths, 24 (46.2%) deaths were during child birth, 22 (42.3%) deaths were within post partum period and 6 (11.5%) deaths were during pregnancy (Table 13).

Table 13: Situations of mothers at death

Time of death	Khotang (n=15)	Taplejung (n=15)	Panchthar (n=15)	Terhthum (n=7)
During pregnancy	1 (6.7)	2 (13.3)	3 (20.0)	0 (0.0)
During child birth	8 (53.3)	7 (46.7)	5 (33.3)	4 (57.1)
Within post partum period	6 (40.0)	6 (40.0)	7 (46.7)	3 (42.9)

Regarding place of maternal deaths, 31 (59.6%) deaths took place on the way to hospital. Similarly, 11 (21.2%) maternal deaths occurred at health facility and 10 (19.2%) maternal deaths occurred at home (Table 14).

Table 14: Place of death of the mothers

Place	Khotang (n=15)	Taplejung (n=15)	Panchthar (n=15)	Terhthum (n=7)
At health facility	5 (33.3)	1 (6.7)	3 (20.0)	2 (28.6)
At home	1 (6.7)	1 (6.7)	6 (40.0)	2 (28.6)
On the way to hospital	9 (60.0)	13 (86.7)	6 (40.0)	3 (42.8)

Regarding the causes of deaths, 30 (57.7%) were due to post partum haemorrhage, 4 (7.7%) were due to obstructed labour, 3 (5.8%) were due to pre-eclampsia and 3 (5.8%) were due to eclampsia (Table 15).

Table 15: Causes of maternal deaths

Causes of deaths	Khotang (n=15)	Taplejung (n=15)	Panchthar (n=15)	Terhthum (n=7)	Total (n=52)
Antepartum haemorrhage	1	1	-	-	2 (3.8)
Post partum haemorrhage	5	11	10	4	30 (57.7)
Pre-eclampsia	3	-	-	-	3 (5.8)
Eclampsia	-	-	2	1	3 (5.8)
Pulmonary embolism	-	-	-	1	1 (1.9)
Sepsis	1	1	-	-	2 (3.8)
TB, hepatitis, typhoid, fever	1	-	-	-	1 (1.9)
Obstructed labour	1	1	1	1	4 (7.7)
Gestational diabetes	1	-			1 (1.9)
Hypertension	-	1		-	1 (1.9)
Postpartum phycosis	-	-	1	-	1 (1.9)
Cause unknown	2	-	1	-	3 (5.8)

3. Discussion

Among the infant deaths, majority were in neonatal period in all four districts. Nepal has made huge progress in reduction of under five and infant mortality but the reduction of neonatal mortality is still low because of less targeted interventions for newborns (DoHS, 2015). To reduce neonatal deaths, management of possible severe bacterial infection (PSBI), local bacterial infection, hypothermia, and jaundice, and referral of sick baby to health facilities through FCHVs have been implemented. Globally, three million children die per year in the first 28 days after birth, predominantly due to complications of preterm birth, asphyxia and sepsis (Black et al., 2010).

Although less live births in the district, neonatal and infant deaths were high in Taplejung district. In Nepal, infant mortality rate (IMR) was 48 and 46 per 1000 live births for the year 2006 and 2011 (MoHP, 2006; MoHP, 2011). Ecological region, birth interval, delivery assistant type, baby's birth size and breastfeeding status were significant predictors of infant mortality (Lamichhane et al., 2017). In mountain region, infant mortality rate was 60 per 1000 live births in 2011(Lamichhane et al., 2017).

Among death cases, majority of neonate/infant death cases were delivered at home. In total 748 infant deaths in four districts, 68.7% were delivered at home and 31.3% were delivered at health facility. In Nepal, institutional deliveries were 45%, 50% and 52% respectively in 2012/2013, 2013/2014, and 2014/2015 (DoHS, 2016). Even in health facilities, quality of care provided during pregnancy and delivery remains sub-optimal (Manandhar et al., 2010).

Among total 748 infant deaths in four districts, 426 (57.0%) deaths were during early neonatal period (within 7 days of birth) and 75.9% infant deaths were in neonatal period. The study conducted in four resource poor countries also revealed between 63 to 82% neonatal deaths occurred during early neonatal period (Fottrell et al., 2015).

Among total 180 dead infants other than neonates in four districts, 14 (7.8%) had low birth weight (<2.5kg). Among total 568 dead neonates of four districts, 118 (20.8%) had low birth weight. Babies birth weight is one of the predictors of infant mortality (Manandhar et al., 2010; Lamichhane et al., 2017).

in FY 2072/073, MMR per 100,000 live births was 237 in Taplejung, 127 in Terhthum, 116 in Khotang and 90 in Panchthar. Maternal mortality may be contributed by several factors including low utilization of antenatal care services (Sharma et al., 2016), limited knowledge of

maternal care among primary health care workers (Acharya et al., 2016), distant health facilities etc. Although the obstetric care facilities are improving with time, the feto-maternal outcomes are still poor in Nepal (Ghimire, 2016).

Among total maternal deaths, most of deaths were during child birth and post partum period. Among them the causes of deaths include post partum haemorrhage, obstructed labour, pre-eclampsia and eclampsia. Eclampsia, low oxygen saturation, ICU admission, intubation, mechanical ventilation, and cardiopulmonary resuscitation were most associated with maternal death (Lima et al., 2017).

Regarding place of maternal deaths, about three fifth deaths took place on the way to hospital and rest at the hospital and at home. A number of social factors including delivery conducted by the untrained birth attendant or family members, delays in understanding about maternal complications, delays in decision making to transfer the mother, lack of proper knowledge, education and traditional myth influences the maternal deaths. Social autopsy can be a useful tool to identify factors within the community that took place during a maternal death. The process supports villagers to think and change their behavioural patterns and commit towards preventing such deaths in the future (Biswas et al., 2016).

4. Conclusions and Recommendations

Neonatal mortality rates per 1000 live births in FY 2072/073 were 19.29 in Khotang, 28.81 in Taplejung, 13.77 in Panchthar and 21.13 in Terhathum. Infant mortality rates per 1000 live births in FY 2072/073 were 28.35 in Khotang, 38.31 in Taplejung, 19.09 in Panchthar and 24.09 in Terhthum. Perinatal asphyxia (24.9%), neonatal sepsis (16.6%), pneumonia (12.6%), prematurity and complications (12.3%), sepsis (8.6%), and low birth weight with complications (5.1%) were the most common causes of neonatal/infant deaths.

In FY 2072/073, MMR per 100,000 live births was 237 in Taplejung, 127 in Terhthum, 116 in Khotang and 90 in Panchthar. Among maternal deaths, 30 (57.7%) were due to post partum haemorrhage, 4 (7.7%) were due to obstructed labour, 3 (5.8%) were due to pre-eclampsia and 3 (5.8%) were due to eclampsia.

The following recommendations have been summarized from the study:

a) The present district health system includes only the reporting of deaths from the health facilities. Therefore, it should be strengthened for proper surveillance and reporting of death events including from the community since there are many deaths outside of the health facilities.
b) Post partum haemorrhage, obstructed labour, pre-eclampsia and eclampsia targeted response activities should be available in health facilities for reducing maternal deaths.
c) It is important to decrease patient delay including decision making for seeking care since many of the neonatal/infants and maternal deaths occurred on the way to hospital. This needs awareness raising activities to the community for early decision making to seek care.
d) Every delivery should be attended by skilled birth attendant since the home based mortality was high which was not attended by the skilled birth attendant.
e) Neonatal/infants death prevention activities should address birth asphyxia, neonatal sepsis, still birth, pneumonia, prematurity and complications, sepsis and low birth weight with complications.
f) Capacity of different level health workers should be strengthened to response timely and provide quality of maternal and neonatal care in respective areas.

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Neonatal/Infant Death Validation Form

<table>
<tr><td colspan="2" align="center">मञ्जुरीनामा फाराम</td></tr>
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नमस्कार, मेरो नाम .... हो । म जनस्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र (PHIDReC) बाट आएको हुँ । जनस्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र (PHIDReC) र One Heart World-wide को संयुक्त तत्वाबधानमा खोटाङ ∕ ताप्लेजुङ ∕ पाँचथर ∕ तेह्रथुम जिल्लामा मातृ तथा नवजात शिशुको मृत्युदर सम्बन्धि अनुसन्धान गर्दैछौ । यस्तो किसिमको अध्ययनले भविष्यमा मातृ तथा नवजात शिशुको मृत्युदर घटाउन सकारात्मक परिवर्तन ल्याउने छ । यसै शिलसिलामा प्रस्तुत बिषयमा तपाईसँग केही कुरा गर्न आएको हुँ ।

यो अर्न्तवार्ता करिव ३० मिनेटको हुनेछ र हामीले यस अर्न्तवार्ताबाट आएका सुचनाहरु नोट तथा टिपोट गर्नेछौं । तपाईबाट आएको जानकारीहरु गोप्य रहने छन् र पछि गएर अरुका सुचनाहरुसँग समायोजन गरी एउटा प्रतिवेदन तयार गरिनेछ ।

यस सर्भेक्षणमा तपाईको सहभागिता पूर्णरुपमा तपाईको चाहना बमोजिम हुनेछ । के तपाई यस सर्भेक्षणमा भाग लिनको लागि मन्जुर हुनुहुन्छ ?
१. छु   २. छैन

अन्तरवार्ता दिने व्यक्तिको कोड :....................................अन्तरवार्ता दिनेको दस्तखत: ....

साक्षीको नाम :.................................   साक्षीको दस्तखत: ....

अन्तरवार्ता लिनेको नाम :...

अन्तरवार्ता मिति : ....∕...............∕............................ (गते ∕ महिना ∕ बर्ष)
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</table>

Form No:

A. IDENTIFICATION

District:		
Mother's Name:		Caste:
Address:	VDC/Municipality:	Ward Number:
Death reported by	FCHV ☐ ☐ Teacher ☐ Community leader ☐ Religious person	VHW/MCHW ☐ HW ☐ ☐ Doctor: ☐ Nurse/ANM: Other HW: ☐

B. NEONATAL/CHILDREN INFORMATION

*Use the authentic information sheet/discharge paper whenever available to confirm the diagnosis

Date of Birth:	Date of death:

Age at death: ....days...................months			
Delivery Status	Health Facility	Yes.................1	No..............0
	Home (Presence of FCHV)	Yes.................1	No..............0
	Home (Delivery by SBA of health worker)	Yes.................1	No..............0
Newborn weight	Newborn weight taken within 3 days of delivery	Yes.................1	No..............0
	Newborn was normal weight	Yes.................1	No..............0
	Newborn was low birth weight	Yes.................1	No..............0
	Newborn was very low birth weight	Yes.................1	No..............0
	Birth weight unknown	Yes................1	

C. CASE HISTORY

D. SCREENING QUESTIONS

SN	Conditions (0=absent, 1=present, 2=unknown)			
a.	Not breathing even after cleaning mouth and nose, initial stimulation and suction	0	1	2
a1.	Macerated still birth	0	1	2
a2.	Fresh still birth	0	1	2
b.	Fast Breathing/Pneumonia (छिटो छिटो श्वास फेर्ने/निमोनिया)	0	1	2
c.	Severe Chest In-drawing(कोखा हान्ने)	0	1	2
d.	Lethargy (आलस्यता/चल्न नसक्नु)	0	1	2
e.	Unable to suck mother's milk (आमाको दुध चुस्न नसक्नु)	0	1	2
f.	Severe Hypothermia (शिताङ्ग/चिसो हुनु)	0	1	2
g.	Fever (ज्वरो)	0	1	2
h.	Reddish Umbilicus or Blisters in skin with pus (नाभी रातो भएको वा पिप भरिएका फोकाहरु देखिएका)	0	1	2
i.	Single Boil or 10 or more blisters in skin with pus (एउटा पिलो वा दश वा बढि पिप भरिएका फोकाहरु देखिएका)	0	1	2
j.	Convulsion (काम्ने/ऐठन भएको)	0	1	2
k.	Nasal flaring (नाकको फोरा फुल्ने)	0	1	2
l.	Bulged fontanelle (तालु निस्केको)	0	1	2
m.	Pus from ear (कानबाट पिप बगेको)	0	1	2
n.	Grunting (कन्ने)	0	1	2
o.	Severe Jaundice (कडा जण्डीस)	0	1	2
p.	Diarrhea (पखाला)	0	1	2
q.	Vomiting (वान्ता)	0	1	2

Maternal Death Validation Form

मञ्जुरीनामा फाराम

नमस्कार, मेरो नाम ………………………… हो । म जनस्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र (PHIDReC) बाट आएको हुँ । जनस्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र (PHIDReC) र One Heart World-wide को संयुक्त तत्वाबधानमा खोटाङ∕ताप्लेजुङ∕पाँचथर∕तेह्रथुम जिल्लामा मातृ तथा नवजात शिशुको मृत्युदर सम्बन्धि अनुसन्धान गर्दैछौ । यस्तो किसिमको अध्ययनले भविष्यमा मातृ तथा नवजात शिशुको मृत्युदर घटाउन सकारात्मक परिवर्तन ल्याउने छ । यसै शिलसिलामा प्रस्तुत बिषयमा तपाईसँग केही कुरा गर्न आएको हुँ ।

यो अर्न्तवार्ता करिव ३० मिनेटको हुनेछ र हामीले यस अर्न्तवार्ताबाट आएका सुचनाहरु नोट तथा टिपोट गर्नेछौ । तपाईबाट आएको जानकारीहरु गोप्य रहने छन् र पछि गएर अरुका सुचनाहरुसँग समायोजन गरी एउटा प्रतिवेदन तयार गरिनेछ ।

यस सर्भेक्षणमा तपाईको सहभागिता पूर्णरुपमा तपाईको चाहना बमोजिम हुनेछ । के तपाई यस सर्भेक्षणमा भाग लिनको लागि मन्जुर हुनुहुन्छ ?
१. छु   २. छैन

अन्तरवार्ता दिने व्यक्तिको कोड :………………………………अन्तरवार्ता दिनेको दस्तखतः ………………………………………

साक्षीको नाम   :……………………………   साक्षीको दस्तखतः ……………………………………………

अन्तरवार्ता लिनेको नाम :………………………………

अन्तरवार्ता मिति : …………∕……………∕………………… (गते∕महिना∕बर्ष)

Form No:

A. IDENTIFICATION

District:			
Name of died mother:		Caste:	
Address:	VDC/Municipality:	Ward Number:	
Death reported by	FCHV ☐ ☐ Teacher ☐ Community leader ☐ Religious person	VHW/MCHW ☐	HW ☐ ☐ Doctor: Nurse/ANM: ☐ Other HW: ☐

B. CONTRIBUTORY/ASSOCIATED CONDITIONS
*Use the authentic information sheet/discharge paper whenever available to confirm the presence of the life threatening conditions and organ dysfunctions

Pregnancy	Mother's history of illness	Yes………………1	No……………0
	Prolonged/Obstructed Labour	Yes………………1	No……………0

	Premature Birth	Yes…………….1			No…………..0		
	Age at last pregnancy (completed years)						
	Date of death:						
	How old was she when she died?						
	Education	Illiterate ……..0	Literate ……..1	Primary …….2	Lower secondary/S econdary …….3	Higher secondary and above …..4	
	Parity						
	Gravida						
	When did she die?	During pregnancy……… 1	During child birth…2	Within 2 months after the end of pregnancy or child birth………3			
	Where did she die?	At home….1	On the way to health facility…..2	At health facility……3			

C. CASE HISTORY

D. CASE SUMMARY (use case definition form to confirm diagnosis)

S.N.	Conditions *(0=absent, 1=present, 2=unknown)*			
1	**Women with life-threatening conditions**			
1.1	**Women with severe complications**			
a.	Severe postpartum haemorrhage (प्रसुती पश्चात अत्याधिक रक्तश्राब)	0	1	2
b.	Severe pre-eclampsia	0	1	2
c.	Eclampsia (मुर्छा पर्नु)	0	1	2
d.	Sepsis or severe systemic infection (सेप्सीस/जटिल संक्रमण)	0	1	2
e.	Jaundice (जण्डीस)	0	1	2
f.	Ruptured uterus (पाठेघर च्यातिएको)	0	1	2
g.	Other complications associated with severe maternal outcome (आमा सम्बन्धी अन्य जटिलता)	0	1	2
1.2	**Women undergoing critical interventions or intensive care unit admission**			
a.	Use of blood products (रगत लिएको वा चढाएको)	0	1	2
b.	Interventional radiology (औषधि प्रयोग गरेर सि.टी स्क्यान/एम.आर.आइ. गरेको)	0	1	2
c.	Laparotomy (पाठेघरको शल्यक्रिया गरेको)	0	1	2
d.	Admission to intensive care unit/≥6 hours in the recovery room (आइ.सि. यु. मा भर्ना गरेको/छ वा छ घण्टा भन्दा बढि रिकभरी रुममा राखेको)	0	1	2
2	**Organ dysfunction in maternal death cases** *(Only for Health Facility Deaths and Community Deaths with the Diagnostic card)*			

a.	Cardiovascular dysfunction (मुटु तथा नशाले काम नगरेको)	0	1	2
b.	Respiratory dysfunction (श्वास प्रश्वासले काम नगरेको)	0	1	2
c.	Renal dysfunction (मृगौलाले काम नगरेको)	0	1	2
d.	Coagulation/haematologic dysfunction (रगत नजमेको)	0	1	2
e.	Hepatic dysfunction (कलेजोले काम नगरेको)	0	1	2
f.	Neurologic dysfunction (नशा सम्बन्धी समस्या)	0	1	2
g.	Uterine dysfunction/hysterectomy (पाठेघरले काम नगरेको/पाठेघर निकालेको)	0	1	2
h.	Multiple organ dysfunction (धेरै अंगहरुले काम नगरेको)	0	1	2
i.	Unspecified organ dysfunction (यहि अंगले काम नगरेको भन्ने थाहा नभएको)	0	1	2
3	Underlying causes			
a.	Pregnancy with abortive outcome (गर्भ खेर गएको)	0	1	2
b.	Obstetric haemorrhage (प्रसुती अवस्थामा रक्तश्राब)	0	1	2
c.	Hypertensive disorders (उच्च रक्तचाप सम्बन्धी समस्या)	0	1	2
d.	Pregnancy-related infection (गर्भावस्था सम्बन्धी संक्रमण)	0	1	2
e.	Other obstetric disease or complication (अन्य प्रसुती सम्बन्धी रोग वा जटिलता)	0	1	2
f.	Medical/Surgical/Mental disease or complication (मेडिकल/शल्यक्रिया/मानसिक रोग वा जटिलता)	0	1	2
g.	Unanticipated complications of management (नसोचेको जटिल समस्याको व्यवस्थापन)	0	1	2
h.	Coincidental conditions (एकैपटक हुने जटिल अवस्था)	0	1	2
i.	Unknown (थाहा नभएका कारणहरु)	0	1	2
4	Contributory causes/associated conditions			
a.	Anaemia (रक्तअल्पता)	0	1	2
b.	HIV infection (एच.आइ.भी. संक्रमण)	0	1	2
c.	Previous caesarean section (यस अगाडी पेट चिरेको)	0	1	2
d.	Prolonged / obstructed labour (लामो सुत्केरी ब्यथा/सुत्केरी हुनलाइ अबरोध)	0	1	2
e.	Other locally specified………………………………(अन्य स्थनिय कारणहरु)	0	1	2
f.	Other locally specified………………………………	0	1	2
g.	Other locally specified……………………………	0	1	2
h.	Other locally specified……………………………	0	1	2
5	End of pregnancy			
a.	Vaginal delivery (सामान्य सुत्केरी)	0	1	2
b.	Caesarean Section (पेट चिरेर बच्चा निकाल्नु)	0	1	2
c.	Complete abortion (पुर्ण गर्भपतन)	0	1	2
d.	Curettage/vacuum aspiration (क्युरेट गरेको/पाठेघर सफा गरेको)	0	1	2
e.	Medical methods for uterine evacuation (औषधी प्रयोग गरेर पाठेघर सफा गरेको)	0	1	2
f.	Laparotomy for ectopic pregnancy (नलिमा बच्चा बसेर पेट चिरेको)	0	1	2
g.	Other/unknown (अन्य /थाहा नभएको)	0	1	2
h.	Women still pregnant at discharge from hospital or at death (अस्पतालबाट डिस्चार्ज हुदा गर्भवती रहेको वा गर्भवती अवस्थामै मृत्यु भएको)	0	1	2
i.	Preterm births (महिना नपुगी बच्चा जन्मेको)	0	1	2
j.	Stillbirths (मरेको बच्चा जन्मेको)	0	1	2
k.	Perinatal deaths (बच्चा बसेको २८ हप्ता देखी बच्च जन्मेको २८ दिन सम्म मरेको)	0	1	2

Ethical Approval Letter

Government of Nepal
Nepal Health Research Council (NHRC)
Estd. 1991

Ref. No.: 655

04 October 2016

Mr. Satya Narayan Acharya
Principal Investigator
One Heart World wide
Kathmandu

Subject: Approval of Research Proposal entitled **Determination of Maternal, neonatal and infant mortality in Khotang, Panchthar, Taplejung and Tehrathum districts**

Dear Mr. Acharya,

It is my pleasure to inform you that the above-mentioned proposal submitted on **24 August, 2016** [Reg.no. **244/2016** please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on **21 September 2016**.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol before the expiration date of this approval. Expiration date of this study is **February 2017**

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission. The researchers will not be allowed to ship any raw/crude human biomaterial outside the country; only extracted and amplified samples can be taken to labs outside of Nepal for further study, as per the protocol submitted and approved by the NHRC. The remaining samples of the lab should be destroyed as per standard operating procedure, the process documented, and the NHRC informed.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal and submit progress report and full or summary report upon completion.

As per your research proposal, the total research amount is **NRs. 69,33,900.00** and accordingly the processing fee amount to **NRs. 2,08,017.00** . It is acknowledged that the above-mentioned processing fee has been received at NHRC.

If you have any questions, please contact the Ethical Review M & E section of NHRC.

Thanking you,

Dr. Khem Bahadur Karki
Member Secretary

Tel: +977 1 4254220, Fax: +977 1 4262469, Ramshah Path, PO Box: 7626, Kathmandu, Nepal
Website: http://www.nhrc.org.np, E-mail: nhrc@nhrc.org.np

Support Letters from District Public/Health Offices

नेपाल सरकार
स्वास्थ्य मन्त्रालय
स्वास्थ्य सेवा विभाग
पूर्वाञ्चल क्षेत्रीय स्वास्थ्य निर्देशनालय

जिल्ला स्वास्थ्य कार्यालय खोटाङ

सगरमाथा अञ्चल

प म : २०७३/०७४
च न ५९८

मिति : २०७३/०५/२७

विषय : आवश्यक सहयोग गर्नु हुन ।

श्री प्राथमिक स्वास्थ्य केन्द्र २ वटा (ऐसेलुखर्क र चिसापानी)
श्री स्वास्थ्य चौकी ७ वटा ।
श्री उप-स्वास्थ्य चौकी २ वटा (दिप्लुङ र स-छितापोखरी)

प्रस्तुत विषयमा One Heart World Wide Kathmandu बाट तांहा स्वास्थ्य संस्थामा Maternal and Neotal Health सम्बन्धि Base line Survey गर्नका लागी खटि आउनु भएका टिमलाई तांहाबाट आवश्यक सहयोग गरि दिनु हुन अनुरोध छ ।

बोधार्थ
श्री One Heart World Wide Kathmandu .

(डा.राम बहादुर के.सी)
जि. स्वा. का. प्रमुख

नेपाल
स्वास्थ्य तथा जनसंख्या मन्त्रालय
स्वास्थ्य सेवा विभाग
पुर्वाञ्चल स्वास्थ्य महानिर्देशनालय
स्वास्थ्य सेवा विभाग
पुर्वाञ्चल क्षेत्रीय स्वास्थ्य निर्देशनालय
जिल्ला स्वास्थ्य कार्यालय
तेह्रथुम

फोन न ०२६-४८०

४८०

४८०

पत्र संख्या :- ०७३/७४

चलानी नम्बर:- 646

(कोशी अञ्चल, नेपाल)

विषय :-आवश्यक सहयोग गरिदिने बारो।

श्री .... प्रा. स्वा. के/ स्वा. चौं. ,

तेह्रथुम ।

प्रस्तुत विषयमा, यस जिल्लामा मिति २०७३।०८।०५ गतेदेखि जनस्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र काठमाडौं र One Heart World - Wide को आयोजनामा Maternal , Neonatal and Infant Mortality Study सम्बन्धी तथाङ्क संकलन गर्न आउनु भएका टोलीलाई आवश्यक सहयोग गरिदिनु हुन अनुरोध छ ।

(डा. जय कुमार शाह)

नि. जिल्ला स्वास्थ्य प्रमुख

नेपाल सरकार
स्वास्थ्य मंत्रालय
स्वास्थ्य सेवा विभाग
पूर्वाञ्चल क्षेत्रीय स्वास्थ्य निर्देशनालय
जिल्ला स्वास्थ्य कार्यालय
ताप्लेजुङ्ग
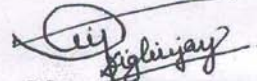
फो.नं:०२४-४६०१८८
:०२४ -४६०१८९
फ्याक्स: ०२४ -४६०१८९

आ.व.०७३/०७४
च.नं. ५२२

मिति:२०७३ / ०७ / २६

विषय:आवस्यक सहयोग गरिदिने वारे ।

श्री प्रा.स्वा.के. / स्वा.चौ...
ताप्लेजुङ्ग ।

प्रस्तुत विषयमा जन स्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र(PHIDReC) को मिति २०७३।०७।२२ च.नं.१६४ को प्राप्त पत्र अनुसार One Heart World-Wide को आयोजनामा हुने Maternal Neonatal and Infant Mortality study तथा तथ्याङ्क संकलन गर्नको लागि आउनुहुने टिमलाई आवस्यक सहयोग गरिदिनहुन अनुरोध छ ।

डा.दिग्विजय कुमार ठाकुर
कार्यालय प्रमुख
निमित्त स्वास्थ्य प्रमुख

नेपाल सरकार
स्वास्थ्य मन्त्रालय
स्वास्थ्य सेवा विभाग
पूर्वाञ्चल क्षेत्रीय स्वास्थ्य निर्देशनालय

Fax ५२०१८९
☎ ०२४ –५२०१८८
५२००९०

जिल्ला स्वास्थ्य कार्यालय

पाँचथर, फिदिम

e-mail - dho.panchthar@yahoo.com

मेची अञ्चल ,नेपाल

प .स . :- ०७३/७४
चलानी नं. :- ६९८

मिति : - २०७३।०८।१०

बिषय :- आवश्यक सहयोग गरी दिने बारे ।

श्री प्रा.स्वा.के / स्वा.चौ ....।
       पांचथर ।

प्रस्तुत बिषयमा जन स्वास्थ्य तथा सरुवा रोग अनुसन्धान केन्द्र (PHIDReC) ले One Heart
World-Wide को सहयोगमा गर्न लागेको Maternal Neonatal and Infant Mortality study
तथा तथ्याङ्क संकलन गर्नको लागि आउनुहुने टिमलाई आवश्यक सहयोग गरि दिन हुन अनुरोध छ ।

....
(डा.पवनकुमार साह)
निमित्त
जिल्ला स्वास्थ्य प्रमुख

District-wise of Maternal and Neonatal Deaths

District: Khotang

S.N.	Name of the VDC/Municipality	No. of maternal deaths	No. of neonatal deaths	No. of infant deaths
1	Badahare	0	3	1
2	Manglatar	0	4	0
3	Rajapani	0	0	1
4	Bijayakhark	1	0	1
5	Arkhaule	0	2	0
6	Lamidada	0	0	0
7	Dikuwa	3	4	2
8	Chaysmitar	0	8	2
9	Nunthala	0	2	1
10	Mahadevthan	0	2	0
11	Dhitung	0	4	1
12	Kuvinde	0	2	2
13	Bamrang	0	3	0
14	Kharpa	0	1	2
15	Buipa	0	4	1
16	Bahunidada	0	1	1
17	Salle	0	2	0
18	Durchhim	0	6	3
19	Laphyang	0	2	0
20	Khalle	0	4	2
21	Diktel	0	0	1
22	Hanchur	0	3	0
23	Jalpa	0	2	1
24	Makpa	0	0	0
25	Aineselukhark	0	1	1
26	Bakachol	0	1	1
27	Kharmi	0	3	1
28	Patheka	1	0	4
29	Phedi	0	5	4
30	Suntale	0	3	3
31	Saunechaur	0	1	1
32	Faktang	0	4	0
33	Pauwasera	0	1	1
34	Mauwabotey	0	0	0
35	Diplung	0	0	0
36	Devisthan	0	0	0
37	Khartamchha	0	4	3
38	Simpani	0	2	3
39	Indrenipokhari	0	1	0
40	Chipring	0	2	1

41	Likuwapokhari	0	1	0
42	Chisapani	0	1	1
43	Sawakatahare	0	1	3
44	Jaleshwari	1	14	4
45	Dorpachuridada	0	4	3
46	Nirmalidada	0	6	0
47	Bajechayandada	0	3	0
48	Ratancha	0	2	1
49	Matim	0	0	1
50	Khidima	0	1	1
51	Nerpa	0	2	0
52	Baspani	0	1	2
53	Sundel	4	6	2
54	Rakha	0	3	0
55	Dipsung	0	0	0
56	Sapteshwor	1	3	2
57	Temma	1	4	1
58	Yamkha	0	5	1
59	Dandagau	0	5	1
60	Chhitapokhari	0	2	0
61	SateshworChitapokhari	0	4	0
62	Chhorambhu	0	0	0
63	Batase	0	0	0
64	Lichkiramchey	1	1	1
65	BarahaPokhari	0	0	1
66	BadkaDiyale	0	1	0
67	Khotang Bazar	0	2	1
68	Waplukha	0	0	1
69	Kahuley	0	1	0
70	Baksila	1	5	0
71	Chyandada	0	3	0
72	Damarkhushivalaya	0	3	2
73	Dubekol	0	4	0
74	DumreDharapani	0	3	0
75	Jyamire	0	1	0
76	Wopung	0	1	0
	Total	**14**	**180**	**74**

District: Panchthar

S.N.	Name of the VDC/Municipality	Still Birth	No. of maternal deaths	No. of neonatal deaths	No. of infant deaths
1	Bharapa	0	0	1	0
2	Subhang	3	0	6	2
3	Panchami	3	0	1	2
4	Amarpur	1	0	3	3
5	Nagi	0	0	5	0
6	Tharpu	2	1	1	1

7	Oyam	2	1	3	2
8	Phalaicha	2	0	1	3
9	Changtharpu	0	0	3	1
10	Ekteen	3	0	3	1
11	Memeng	1	1	3	0
12	Prangbung	0	0	2	1
13	Sidin	2	0	2	2
14	Nageen	0	1	2	3
15	Yangnam	1	0	5	0
16	Lungrupa	1	1	5	2
17	Ranitar	2	0	3	2
18	Chokmagu	3	1	2	1
19	Siwa	1	0	6	2
20	Lumphabung (Kaphalbote)	0	0	4	0
21	Nawamidanda	1	0	3	1
22	Imbung	1	0	0	1
23	Pawasartep	0	1	1	1
24	Chilingding	3	1	4	0
25	Phaktep	0	0	2	0
26	Ranigaw	7	1	2	3
27	Yasok	1	0	0	0
28	Angsarang	4	0	0	1
29	Syangrumba	2	0	2	1
30	Mangjabung	1	0	2	0
31	Angna	1	0	0	4
32	Mawa	1	0	4	0
33	Sarangdanda	2	2	2	0
34	Olane	1	0	3	1
35	Hangum	0	0	3	0
36	Arubote	0	2	5	3
37	Rabi	2	0	1	1
38	Kurumba	0	1	1	0
39	Limba	1	0	3	0
40	Durdimba	3	0	1	2
41	Phidim Hospital	0	0	1	0
42	Lalikharka	0	1	1	0
	Total	**58**	**15**	**102**	**47**

District: Taplejung

S.N.	Name of the VDC/Municipality	Still Birth	No. of maternal deaths	No. of neonatal deaths	No. of infant deaths
1	Phurumba	5	0	3	0
2	Hangdeva	2	0	5	1
3	Surumkhim	5	1	2	3
4	Thechambu	1	0	6	1

5	Dumrise	1	0	3	0
6	Mehele	5	0	6	1
7	Khewang	4	1	4	2
8	Chaksibote	0	0	0	0
9	Phungling	6	1	7	4
10	Phakumba	1	0	9	4
11	Yamphudin	0	0	2	1
12	Sinam	1	1	0	1
13	Aambegudin	2	0	3	2
14	Thumbedin	1	0	0	1
15	Lingtep	0	0	4	2
16	Masring	0	1	2	1
17	Nalbu	2	0	3	1
18	Papung	0	1	3	4
19	Saba	0	0	3	0
20	Tellok	0	0	4	0
21	Santhakra	1	0	3	1
22	Thinglabhu	0	2	9	0
23	Sanghu	3	0	13	4
24	Dhungshangu	0	0	9	0
25	Change	2	0	2	0
26	Dokhu	3	0	4	3
27	Hangpang	4	0	5	0
28	Limbudin	5	0	3	1
29	Nankholyang	3	0	4	3
30	Niguradin	4	1	3	1
31	Kalikhola	2	1	0	0
32	Pedang	6	0	5	3
33	Sadewa	3	1	1	3
34	Aankhop	2	0	3	0
35	Saplakhu	2	0	3	0
36	Tiringe	0	0	2	1
37	Lelep	2	1	3	0
38	Olangchunggola	0	0	1	1
39	Ekhabu	2	0	0	0
40	Tapethok	3	0	0	0
41	Mamankhe	1	0	5	2
42	Khamlung	4	0	1	1
43	Phawakhola	1	0	3	0
44	Sikaichha	2	0	2	1
45	Liwang	0	0	1	0
46	Khokling	0	2	2	2
47	Sawadin	1	0	3	0
48	Khejenim	2	0	4	0
49	Limkhim	3	0	2	1
50	Phulbari	5	2	9	3
	Total	**102**	**16**	**174**	**60**

District: Tehrathum

S.N.	Name of the VDC/Municipality	Still Birth	No. of maternal deaths	No. of neonatal deaths	No. of infant deaths
1	Myanglung	3	0	4	0
2	Tamphula	1	0	0	1
3	Piple	0	0	2	0
4	Sabla	3	0	0	1
5	Girikhimti	3	0	2	0
6	Ambung	1	0	4	0
7	Solma	1	0	6	0
8	Sungnam	1	0	3	0
9	Basantpur	1	1	6	1
10	Phulek	0	0	1	0
11	Dangpa	0	0	2	0
12	Angdim	0	1	2	1
13	Hamargung	0	1	3	0
14	Panchkanya	0	0	1	0
15	Okhare	0	0	1	2
16	Sudap	0	1	1	0
17	Morahang	0	0	11	0
18	Srijung	0	0	4	1
19	Pautha	0	0	2	3
20	Oyakjung	0	0	5	0
21	Jaljale	0	0	5	1
22	Simle	0	0	5	2
23	Ishibu	3	0	4	0
24	Samdu	5	1	0	0
25	Khamlalung	3	1	5	0
26	Sankranti	4	0	7	0
27	Hwaku	0	1	3	1
28	Iwa	0	0	7	0
29	Chatedhunga	0	0	4	1
30	Chuhandada	0	0	2	1
31	Thoklung	0	0	2	0
32	Phakachamara	0	0	1	0
	Total	**29**	**7**	**105**	**16**

Summary of Field Activities

Khotang

Start date: Sep. 14, 2016
End date: Nov 19, 2016
Number of VDCs visited: 76
Number of wards visited: 192
Number of household visited/interviewed: 260

Detail number of persons interviewed

S.N.	Name of VDC	Number of persons interviewed						
		# of health facility staffs	# of FCHVs	# of community leaders	# of teacher	# of religious leader	# of	Date visited
1.	Temma	3	10		1	1		Nov.9,2016
2.	Yamkha	2	11		2			Nov. 10,2016
3.	Dadagau	3	12		1	1		Nov.11,2016
4.	Chitapokhari	3	7		1	1		Nov 12,2016
5.	SapteshworChitapokhari	2	6			1		Nov 13,2016
6.	Chorambhu	3	9		1	1		Nov.14,2016
7.	Batase	3	7		1			Nov 15,2016
8.	LichkiRamchey	3	6		1			Nov 16,2016
9.	Barahapokhari	5	9		1			Nov 17,2016
10.	Sapteshwor	3	11		1			Nov 23,2016
11.	Baspani	3	10			1		Nov 12,2016
12.	Kharmi	3	10		1	1		Nov 09,2016
13.	Dipsung	4	9		1			Nov 12,2016
14.	Phedi	4	12		1	1		Nov 11,2016
15.	Khartamchha	3	9		1	1		Nov 13,2016
16.	Rakha	3	10		1			Nov 19,2016
17.	Patheka	4	11		1			Nov 10,2016
18.	Sungdel	4	12		1	1		Nov 16.2016
19.	Matim	3	12					Nov 16.2016
20.	Khidima	3	7			1		Nov 17,2016
21.	Nirmalidanda	2	9					Nov 13,2016
22.	BajeChayandada	4	8			1		Nov 14,2016
23.	Ratanche	2	8			1		Nov 15,2016
24.	Nerpa	3	11					Nov 11,2016
25.	Dorpachuridanda	2	14		1	1		Nov 12,2016
26.	Diktel	4	11		1			Nov 10,2016
27.	Lyafang	4	8					Nov 8,2016
28.	Khale	2	10			1		Nov 7, 2016
29.	Rajapani	5	12		1	1		Sep 14,2016
30.	Bijayakharka	4	10		1	1		Sep 15,2016
31.	Buipa	5	11		1	1		Sep 16,2016
32.	Badahare	3	11		1	1		Sep 14,2016

S.N.	Name of VDC	Number of persons interviewed						Date visited
		# of health facility staffs	# of FCHVs	# of community leaders	# of teacher	# of religious leader	# of	
33.	Manglatar	4	12		1	1		Sep 15,2016
34.	Durchhim	3	13		1			Sep 16,2016
35.	Dikuwa	3	10	1	1	1		Sep 14,2016
36.	Chaysmitar	4	11		1	1		Sep 15,2016
37.	Bahunidanda	3	10		1	1		Sep 16,2016
38.	Kharpa	3	14		1	1		Sep 16,2016
39.	Lamidanda	7	15	1	1	1		Sep 15,2016
40.	Arkhaule	3	11		1	1		Sep 14,2016
41.	Bamrang	5	12		1	1		Sep 16,2016
42.	Kuvinde	5	10		1	1		Sep 15,2016
43.	Nunthala	3	11		1	1		Sep 14,2016
44.	Salle	6	10	1	1	1		Sep 17,2016
45.	Mahadevthan	7	13		1	1		Sep 15,2016
46.	Dhitung	5	12		1	1		Sep 14,2016
47.	Saunechaur	3	8		1	1		Nov 9,2016
48.	Faktang	3	6		1	1		Nov 10,2016
49.	Pauwasera	3	8		1	1		Nov 11,2016
50.	Mauwabote	2	8		1	1		Nov 12,2016
51.	Sawakatahare	4	11		1	1		Nov 15,2016
52.	Chisapani	5	13		1			Nov 14,2016
53.	Likuwapokhari	3	11			1		Nov 13,2016
54.	Waplukha	4	10		1			Nov 12,2016
55.	Chipring	4	9					Nov 11,2016
56.	IndreniPokhari	4	12		1			Nov 10,2016
57.	Simpani	4	14		1			Nov 9,2016
58.	Suntale	4	7					Nov 8,2016
59.	Kahule	4	11		1	1		Nov 15,2016
60.	Damarkhushivalaya	2	12		1	1		Nov 16, 2016
61.	Wopung	5	11		1	1		Nov 17,2016
62.	Devisthan	3	8		1	1		Nov 14,2016
63.	Diplung	3	7		1	1		Nov 13,2016
64.	BadkaDiyale	5	13		1	1		Nov 17,2016
65.	Khotang Bazar	6	13		1	1		Nov 18,2016
66.	Dubekol	3	11		1			Nov 20,2016
67.	DumreDharapani	5	14		1			Nov 19,2016
68.	Maheshwari	5	10		1			Nov 16,2016
69.	Bakchol	4	13		1	1		Nov 13,2016
70.	Ainselukhark	4	15		1	1		Nov 12,2016
71.	Makpa	4	11		1	1		Nov 11,2016
72.	Jalpa	4	10		1	1		Nov 9,2016
73.	Hanchur	5	10		1	1		Nov 8, 2016
74.	Jaleshwori	3	11		1			Nov 14,2016
75.	Jyamire	5	10		1			Nov 17,2016
76.	Bakshila	6	12		1	1		Jan 1 ,2017

Taplejung

Start date: 12 Nov, 2016
End date: 24 Nov 2016
Number of VDCs visited: 50
Number of wards visited: 193
Number of household visited/interviewed: 305

Detail number of persons interviewed

S.N.	Name of VDC	# of health facility staffs	Number of persons interviewed					Date visited
			# of FCHVs	# of community leaders	# of teacher	# of religious leader	# of	
1.	Phakumba	2	25		1	1		Nov 15,2016
2.	Phurumbu	2	13					Nov 12,2016
3.	Hangdeva	5	13		1	1		Nov 13,2016
4.	Lelep	3	10	1	1	1		Nov 19,2016
5.	Olangchunggola	2	9	1	1	1		Nov 22,2016
6.	Ekhabu	2	7		1			Nov 16,2016
7.	Tapethok	2	10		1	1		Nov 17,2016
8.	Nankholyang	3	21		1			Nov 22,2016
9.	Dokhu	6	16			1		Nov 21,2016
10.	Limbudin	3	15			1		Nov 24,2016
11.	Niguradin	2	14		1			Nov 18,2016
12.	Phulbari	2	12			1		Nov 17,2016
13.	Hangpang	2	15		1	1		Nov 15,2016
14.	Phungling	2	20		1	1		Nov 12,2073
15.	Mehele	4	16		1	1		Nov 13,2016
16.	Surumkhim	2	15		1	1		Nov 14,2016
17.	Khewang	3	16		1	1		Nov 15,2016
18.	Yamphudin	2	13		1	1		Nov 16,2016
19.	Mamankhe	3	17		1	1		Nov 17,2016
20.	Pedang	3	11		1	1		Nov 18,2016
21.	Kalikhola	2	9		1	1		Nov 20,2016
22.	Aankhop	4	16		1	1		Nov 22,2016
23.	Sadewa	3	10		1	1		Nov 21,2016
24.	Sablakhu	3	16		1	1		Nov 23,2016
25.	Khokling	4	16	1	1	1		Nov 21,2016
26.	Liwang	3	14	4	1	1		Nov 20,2016
27.	Sawadin	4	14	1	1	1		Nov 22,2016
28.	Khejenim	4	16	1	1	1		Nov 23,2016
29.	Limakhim	6	13		1	1		Nov 24,2016
30.	Marsing	4	12	1	1	1		Nov 14,2016
31.	Nalbu	4	14	1	1	1		Nov 16,2016
32.	papung	2	12	1	1	1		Nov 18,2016
33.	Saba	3	15	1	1	1		Nov 19,2016
34.	Phawakhola	4	13					Nov 22 ,2016
35.	Sikaichha	2	18					Nov 23,2016
36.	Lingtep	5	14	1	1	1		Nov 13,2016
37.	Sinam	3	18		1	1		Nov 17,2016
38.	Telok	3	18		1			Nov 21,2016

S.N.	Name of VDC							Date visited
39.	Aambegudin	4	18	2	1	1		Nov 18,2016
40.	Thechambu	3	22					Nov 12,2016
41.	Dumrise	3	8			1		Nov 13,2016
42.	Thumbedin	2	16		1			Nov 16,2016
43.	Chaksibote	4	9		1	1		Nov 15,2016
44.	Change	4	15					Nov 18,2016
45.	Khamlung	3	12		1	1		Nov 22,2016
46.	Tiringe	5	12					Nov 24,2016
47.	Sanghu	3	26	1	1	1		Nov 16,2016
48.	Dhungshangu	6	10					Nov 17,2016
49.	Santhakra	4	18		1			Nov 13,2016
50.	Thinglabhu	3	18					Nov 14,2016

Panchthar

Start date: Nov 24,2016
End date: 6 Dec 2016
Number of VDCs visited: 42
Number of wards visited: 141
Number of household visited/interviewed: 184

Detail number of persons interviewed

S.N.	Name of VDC	Number of persons interviewed						
		# of health facility staffs	# of FCHVs	# of community leaders	# of teacher	# of religious leader	# of	Date visited
1.	Syamrumba	4	6		1	1		Dec 1,2016
2.	Yasok	6	8	1	1	1		Nov 30, 2016
3.	Angna	3	9	1	1	1		Dec 4,2016
4.	Mangjabung	3	9	1	1	2		Dec 3,2016
5.	PhidimMunicipality,Lalikhark	7	14		1			Nov 27,2016
6.	Ansarang	4	7	1	1	1		Nov 27,2016
7.	Mauwa	4	9		1	1		Dec 5,2016
8.	Durdimba	4	8		1			Dec 10,2016
9.	Limba	4	10		1	1		Dec 10,2016
10.	Ranigau	3	10		1	1		Nov 29,2016
11.	Amarpur	4	9		1	1		Dec 1,2016
12.	Panchami	5	8	1	1	1		Nov 30,2016
13.	Hangum	2	8					Dec 5,2016
14.	Kurumba	2	8		1			Dec 3,2016
15.	Rabi	3	8		1			Dec 2,2016
16.	Arubote	2	9		1	1		Dec 1,2016
17.	Olane	5	8		1	1		Nov 30,2016
18.	Sarangdanda	3	6		1	1		Nov 29,2016
19	Chokmagu	5	9		1			Nov 26,2016
20	Lungrupa	2	10		1	1		Dec 5,2016
21	Tharpu	6	10		1	1		Dec 2, 2016
22	Nagi	4	9	1	1	1		Dec 2,2016
23	Phaktek	5	9		1	1		Dec 4, 2016
24	Chilingding	5	9		1	1		Dec 5,2016

S.N.	Name	# health facility staffs	# FCHVs	# community leaders	# teacher	# religious leader		Date visited
25	Pawasartep	3	8	1	1			Dec 4,2016
26	Imbung	5	9		1	1		Dec 1,2016
27	Nawamidanda	5	9		1	1		Nov 30,2016
28	Lumfabung	6	8		1	1		Nov 29,2016
29	Siwa	5	8		1	1		Nov 28,2016
30	Ranitar	2	9	1	1	1		Dec 6,2016
31	Nageen	4	15		1	1		Dec 3,2016
32	Yangnam	5	9		1			Dec 2,2106
33	Changtharpu	5	8		1	1		Dec 2,2016
34	Subhang	5	9		1	1		Nov 30,2016
35	Bharapa	2	6			1		Nov 27,2016
36	Oyam	5	9	1	1	1		Dec 1,2016
37	Phalaicha	4	9	1		1		Dec 3,2016
38	Sidin	3	9		1	1		Dec 2,2016
39	Prangbung	5	8		1			Dec 1,2016
40	Memeng	4	9		1	1		Nov 30,2016
41	Ekteen	3	13	1	1	1`		Nov26,2016

Tehrathum

Start date: 21 Nov,2016
End date: 28 Nov 2016
Number of VDCs visited: 32
Number of wards visited: 103
Number of household visited/interviewed: 125

Detail number of persons interviewed

		Number of persons interviewed						
S.N.	Name of VDC	# of health facility staffs	# of FCHVs	# of community leaders	# of teacher	# of religious leader	# of	Date visited
1	Thoklung	3	13			1		Nov 28,2016
2	Chuhandanda	5	14	1	1			Nov 27,2016
3	Chatedhunga	4	14		1			Nov 28,2016
4	Hwaku	4	13	1	1			Nov 24,2016
5	Iwa	5	15		1	1		Nov 25,2016
6	Sabla	5	9		1	1		Nov 24,2016
7	Tamphula	4	9	1	1	1		Nov 23,2016
8	Myanglung	2	15		1	1		Nov 22,2016
9	Angdim	4	8		1	1		Nov 26,2016
10	Phakachamara	5	10		1	1		Nov 23,2016
11	Ambung	5	10		1	1		Nov 27,2016
12	Piple	5	10		1	1		Nov 26,2016
13	Jirikhimti	4	11		1	1		Nov 25,2016
14	Okhare	5	12		1	1		Nov 21,2016
15	Hamargung	8	8		1	1		Nov 25,2016
16	Sudap	4	8		1	1		Nov 22,2016
17	Panchakanya	5	6		1	1		Nov 9,2016
18	Khamlalung	2	12		1	1		Nov 25,2016
19	Ishibu	3	11		1	1		Nov 23,2016

20	Sankranti	6	15			1		Nov 28,2016
21	Samdu	3	11		1	1		Nov 24,2016
22	Simle	3	16		1	1		Nov 27,2016
23	Jaljale	3	12		1	1		Nov 26,2016
24	Oyakjung	3	15		1	1		Nov 25,2016
25	Pauthak	3	9					Nov 24,2016
26	Srijung	3	8		1			Nov 23,2016
27	Morahang	3	9		1	1		Nov 21,2016
28	Solma	4	12		1	1		Nov 21,2016
29	Sungnam	3	13			1		Nov 22,2016
30	Basantpur	4	10		1	1		Nov 23,2016
31	Phulek	2	10			1		Nov 23,2016
32	Dangpa	3	9			1		Nov 24,2016

Photos of Data Collection Activities