

# Coverage and Compliance of Chlorhexidine (Kawach) in Banke, Jumla and Bajhang Districts

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## Abbreviations

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ANC	Antenatal Care
CHDK	Clean Home Delivery Kit
CHX	Chlorhexidine
DoHS	Department of Health Services
FCHVs	Female Community Health Volunteers
FHD	Family Health Division
HF	Health Facilities
IMR	Infant Mortality Rate
KAP	Knowledge Attitude and Practices
MDG	Millennium Development Goal
MNH	Maternal and Newborn Health
NDHS	Nepal Demographic and Health Survey
NFHP	Nepal Family Health Program
NMR	Neonatal Mortality Rate
PPS	Population Proportion to Size
RDW	Recently Delivered Women
SBA	Skill Birth Attendants
TT	Tetanus Toxide
VDCs	Village Development Committees

## Summary

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### Introduction

Reduction of infant mortality rate (IMR) by two thirds by 2015 still remains goal for Nepal. As Nepal Demographic and Health Survey (NDHS) 2011 points out that 72 percent of infant deaths take place during the first month of birth, preventing neonatal deaths can contribute in the IMR. Several recent studies have identified an infection of umbilical cord stump (Omphalitis) as one of the leading causes of neonatal mortality in developing countries. So, use of 4% chlorhexidine (CHX) for cord stump care could be a simple intervention to reduce neonatal mortality rate (NMR). Department of Health Services (DoHS) thus has piloted the use of CHX lotion called *Kawach* in the umbilical cord stump of the newborn in Banke, Jumla and Bajhang districts as part of essential newborn care program at community level.

### Coverage and Compliance Survey:

The purpose of the household survey was to collect information on the coverage and compliance of CHX in Banke, Bajhang and Jumla districts. The study was based on multiple stage sampling, which first identified 30 clusters in each districts. Secondly, based on the number of household settlements, segments were selected where index household was selected by 'spin the bottle' method. The screening form-I was filled from the index household to locate the presence of married women of reproductive age. The screening-II was administered among women who were pregnant in the last two years and finally, the main questionnaire was administered to the women who had given birth in last one year. A total of 600 recently delivered women (RDW) in each districts were interviewed as main respondents selecting 20 RDW from each cluster. The report here presents the data collected from RDW who had live births only.

### Results

#### *Background Characteristics of RDW*

The majority of RDW belonged to the age group of 20-24 years. The proportion of younger mothers aged 15-19 years was higher in Jumla compared to the other two districts. Likewise, Jumla had least proportion of literate RDW (20%) than Bajhang (29%) and Banke (47%). Around eight in ten RDW in Jumla and Bajhang had no schooling. Though, Banke also shows low education attainments, it was slightly better than the remaining two districts with 20 percent RDW with some secondary level and 12 percent with SLC and higher level of education. The RDW of upper caste group were the predominant ethnic group in the study. There was predominance of the upper caste group in all three districts. The RDW belonging to Dalit groups are more in Jumla (24%) followed by Bajhang (18%) and Banke (13%).

#### *Antenatal and Delivery Care*

Nearly all RDW in the three study districts knew the FCHV working in their community. Yet, only 82 percent of the RDW in Banke, 85 percent in Jumla and 68 percent of the RDW met with a FCHV in their last pregnancy. Antenatal Care (ANC) services-seeking behavior was almost universal in the study districts. The proportion of RDW who attended at least four ANC check ups during the entire pregnancy period, however, declines sharply in all districts (69% in Banke, 62% in Jumla and 40% in Bajhang). Over nine in ten RDW in Banke and Jumla and slightly less than eight in ten in Bajhang had taken at least one shot Tetanus

Toxide (TT) vaccine during their last pregnancy. The proportion of RDW who had taken the prescribed dose of two shots of TT vaccine was higher in Jumla (84%) followed by Bajhang (67%) and Banke (57%). Around nine in ten RDW in Banke and Jumla and eight in ten in Bajhang had taken de-worming tablets in their last pregnancy.

Consumption of iron-folic-acid tablets during pregnancy was very high among the respondents (96% in Banke, 93% in Jumla and 84% in Bajhang). Though the intake of the tablets is very high in all three districts, only about four in ten RDW in Banke and Bajhang districts each and slightly higher than one third in Jumla district had taken the entire recommended dose of 180 tablets during the pregnancy period.

Regarding the place of delivery, Banke accounts highest for institutional deliveries at 50% followed by 34 percent in Jumla and 29 percent in Bajhang. Among the study districts, especially in Banke, a high percentage of births were assisted by a skilled birth attendant (staff nurse, doctor, and ANM) than compared with the other two districts. Assistance by relative/friend/neighbor and family members in delivery was also highly reported by RDW in the study districts.

### ***Umbilical Cord Cutting Practices***

Around a quarter of RDW in Banke and one-third in Jumla had used a clean home delivery kit (CHDK), while only 12 percent of home deliveries in Bajhang had used a CHDK. Though many RDW in all districts had used a new blade/boiled blade to cut the cord (72% in Banke, 45% in Jumla and 50% in Bajhang), the practice of cutting the cord of a newborn using other instruments such as a sickle (*hasiya* and *chulesi*), knife, used blade, scissor, etc was common in Bajhang (38%) and Jumla (19%). Among them, large proportion of RDW in both Bajhang (99%) and Jumla (89%) reported that those instruments were not boiled before cutting the umbilical cord. Nonetheless, more than eight in ten RDW in all three districts, who did not use a CHDK during home delivery, had used a new string or thread to tie the umbilical cord.

Wooden vessels/sticks/logs were widely used as surface to cut the umbilical cord in home deliveries among those who did not use CHDK. The timing of cutting umbilical cord after birth of child in case of home delivery was different in all three districts governed by their cultural practice. The average timing of cutting of umbilical cord was around 60 minutes in Banke and less than 10 minutes in Jumla and in Bajhang. The timing in Banke is significantly high as they wait for the occupational caste to cut the cord.

### ***Application of Substance on Umbilical Cord Stump***

High proportion of RDW who had home delivery in Bajhang (34%) and Jumla (24%) compared to Banke (9%) reported that they had not applied anything on their newborn's umbilical cord stump. Yet, a majority of RDW in all three districts reported that something was applied to the cord stump of the newborn. Among RDW who stated that something was applied in the cord, majority reported application of Kawach in their child's cord stump followed by other substances. In Banke and Bajhang, after Kawach, oil was the second most frequently used substance on a child's umbilical cord stump, as cited by 14 percent of the respondents in each district. The practice of using turmeric powder was also common in Jumla. On the other hand, in Bajhang, nearly a quarter reported applying ghee or butter (*nauni*) to the cord stump.

### ***Accessibility of Kawach***

A little over half RDW in Banke (52%), 40 percent in Jumla and 38 percent in Bajhang had received Kawach during the pregnancy period. Those RDW who reported of not receiving Kawach told that they never had heard of Kawach and/or FCHVs were supposed to bring Kawach at the time of delivery. Majority of RDW who had received Kawach in all districts had received all the advices including washing hands with soap and water before applying Kawach (> 90% in all three districts), spreading Kawach by finger (> 90% in all three districts), keeping the cord stump untouched by clothes for sometime after applying Kawach (almost 90% in all three districts), and not to apply anything on the stump other than Kawach while keeping it clean and dry (>90% in all districts).

### ***Use of Kawach***

Two third RDW in Banke (67%), around six in ten in Jumla (58%) and almost half in Bajhang (47%) confirmed Kawach was used in their newborns umbilical cord stump after showing the tube of Kawach. In Banke, mostly health workers (47%) followed by FCHV (26%) had applied the Kawach. In reverse, in Jumla mostly FHCV (46%) followed by HW (24%) had applied Kawach. In Bajhang, RDW themselves (44%) had applied Kawach followed by HW (35%). Among the respondents who received Kawach application to their newborns from other than family members (health workers/FCHV/TBA), very high proportion were notified about the application (98% in Jumla, 94% in Banke and 89% in Bajhang).

Kawach use was consistent across RDW of all age groups in all three districts, except that fewer women age 35-49 years than their younger counterparts in Banke and Bajhang had used Kawach. A significantly higher proportion of illiterate RDW had used Kawach in Banke and in Jumla compared to their literate counterparts (70% versus 65% in Banke and 59% versus 55% in Jumla). Conversely, in Bajhang a higher proportion of literate RDW had used it than their illiterate counterparts (52% versus 45%). Furthermore, RDW with a higher level of education (SLC and above) were less likely to use Kawach in Banke and Jumla than RDW with no education. Kawach use was reported to be the lowest among Dalits in all three districts compared to other caste groups. Lower proportion of RDW in the highest wealth quintiles in Banke and Jumla applied Kawach, while, in the case of Bajhang, a higher proportion of RDW in the highest wealth quintile had applied it. Based on place of delivery, three-quarters in Banke and two-thirds in Jumla reported Kawach use in home delivery cases, while Bajhang shows higher Kawach use in institutional delivery cases.

Among RDW who had applied Kawach to their newborn's umbilical cord stump, almost nine in ten in all districts had not applied any other substance besides Kawach. A slightly higher RDW in Jumla had applied other substance than compared with RDW in other two districts. Among those who had not applied Kawach even after receiving it, the common reason was because of delivery in health facility. A considerably smaller number of RDW who received Kawach reported loosing it, delivered at someone else's house, or gave other reasons for not applying it.

### ***Appropriateness of Kawach Application***

Among the RDW who reported Kawach application to their newborn, almost nine in ten in all three districts reported of applying it within two hours of cutting the cord. Although Banke showed a delay in cord cutting, the average timing of applying Kawach after cutting was quicker than the other two districts; for, the timing of applying Kawach after cutting of cord. Among RDW who delivered at home and had applied Kawach, more than 80 percent in all

three districts stated that person who applied Kawach on child's cord stump had washed his/her hands with soap and water.

In most cases, in all the three districts among those who had received Kawach application, it was applied on both the cord stump and the surrounding area. Almost eight in ten RDW in all three districts reported the application of whole content of the tube and nine in ten RDW in all three districts reported the single time application. More than 80 percent RDW further reported that the cord stump was kept untouched for sometime after applying Kawach.

### ***Compliance of Kawach***

Around seven in ten RDW (of those who had applied Kawach to their newborn) in Banke and Bajhan reported meeting the requirements of Kawach application, while this rate was slightly higher in Jumla where a little over three-quarters complied with the prescribed application. There was no difference in compliance of Kawach based on age, literacy status and education level of RDW in all three districts except in Banke where a higher proportion of illiterate RDW and RDW with no education or some primary education had fulfilled the requirements. By caste, in Jumla, the upper caste group showed a significantly higher compliance rate. There was however no difference in Banke and Bajhang based on caste. Household wealth quintile further showed no difference in meeting the compliance of Kawach in Jumla and Bajhang, while in Banke households belonging to the lowest quintile showed a higher compliance than their highest quintile counterparts. A higher proportion of RDW who had delivered the child at home in Banke and who had delivered at a health institution in Jumla had met the requirements, whereas in Bajhang there was no difference according to where the delivery occurred

### ***Timeline Analysis***

Compared to the beginning six months of the program implementation coverage has improved in the later six months of the intervention from 65 to 70 percent in Banke; from 53 to 61 percent in Jumla and from 42 to 51 percent in Bajhang. Similarly, the compliance too had slightly improved in later six month in Banke and Bajhang than compared to earlier months of program implementation, although no significant difference was observed (66% Vs 71% in Banke and 68% Vs 71% in Bajhang). There was however no change in compliance in this two timeline in case of Jumla.

### ***Problem Encountered in the Umbilical Cord of the Newborn***

Very few children above one months of age were reported of occurrence of problem in cord stump (17% in Banke, 12% in Jumla and 8% in Bajhang). Among those who had problems, infection of the cord stump was cited frequently (94% in Banke, 84% in Jumla and 89% in Bajhang). Further seven and nine RDW from Banke and Jumla respectively reported of delayed falling of cord. When encountered with these problems in the umbilical cord stump, most of the RDW were found resorting to home remedies as said by three in ten in Banke, one third in Jumla and above seven in ten in Bajhang. RDW also reported of visiting health facility or health worker when faced with such problem. Some RDW also reported of re-using Kawach to treat the infection of umbilical cord stump while as many as 24 percent in Jumla, and less than 10 percent in Bajhang and in Banke reportedly did nothing about the problem.

### ***Opinion Regarding Kawach Use***

Majority of the RDW (66% in Banke, 53% in Jumla and 50% in Bajhang) expressed that Kawach should be applied in order to prevent infection of the cord stump, yet a considerable

percent of RDW shared that they don't know why Kawach should be applied. Almost a quarter in Jumla responded that Kawach should be applied as it has been advised by health workers and FCHVs to use.

## **Conclusions**

The study has revealed the optimistic findings on coverage and compliance of Kawach. Almost seven in ten newborns in Banke, six in ten in Jumla and about half in Bajhang had received the Kawach application in such a short span of program implementation (i.e within a year). Further, very high proportion of the newborns had met the compliance as per the program mandate i.e received full tube lotion application at a single time within 2 hours of cutting the umbilical cord. Taking consideration of the high acceptance of Kawach in these three pilot districts, the expansion of Kawach in other districts with high occurrence of neonatal mortality or home delivery can be promoted and thus can benefit the neonates' chances of prevention from omphalitis.



## 1.0 Introduction

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### 1.1 Background

Pushing for a better neonatal healthcare is crucial for the achievement of Millennium Development Goals (MDG) to reduce infant and under-five mortality rate by two-thirds by 2015. Data from the 2011 NDHS indicate that there has been a slight decrease in under-five mortality rate that has gone down to 54 deaths per 1,000 live births from 118 deaths in 1996. Likewise, Infant Mortality Rate (IMR) has declined from 79 per 1,000 live births to 48 for the same period. But, the further dissection of reduced under-five mortality and IMR reveal no significant progress in Neonatal Mortality Rate (NMR). Compared to other childhood mortality trend, the NMR has reduced to just 33 from 50 in the same 15 years period, which is more than double of the post-neonatal deaths at 13 per 1,000 live births (Ministry of Health and Population, New ERA, and Macro International Inc., 2011). Bearing in mind, 61 percent of deaths among children under five years and 72 percent of deaths among children under one year occur during the first month of birth, it is requisite that the neonatal deaths should be prioritized in order to reduce the child and infant mortality by two-thirds before 2015. Save the Children had pointed that Nepal's NMR is third highest in the world, (Save the Children/US, 2002) which entails lots of effort needed towards ensuring neonatal health and survival and further to address the apparent cause of neonatal mortality.

NDHS 2006 illustrates that NMR in Nepal is highest in Mid-West (57 deaths/1,000 births) and Far-West (39 deaths/1,000 births) regions which also account for 86 percent and 90 percent home deliveries respectively (Ministry of Health and Population, New ERA, and Macro International Inc., 2006). The regions were observed with instances of delivering a child in a cowshed (*goth*), especially by Dalits and also noted for unhygienic practices of handling the newborn and umbilical cord (Nepal Family Health Program, New ERA, 2007). In addition, according to NDHS 2006, use of non-sterile instruments to cut the umbilical cord; applying different non-medical substances on the cord stump and not wrapping the newborn with clean and warm cloth after the birth are common practices in these regions. Consequently an unhygienic place at the time of delivery, malpractices of handling placenta and the cord stump, lack of awareness about risks associated with infection, lack of knowledge of health service/providers and, adhering to the traditional unhealthy practices, put the newborns to high risk of exposing to pathogens. Such exposure to pathogens through hands, clothes, instruments, and substances used on to cord stumps may result in an infection of umbilical cord stump, known as omphalitis, that has been found contributing to neonatal morbidity and mortality in developing countries (Mullany et. al., 2006). Therefore, one crucial step to aide in reducing the NMR could be the prevention of omphalitis in neonates.

A study conducted in Sarlahi in 2005 showed the risk of omphalitis markedly reduced by cleansing the umbilical cord with Chlorhexidine (CHX) compared to dry cord care or other home treatments. The report additionally claims that the early antisepsis of umbilical cord with CHX reduced the cord infection and overall neonatal mortality. The mortality risk is lowered by 24 percent in the newborn receiving CHX cleansing compared to neonates with dry cord care. Further, the risk is reduced by 34 percent if treated with CHX on the first day (24 hours) of their life (Mullany et. al., 2006).

## **Program Overview**

Use of CHX for cord stump care started as randomized non-inferiority clinical trial of use of CHX lotion over liquid for cord stump care. The study was evaluated through the microbial colonization on the cord stump after 24 hour of application. The result showed that lotion was non-inferior to liquid preparation of CHX (Hodgins et. al., 2010). The study was followed by a community level acceptability study in two village development committees of Banke district. In this study, liquid and lotion preparation of CHX was distributed to pregnant mothers and preference for the preparation was accessed through focus group discussion and key informant interviews after completion of the study period. The community showed preference for “lotion” formulation over “liquid”. Then the use of CHX for cord care was integrated with the ongoing Maternal Newborn Health (MNH) interventions at community level and expanded to all villages of Banke district as pilot study for coverage and compliance. Later, the pilot study was extended to Jumla and Bajhang districts. In this pilot study, CHX was distributed to pregnant mothers during the late pregnancy (8-9 months) by Female Community Health Volunteers (FCHVs). The mothers or family members were counseled about the CHX and method of application. The CHX was also used for the newborns born at health facility and referral hospital in the district by health workers. In this pilot study, 4% Chlorhexidine (CHX) was named as “kawach” for easy understanding at the community level.

### **1.2 Objectives of the Study**

The overall objective of the study was to collect information on the coverage and compliance of CHX lotion application, at community level in Banke, Bajhang and Jumla districts. The specific objectives of the study were.

- i. to assess the accessibility of Kawach in the three pilot districts
- ii. to assess the coverage of Kawach use
- iii. to assess the status of appropriateness of Kawach application,
- iv. to assess compliance of Kawach use

### **1.3 Methodology**

#### ***Study Site***

The coverage and compliance survey for CHX was conducted in three districts: Banke, Jumla and Bajhang. A cross sectional study was designed and households study was carried out in those districts. Banke is a flat land district where as Jumla is hilly district and Bajhang is the mountain district of Nepal. Banke was the district where accessibility study for CHX was done and the program was implemented first. The program was expanded later in other two districts. So, Banke had more than one year implementation of CHX program and other two districts had one year implementation of CHX program.

#### ***Study Population***

The survey collected quantitative information from these three districts on maternal and neonatal health from a recently delivered woman (RDW) living in the household as primary respondents. The RDW were confined to women who had been or were currently married

who had given birth to a living baby or had delivered a still born (that had been in the gestation period for at least 28 weeks) in the year preceding the survey.

### ***Sample Size***

A total of 600 RDW in each district were interviewed to gather the data. The sample size of 600 RDW in each district was calculated assuming an anticipated rate of 50 percent, with a margin error of 5 percent, confidence level at 95 percent and design effect of 1.5 percent.

### ***Sample Design***

The sample design included a stratified two-stage cluster sampling with selection of households through random sampling at the final stage, providing a population-based probability sample of households. The entire VDCs of each of the three districts were included in the sampling frame to ensure a representative result in each district. First, the clusters were identified following Population Proportion to Size (PPS) method and the identified clusters were then segmented (3 to 5) by mapping. Finally, the required numbers of RDW were recruited from those segments in the each cluster.

#### **First Stage: Selection of Clusters**

The first stage of the sampling design included the selection of clusters. Wards being the smallest administrative units in Nepal were taken as cluster units. All wards of each Village Development Committees (VDCs) of each district were listed following the Population Proportion to Size (PPS) method and 30 wards were selected from each district. For this a cumulative household population column was prepared using the recent census data from the Central Bureau of Statistics. Twenty RDW were recruited from each clusters to make a total of 600 samples from 30 clusters in each district.

Based on New ERA's past experiences conducting studies with similar sampling methods, it was determined that at least 6 households needed to be visited to locate one RDW in the Western Terai (6.2) as well as in the Western Mountains (6.1)<sup>1</sup>. Thus, it was required to visit 120-150 households in a cluster in each district, and it was mandatory that each cluster had at least 150 households. The wards that had less than 150 households were combined with their adjoining wards and treated as single cluster. For this, household size in each ward was thoroughly reviewed, and clusters of a minimum of 150 households were formed. Subsequently, the required number of 30 clusters from each stratum was selected following this method.

#### **Second Stage: Selection of Households**

In order to begin household selection, the field team consulted FCHVs and local key informants prior to data collection to prepare a map. The map laid out public places, rivers, forests, temples, farmland and so on to locate settlements. The cluster was divided into 3-5 segments with the estimated number of households in each segment. The first segment was chosen randomly from the list of segments to start the data collection.

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<sup>1</sup> A recent survey of RDW by New ERA for MI in Banke shows that 6.2 households should be visited to locate a RDW. Similarly, NDHS (2006) showed 72 RDWs were present in 437 sample households in Western Mountain Regions, making the proportion of household visit of 6.1.

*i. Selection of Index Household*

The index of households to interview within the selected segment was identified using the ‘Spin the Bottle’ method. For this, a stick or a pen was spine in the center of the sample segment. Following this, the field team walked in the direction that the stick/pen pointed and assigned a number to each of the house until they reached the edge of the settlement, working their way to the right until the all households were assigned numbers. An index household was randomly chosen from a number between one and the total number of houses in each segment.

*ii. Selection of the Main Respondent (RDW)*

After selecting the index household, a screening questionnaire was administered to the head of the household or a knowledgeable person in the household to identify the women in the households between the ages of 15-49 years and whether or not they were pregnant or had given birth in the past two years. If such women were available, a second set of screening questionnaire was administered to each eligible women present in the house. From those eligible women, women who had given birth in the past year (RDW) were chosen, and a structured questionnaire was administered, making the RDW the main respondent. In cases where there was more than one eligible RDW, a random selection procedure was followed to select one respondent from each household.

*iii. Selection of the required Sample Households*

The possible number of RDW in each segment was determined through household screening (using screening form 1). To recruit 20 RDW, the team members filled the screening 1 starting with the index household and ending with the last household in the segment. If a segment had less than 20 RDW, the process was repeated in second and third segments and so on, until the 20 RDW were recruited from the cluster.

Screening 1 was administered in 3,968 households in Banke, 3,119 households in Jumla and 2,859 households in Bajhang with the purpose of listing availability of women aged 15–49 years. A total of 40 households in Banke refused to participate in the survey, and one household in Jumla and two in Bajhang could not be reached, as none of the family members were available for interviewing. Screening 2 was administered to all women in each household who were pregnant in the past two years based on the information provided by the household head. From these women, 621 in Banke, 607 in Jumla and 617 in Bajhang were found eligible as they had delivered within a year preceding the survey and 600 from this pool were selected for the main questionnaire from each district.

**Sample Household Visited and Proportion of RDW**

	<b>Banke</b>	<b>Jumla</b>	<b>Bajhang</b>
No. of clusters visited	30	30	30
No. of households visited	3,968	3,119	2,859
No of women aged 15-49 years	5,809	4,091	3,827
No. of women who were pregnant in last two years	1,030	919	922
No. of RDW screened	621	607	617
Proportion of households with RDW	6.4	5.1	4.6
No. of RDW recruited	600	600	600

### ***Methods of Data Collection and Survey Instruments***

New ERA reviewed the draft instruments developed by NFHP II. There were two sets of screening questionnaires and a set of structured questionnaire designed for the RDW. The first screening questionnaire was administered to the head of the household or a knowledgeable person in the household in order to determine the existence of women aged 15-49 years and whether or not they were pregnant or had given birth in the past two years. The second set of screening questionnaire was administered to each eligible woman (age 15-49 yrs and had delivered a baby or had pregnancy loss in the previous two years) for further confirmation of her age, date of delivery and the number of children she had.

After screening and confirming the existence and availability of RDW (women who had given live births in the preceding year or had a still born after a 28 weeks or more gestation period) in the household, the main questionnaire was administered to her. Though the information on coverage and compliance of Kawach was applicable to RDW with live births only, RDW with still born were also recruited for the survey in order to assess other component on maternal health including awareness on danger signs during antenatal, delivery and postpartum periods, coverage of ANC and PNC services, birth preparedness practice and complications readiness.

In the case of more than one eligible RDW in a household, one RDW was selected randomly. The main household questionnaire included the background characteristics of the respondents as well as their knowledge, attitude on and practice of various aspects of maternal and neonatal health, coverage and compliance of Kawach, level of acceptance and perception on Kawach use and other information directly related to the study objectives.

### ***Field-test of the Survey Instruments***

In order to familiarize the field enumerator with the survey procedures and to identify the necessary changes required to the survey instruments, a pre test was done in Alau VDC of the Parsa district, where Plan Nepal was implementing the CHX pilot study along with community based newborn care program. The pre-test assisted in improving the field procedures and familiarized the rest of the team member with potential survey cases. Based on pre-test, the questionnaires were again reviewed and modified. Also, experiences were shared amongst all team members so that the necessary information could be collected in an efficient manner.

### ***Implementation of Survey***

#### **Field Survey Team Selection**

The household data collection for the study was carried out by 11 field supervisors and 24 enumerators. There were a total of 11 teams of 12 males and 23 females. Each team consisted of one supervisor and two to three enumerators depending on the geographical constraints of the districts. All the field staffs were selected from the pool of New ERA field researchers who have already worked on other similar surveys. The essential requirement for selecting field staff was that they possess relevant work experience in a similar area, work experience in rural communities, academic qualifications, languages known/spoken, and rapport-building capacities.

### Training for the Field Survey Team

Training commenced immediately after the selection of field staff from 5<sup>th</sup> to 15<sup>th</sup> April 2011 that consisted of the standard activities used in New ERA field staff training. The training was conducted by core survey team members. Officials from NFHP II and other stakeholders were also invited to give detailed orientation about the pilot program and the technical insights to the field teams.

### Fieldwork

Each team consisting of three to four members carried out the fieldwork. Each team was assigned to certain number of clusters depending on the geographical constraints. Each field team was provided with the tentative field schedule before their departure to the assigned districts, which was updated after contacting them again once they arrived in the cluster. On arriving to the sampled district, the team contacted the concerned authorities and stakeholders in the districts and then moved to the assigned clusters. The fieldwork commenced on April 18<sup>th</sup> and continued until June 5<sup>th</sup>, 2011.

### Quality Control

Various measures were taken during the data collection to ensure validity and reliability of data. The researcher correctly identified the RDW and administered the household questionnaire. Each questionnaire was filled in correctly and checked before terminating each interview. Field Supervisor checked completed questionnaires for consistency and errors. Apart from this, to further strengthen the field work process and to maintain quality in the data collection process, field supervision was done by New ERA core study team members to Banke from 26<sup>th</sup> - 29<sup>th</sup> April and to Jumla from 7<sup>th</sup> - 12<sup>th</sup> May 2011.

### ***Research Ethics***

The survey procedure was designed to protect participants' privacy, allowing for anonymous and voluntary participation. Prior to the interview, a letter from the MoHP/FHD and NFHP II was presented and the purpose of the study was explained to each participants. The respondents were given the opportunity to ask questions regarding the survey and to decide whether or not to participate in the survey. Prior to interview an informed consent was obtained from each respondent.

### ***Data Entry, Cleaning and Analysis***

Immediately after mobilising the field teams, a software package for data entry was developed by Data Programmer. The computer programming for data entry and analysis were based on questionnaires and expected outputs. A number of quality-check mechanisms, such as range checks and skip instructions, were developed to detect errors during the data entry stage. New ERA started processing and entering the data soon after receiving them from the field. Data entry was done directly from the questionnaires and a double entry process was used for the better accuracy. Before entering data into the computer, all completed questionnaires were thoroughly checked. In addition, a data programmer closely monitored the data entry activities. Data coding and entry was done by trained New ERA employees.

Data was computerized using the SPSS statistical package and descriptive statistics were used to calculate data. The chi-square test was used to compare differences in case of categorical variables and a 95 percent confidence interval was calculated for the main indicators. All the analyses and calculations were carried out in consultation with and under guidance of NFHP II.



## 2.0 Results

### 2.1 Background Characteristics of RDW

Table 1 provides background information of the RDW. A total of 600 RDW in each district were recruited for the study. Among them, four of the selected RDW in Banke, 17 in Jumla and six in Bajhang had still birth after 28 weeks or more gestation period while others had live birth. The data on coverage and compliance of Kawach was collected from RDW with live birth only, however, RDW who had still born was also interviewed during the survey in order to assess other component on maternal health including awareness on danger signs during antenatal, delivery and postpartum periods, coverage of ANC and PNC services, birth preparedness practice and complications readiness which is presented in detail in the main report of this study (JSI and New ERA, 2011). But in this report, RDW with still born are filtered out and only among 596 RDW in Banke, 583 in Jumla and 594 in Bajhang who had live birth were considered for analysis.

Table 1 shows the distribution of RDW with live births by their background characteristics.

The majority of RDW belonged to the age group of 20-24 years (39% in Banke, 46% in Jumla and 40% in Bajhang). The proportion of younger mothers aged 15-19 years was higher in Jumla compared to the other two districts. Likewise, the literacy status shows that Jumla had least proportion of literate RDW (20%) than Bajhang (29%) and Banke (47%). Around eight in ten RDW in Jumla and Bajhang had no schooling. Though, Banke also shows low education attainments, it was slightly better than the remaining two districts with 20 percent RDW with some secondary level and 12 percent with SLC and higher level of education. The RDW of upper caste group were the predominant ethnic group in the study. While Jumla and Bajhang displayed the distribution of mostly upper caste (75% and 82% respectively) and Dalits (25% and 18% respectively) only; Banke displayed more heterogeneity in terms of caste/ethnicity with 24 percent of disadvantaged Janjati group, 19 percent of disadvantaged non-Dalit group, 13 percent Dalits and 12 percent religious minorities.

Background Characteristics	Banke	Jumla	Bajhang
<b>Age</b>			
15-19	15.1	19.2	10.1
20-24	38.9	45.6	40.4
25-29	29.7	21.4	25.4
30-34	10.2	8.7	14.1
35-49	6.0	5.0	9.9
Median age	24.0 yrs	22.0 yrs	24.0 yrs
<b>Literacy Status</b>			
Literate <sup>1</sup>	46.8	19.7	29.0
Illiterate <sup>2</sup>	53.2	80.3	71.0
<b>Level of Schooling<sup>3</sup></b>			
No Education <sup>4</sup>	47.5	77.9	77.4
Some Primary <sup>5</sup>	20.0	11.3	8.6
Some Secondary <sup>6</sup>	20.1	5.1	5.6
SLC and above	12.4	5.7	8.4
<b>Caste/Ethnicity</b>			
Dalit	13.3	24.7	18.4
Disadvantage Janjati	23.8	0.2	
Disadvantage Non-Dalit (Tarai)	18.6		
Religious Minority	11.9		
Upper Caste <sup>7</sup>	32.4	75.1	81.6
<b>Wealth Quintile</b>			
Lowest	19.8	21.3	19.5
Second	20.0	17.8	20.4
Third	20.1	20.4	20.2
Fourth	20.1	21.6	19.9
Highest	20.0	18.9	20.0
<b>Total (n)<sup>8</sup></b>	<b>596</b>	<b>583</b>	<b>594</b>
<sup>1</sup> Includes those who have attended secondary school or higher or who can read a whole sentence <sup>2</sup> Includes those who have never been to school or who can't read whole sentence or can't read at all <sup>3</sup> Includes those who have attended school and completed the highest level <sup>4</sup> Includes those who have never attended school <sup>5</sup> Includes those who have completed 0-4 years of school <sup>6</sup> Includes those who have completed 5-9 years of school <sup>7</sup> Includes 17 advantaged janajati merged in upper caste in Banke <sup>8</sup> Total includes only those RDW who had live birth			

## 2.2 Antenatal and Delivery Care

Table 2 presents the antenatal and delivery care seeking behavior of RDW. The survey result indicates that nearly all RDW in the three study districts knew the FCHV working in their community. Even if, they are familiar with the FCHV in their community, many women (15% to 32%) do not seek advice or counseling from them during pregnancy. Overall, only 82 percent of the RDW in Banke and about 85 percent in Jumla met with a FCHV during their last pregnancy. This rate in Bajhang was even lower where only about two-thirds (68%) of the RDW met with a FCHV in their last pregnancy.

Antenatal Care (ANC) services-seeking behavior was almost universal in the study districts, where almost all RDW in Banke and Jumla and about nine in ten RDW in Bajhang sought ANC services at least once during their last pregnancy. The proportion of RDW who attended at least four ANC check ups during the entire pregnancy period, however, declines sharply in all districts. For instance, in Banke only about seven in ten RDW and in Jumla only about six in ten RDW completed the recommended four ANC checkups.

This rate for Bajhang was even lower at around 40 percent

Regarding the Tetanus Toxide (TT) vaccine, over nine in ten RDW in Banke and Jumla and slightly less than eight in ten in Bajhang had taken at least one shot during their last pregnancy. The survey further shows that the highest number of RDW had taken the prescribed dose of two shots of TT vaccine in Jumla (84%) followed by Bajhang (67%) and Banke (57%). Around nine in ten RDW in Banke and Jumla and eight in ten in Bajhang had taken de-worming tablets in their last pregnancy.

Consumption of iron-folic-acid tablets during pregnancy was very high among the respondents where more than nine in ten RDW in Banke and Jumla and more than eight in ten in Bajhang had taken iron folic acid tablets during the period. Though the intake of the tablets is very high in all three districts, it should however be noted that only about four in ten RDW in Banke and Bajhang districts each and slightly higher than one third in Jumla district had taken the entire recommended dose of 180 tablets during the pregnancy period.

Characteristics	Banke	Jumla	Bajhang
<b>Exposure to FCHV</b>			
Knew FCHV	96.3	98.3	91.9
Met FCHV during pregnancy	82.2	85.4	68.0
<b>Number of ANC Visit</b>			
At least one times	98.5	96.7	89.1
At least four times	68.8	61.7	40.3
Mean Number of ANC visit	4.0	3.5	2.8
<b>Tetanus Toxide Vaccination during pregnancy</b>			
At least one shot	95.1	92.8	78.6
Two or more shots	57.2	83.7	67.0
<b>Intake of De-worming Tablets during pregnancy</b>			
Yes	91.9	88.0	79.9
<b>Intake of Iron-folic-acid Tablets during pregnancy</b>			
At least one tablets	95.8	94.2	84.2
180 or more tablets	40.1	35.2	41.6
Mean number of tablets taken	131.3	127.0	111.9
<b>Place of Delivery</b>			
Institutional Delivery	49.8	33.6	29.1
Home Delivery <sup>1</sup>	50.2	66.4	70.9
<b>Persons assisting Delivery</b>			
Doctor	18.1	5.8	5.4
Staff Nurse	39.6	17.0	14.5
ANM	12.6	19.4	16.0
MCHW	5.4	9.8	3.5
HA	0.8	1.5	1.0
AHW/CMA	3.9	6.0	5.7
VHW	0.0	0.0	0.3
TBA	7.7	5.0	6.4
FCHV	10.7	31.4	7.7
Others <sup>2</sup>	70.8	65.7	77.6
No one	0.8	4.5	11.3
SBA <sup>3</sup>	48.5	32.2	26.3
<b>Total (n)</b>	<b>596</b>	<b>583</b>	<b>594</b>
<sup>1</sup> Home delivery includes delivery at all other places except health facilities (including home, cowshed, road, jungle)			
<sup>2</sup> Other includes relatives, friends, neighbors, family members, and traditional healers			
<sup>3</sup> SBA includes doctor, staff nurse and ANM			

Regarding the place of delivery, the practice of delivering in health institution was highest in Banke with almost half of the total deliveries occurred in health facilities (HF), followed by Jumla with one third deliveries occurred at health facilities. On the other hand, in Bajhang only around three in ten deliveries occurred at health facilities showing high occurrence of home delivery. Among the study districts, especially in Banke, a high percentage of births were assisted by a skilled birth attendant (staff nurse, doctor, and ANM) than compared with the other two districts. Assistance by relative/friend/neighbor and family members in delivery was also highly reported by RDW in the study districts.

### 2.3 Umbilical Cord Cutting Practices

Table 3 shows the types of instruments used to cut the umbilical cord among those who delivered their last child at home. Around a quarter of RDW in Banke and one-third in Jumla had used a clean home delivery kit (CHDK), while only 12 percent of home deliveries in Bajhang had used a CHDK. Though many RDW in all districts had used a new blade/boiled blade to cut the cord (72% in Banke, 45% in Jumla and 50% in Bajhang), the practice of cutting the cord of a newborn using other instruments such as a sickle (*hasiya* and *chulesi*), knife, used blade, scissor, etc was common in Bajhang (38%) and Jumla (19%). In addition, a large proportion of RDW in both Bajhang (99%) and Jumla (89%) districts reported that those instruments were not boiled before cutting the umbilical cord. However, more than eight in ten RDW in all three districts, who did not use a CHDK during home delivery, had used a new string or thread to tie the umbilical cord.

Instruments Descriptions	Banke	Jumla	Bajhang
<b>Instruments used to cut umbilical cord of newborn</b>			
CHDK	23.7	33.6	11.6
New (unused) Blade/Boiled Blade	72.2	45.2	50.1
Others <sup>1</sup>	3.7	19.4	38.2
Do not know	0.3	1.8	0.0
<b>Total (n)</b>	<b>299</b>	<b>387</b>	<b>421</b>
<b>Sterilization of instruments used<sup>2</sup></b>			
Instrument was boiled	25.0	0.0	1.2
Instrument was not boiled	58.3	89.0	98.8
Do not know/Do not remember	16.7	11.1	0.0
<b>Total (n)</b>	<b>12</b>	<b>82</b>	<b>161</b>
<b>Instruments used to tie the umbilical cord of newborn among those who had not used CHDK</b>			
New string/thread	84.6	86.8	94.1
Boiled string/thread	12.8	0.8	0.3
Unbilled used string/thread	2.6	10.5	5.4
Others <sup>3</sup>	0.0	1.2	0.3
Do not know	0.0	0.8	0.0
<b>Total (n)</b>	<b>227</b>	<b>257</b>	<b>372</b>

<sup>1</sup> Others includes used blade, knife, sickle (*hasiya*, *chulesi*), khukuri, scissors  
<sup>2</sup> Sterilization of the instruments was analyzed only among those who have used instruments other than new or boiled blade to cut the umbilical cord.  
<sup>3</sup> Others includes clip, tongue, rubber

RDW were further asked about the surface used to place the cord while cutting (Table 4). Wooden vessels /sticks/logs were widely used in a majority of home deliveries specifically in Bajhang (93%) followed by Jumla (65%). In Banke, around half and, in Jumla, 18 percent of RDW stated that nothing was used. A few RDW also reported using other surfaces like a bamboo spatula, an iron rod and finger nails. This practice was slightly higher in Bajhang, demonstrating the continued unhygienic practices when handling the cord.

Types of Surface	Banke	Jumla	Bajhang
Nothing	52.9	18.3	1.9
Wood/ wooden vessel/stick	16.7	64.6	92.7
Metal coin/vessel	6.2	2.7	0.8
Clay vessels/stones bricks/clay tiles	11.0	5.5	0.0
Plastic disc	1.3	1.6	0.3
Others <sup>1</sup>	0.4	0.4	3.5
Do not know	11.5	7.0	0.8
<b>Total (n)</b>	<b>227</b>	<b>257</b>	<b>372</b>

<sup>1</sup> Other include bamboo spatula, iron rod and finger nail

Most of the RDW in institutional deliveries did not know about the timing of when the cord was cut because the newborns were handled by the health workers. The distribution of RDW who delivered at home shows wide variation in the timing of cord-cutting across districts. In particular, Banke shows the highest delay in cutting the cord, i.e., more than 38 percent reported that their newborn’s umbilical cord was cut after more than one hour (and up to 14 hours). The delay in cutting the cord is because of the cultural practice that requires waiting for a member of the occupational caste group called ‘*Baskhorin*’ and ‘*Chamayan*’ for cutting the cord. In Jumla, almost 44 percent had their newborn’s umbilical cord cut within five minutes of birth. In Bajhang, almost one-third had cut the umbilical cord within five minutes and another one-third had cut it between 6-15 minutes after the birth (Table 5).

Timing of cutting umbilical cord	Banke	Jumla	Bajhang
Within 5 min	13.4	43.9	35.4
6-15 min	14.7	29.5	34.0
16-60 min	26.4	17.3	24.2
More than 1 Hour	38.1	0.5	1.2
Do not know	7.4	8.8	5.2
<b>Median minutes</b>	<b>60</b>	<b>7</b>	<b>10</b>
<b>Total (n)</b>	<b>299</b>	<b>387</b>	<b>421</b>

## 2.4 Application of Substance on Umbilical Cord Stump

Table 6 shows the practice of applying substances on the cord stump of those newborn who were delivered at home. A majority of RDW in all three districts reported that something was applied to the cord stump of the newborn. A significantly high proportion of RDW in Bajhang (34%) and Jumla (24%) compared to Banke (9%) reported that they had not applied anything to their newborns’ cord stumps.

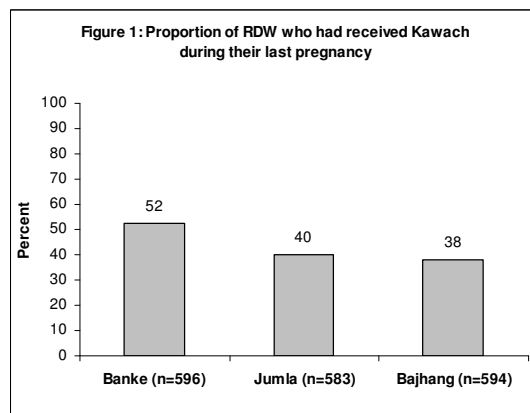
	Banke	Jumla	Bajhang
<b>Types of Substance applied<sup>#</sup></b>			
Nothing	9.0	23.5	33.7
Kawach	72.9	55.8	38.2
Oil	14.4	14.0	1.4
Other medicines (powder/ointment)	5.7	8.5	3.6
Turmeric/Turmeric powder	2.7	12.7	0.7
Ghee or Butter ( <i>nauni</i> )	0.0	0.0	22.8
Others <sup>1</sup>	0.7	0.3	0.5
<b>Total (n)</b>	<b>299</b>	<b>387</b>	<b>421</b>

<sup>1</sup> Others include cotton, herbs, sindoor, and ash.  
<sup>#</sup> Multiple response

Among RDW who stated that something was applied in the cord, a majority reported the application of Kawach to their children’s cord stumps. In Banke and Bajhang, after Kawach, oil was the second most frequently used substance on a child’s umbilical cord stump, as cited by 14 percent of the respondents in each district. The practice of using turmeric powder was also common in Jumla. On the other hand, in Bajhang, nearly a quarter reported applying ghee or butter (*nauni*) to the cord stump (Table 6).

## 2.5 Accessibility of Kawach

To assess the coverage of Kawach, RDW were asked if they had received Kawach during their pregnancy with their last child. Figure 1 shows that a little over half RDW in Banke received Kawach during their last pregnancy period. The proportion of RDW who received Kawach was lesser in Jumla (40%) and Bajhang (38%). Among those who received



Kawach during their pregnancies, more than 90 percent received it in their third trimester (Table not shown).

Those RDW who reported not receiving Kawach were further questioned about the reasons for not getting it. In response, around six in ten from Bajhang and half from Banke reported that they never had heard of Kawach. A sizeable proportion of RDW in Jumla (40%) and Banke (33%) also reported that FCHVs were supposed to bring Kawach at the time of delivery. Other reasons cited are shown in Table 7.

<b>Cited reasons for not getting Kawach</b>	<b>Banke</b>	<b>Jumla</b>	<b>Bajhang</b>
Never heard of Kawach	50.0	29.4	61.8
FCHV was supposed to bring	32.7	40.0	10.6
Didn't knew Kawach should be applied after cutting the cord	6.7	6.3	10.6
FCHV was out of stock/ didn't give	5.3	5.4	7.6
Had planned institutional delivery	2.8	1.1	2.4
Went to other districts during pregnancy	0.4		2.7
Didn't agree or go to get Kawach/ Thought Kawach is dangerous	1.8	1.7	0.3
Do not know	0.4	16.0	4.1
<b>Total (n)</b>	<b>284</b>	<b>350</b>	<b>369</b>

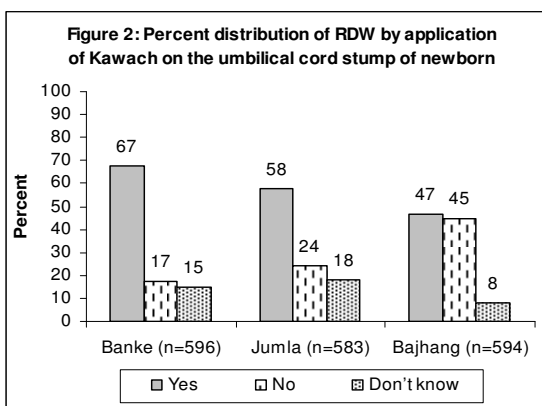
RDW who had received Kawach were further asked if they were told the reasons for applying Kawach on the child's umbilical cord stump. While some RDW said that they were not told of any reasons for applying Kawach (2% in Banke, 3% in Jumla and less than 1% in Bajhang), a majority (more than 86%) in all districts identified the reason that the person giving them Kawach described for applying, which was correct: To prevent umbilical cord infections in newborns. In Jumla and Bajhang, 13 percent and 25 percent, respectively, said that they were told that Kawach reduces the risk of death to newborns (Table 8).

	<b>Banke</b>	<b>Jumla</b>	<b>Bajhang</b>
<b>Reasons for Using Kawach#</b>			
To prevent infection of umbilical cord	86.5	88.4	92.4
To reduce risk of death	5.4	13.3	25.0
No reason was told	1.6	3.0	0.4
Quick recovery	2.2	0.4	1.3
Do not remember	9.3	8.2	6.3
<b>Types of Advices Received#</b>			
Wash hand with soap and water before applying Kawach lotion	90.1	98.7	93.8
Spread Kawach lotion by finger	89.7	94.0	95.1
Keep the stump untouched by clothes for sometime after applying Kawach	85.9	94.8	92.0
Do not apply anything on stump than Kawach and keep the surrounding clean and dry	90.1	97.9	93.8
<b>Total (n)</b>	<b>312</b>	<b>233</b>	<b>225</b>
* Multiple Response			

Table 8 further shows a high and relatively even distribution of RDW in all three districts stating they received all of the following pieces of advice: wash hands with soap and water before applying Kawach (>90% in all districts), spread Kawach by finger (>94% in Jumla and Bajhang and 90% in Banke), keep the cord stump untouched by clothes for sometime after applying Kawach (almost 90% in all three districts), and do not apply anything on the stump other than Kawach while keeping it clean and dry (>90% in all three districts).

## 2.6 Use of Kawach

All RDW were asked to confirm whether the Kawach was applied to the child's cord stump or not, by showing the tube for their reference. In doing so, more women were able to confirm that Kawach was used than when asked without showing the tube. Two-thirds of RDW in Banke, around six in ten in Jumla and around half in Bajhang reported that Kawach was applied on their newborn's cord stump. While 17 percent in Banke and 24 percent in Jumla confirmed that Kawach was not applied, a comparatively larger percentage in Bajhang of almost 45 percent confirmed that Kawach was not applied to their children's cord stumps (Figure 2).



The proportion of RDW who reported the application of Kawach is higher than those who received Kawach because some RDW who had not received it had reported their newborns were applied Kawach by FCHVs at home delivery or by health workers in the institutional deliveries.

Analyzing the use of Kawach by background characteristics of RDW, the data in Table 9 shows that Kawach use was consistent across RDW of all age groups in all three districts, except that fewer women age 35-49 years than their younger counterparts in Banke and Bajhang had used Kawach. A significantly higher proportion of illiterate RDW had used Kawach in Banke and in Jumla compared to their literate counterparts (70% versus 65% in Banke and 59% versus 55% in Jumla). Conversely, in Bajhang a higher proportion of literate RDW had used it than their illiterate counterparts (52% versus 45%). Furthermore, RDW with a higher level of education (SLC and above) were less likely to use Kawach in Banke and Jumla than RDW with no education. Kawach use was reported to be the lowest among Dalits in all three districts compared to other caste groups. Data further shows that a lower proportion of RDW in the highest wealth quintiles in Banke and Jumla applied Kawach, while, in the case of Bajhang, a higher proportion of RDW in the highest

Background Characteristics	Use of Kawach		
	Banke	Jumla	Bajhang
<b>Age</b>	<i>ns</i>	<i>ns</i>	<i>ns</i>
15-19 Yrs.	66.7	50.9	50.0
20-24	68.5	59.0	45.0
25-29	68.4	59.2	49.0
30-34	67.2	60.8	51.2
35-49	58.3	62.1	39.0
<b>Literacy Status</b>	*	*	*
Literate	64.9	54.8	51.7
Illiterate	69.7	58.5	44.8
<b>Level of Schooling</b>	*	*	*
No Education	70.3	57.9	45.7
Some Primary	73.9	60.6	49.0
Some Secondary	67.5	66.7	51.5
SLC and above	45.9	42.4	52.0
<b>Caste/ Ethnicity</b>	*	*	*
Dalit	55.7	47.2	33.9
Disadvantage Janjati	80.6		
Disadvantage Non-Dalit (Tarai)	69.4		
Religious Minority	73.9		
Upper Caste	59.1	61.4	49.7
<b>Wealth Quintile</b>	*	*	<i>ns</i>
Lowest	68.6	65.3	38.8
Second	72.3	56.7	43.8
Third	73.3	62.2	49.2
Fourth	65.8	58.7	49.2
Highest	57.1	44.5	52.9
<b>Place of Delivery</b>	*	*	*
Institutional Delivery	59.6	41.8	56.1
Home Delivery	75.3	65.9	43.0
<b>Total (%)</b>	<b>67.4</b>	<b>57.8</b>	<b>46.8</b>
<b>95% CI</b>	<b>60.5-73.7</b>	<b>47.0-67.9</b>	<b>40.4-53.3</b>
<b>Total (n)</b>	<b>596</b>	<b>583</b>	<b>594</b>

\* Significant at <0.05 level      *ns* = Not Significant

wealth quintile had applied it. Based on place of delivery, three-quarters in Banke and two-thirds in Jumla reported Kawach use in home delivery cases, while Bajhang shows higher Kawach use in institutional delivery cases (56% versus 43%).

Table 10 shows that among RDW who had applied Kawach to their newborns' umbilical cord stump, almost nine in ten in all districts had not applied any other substance besides Kawach.

Among the RDW who had received Kawach but did not applied it to their newborns' cord stump were further asked about the reasons for not applying Kawach even after receiving it (Table 10). The highest proportion of RDW in all the districts reported that they did not apply Kawach because they delivered in a health facility. A considerably smaller number of RDW who received Kawach reported losing it, delivered at someone else's house, or gave other reasons for not applying it. Three RDW from Bajhang said that they did not use it because they did not know how to apply it, while four RDW in Jumla and two RDW each in Banke and Bajhang said that they did not use it thinking that it was not necessary or useful. Also four RDW in Jumla reported that their family members did not allow the use of Kawach.

	Banke	Jumla	Bajhang
<b>Other substance used after applying Kawach</b>			
Yes	6.2	10.1	7.2
No	92.3	89.6	91.7
Do not know	1.5	0.3	1.1
<b>Total (n)</b>	<b>402</b>	<b>337</b>	<b>278</b>
<b>Reasons for not applying Kawach despite receiving it#</b>			
Delivered at a health facility	92.0	53.8	36.8
Thought it was not useful or necessary	4.0	15.4	10.5
Forgot to apply	0.0	11.5	21.1
Family members/others didn't allow to use	2.0	15.4	5.3
Didn't know how to apply Kawach	0.0	0.0	15.8
Child was not delivered in home	0.0	7.7	0.0
Lost Kawach	0.0	0.0	5.3
Others	0.0	7.7	5.3
Do not know	2.0	3.8	0.0
<b>Total (n)</b>	<b>50</b>	<b>26</b>	<b>19</b>

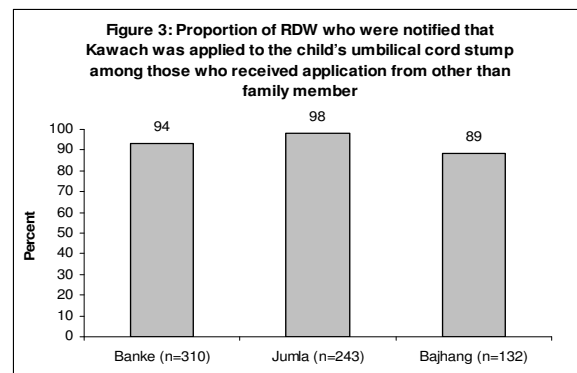
# Multiple Response

Among RDW who confirmed about application of Kawach to their newborn, in Banke 47 percent said that it was applied by health workers while in Jumla FCHVs were cited more frequently (46%). On the other hand, in Bajhang 44 percent of mothers reported applying Kawach on their newborns' cord stumps themselves (Table 11).

Person who applied Kawach	Banke	Jumla	Bajhang
Health Worker	47.0	24.3	34.5
FCHV	25.6	46.0	12.6
TBA	4.5	1.8	0.7
RDW	7.7	17.2	44.2
Family members	7.7	10.1	7.6
Others <sup>1</sup>	1.7	0.6	0.4
Occupational caste (Baskhorin/Chamar)	5.7	0.0	0.0
<b>Total (n)</b>	<b>402</b>	<b>337</b>	<b>278</b>

<sup>1</sup> Others include peon of HF, Neighbor

Figure 3 illustrates the proportion of RDW who reported being notified that Kawach was applied to their newborn by someone (health workers/FCHVs/TBAs) other than one of their family members. Almost 98 percent in Jumla, followed by 94 percent in Banke and 89 percent in Bajhang, affirmed that they were notified regarding the Kawach application.



## 2.7 Appropriateness of Kawach Application

Among the RDW who had confirmed that Kawach was applied to their newborns' cord stumps, around nine in ten in all three districts reported of applying it within two hours of cutting the cord (Table 12). Although Banke showed a delay in cord cutting, the average timing of applying Kawach after cutting was quicker (29 minutes) than the other two districts; for, the timing of applying Kawach after cutting of cord was 44 minutes in Bajhang and extremely delayed in Jumla at 78 minutes.

According to Figure 4, nine in ten RDW in Banke and eight in ten in Jumla and Bajhang who delivered at home said that the person who applied Kawach on the child's cord stump had washed their hands with soap and water.

Time period of Kawach application after the cord was cut	Banke	Jumla	Bajhang
Within 2 hours	91.8	89.0	91.0
After 2 hours	4.0	6.5	5.0
Do not know	4.2	4.5	4.0
<b>Average minutes</b>	<b>28.6</b>	<b>78.4</b>	<b>44.1</b>
<b>Total (n)</b>	<b>402</b>	<b>337</b>	<b>278</b>

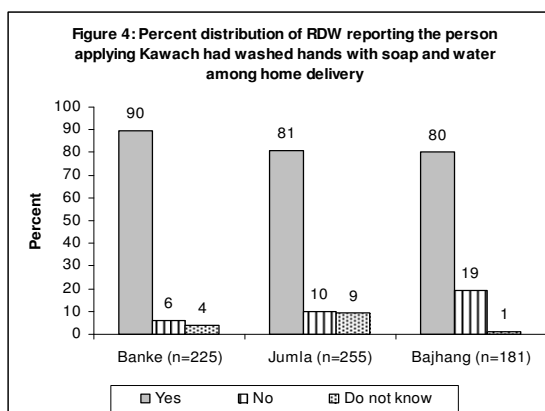


Table 13 presents the data on which body part of the newborn was covered with Kawach, the amount and number of times Kawach was applied and whether or not the cord made contact with cloths after application of Kawach.

In most of the cases, Kawach was applied to both the cord stump and the surrounding area as reported by nearly nine in ten RDW in Banke and Jumla, and 86 percent in Bajhang.

Almost eight in ten RDW in Banke and Bajhang and nine in ten in Jumla stated that the whole content of the Kawach tube was applied on the cord stump. RDW who reported that only 'some content of the tube was applied' was the highest in Bajhang at 12 percent. Most of the RDW who reported that they did not use the whole content of the tube thought that applying Kawach more than once would be more effective. This perception was most frequently cited

	Banke	Jumla	Bajhang
<b>Body part of newborn where Kawach was applied</b>			
Stump only	2.0	3.9	3.6
Surrounding area only	3.5	3.6	5.8
Both in stump and surrounding area	89.1	89.6	86.0
Do not know	5.5	3.0	4.7
<b>Total (n)</b>	<b>402</b>	<b>336</b>	<b>278</b>
<b>Amount of Kawach applied</b>			
Whole content of the tube	78.9	89.6	83.5
Some content of the tube	8.5	4.7	11.9
Do not know	12.7	5.6	4.7
<b>Total (n)</b>	<b>402</b>	<b>337</b>	<b>278</b>
<b>Reasons for not applying the whole content Kawach in the child's umbilical cord*</b>			
Tube lotion is more for one application	26.5	31.3	30.3
Thought more than one applications effective	26.5	31.3	45.5
Did not know that whole content of the tube has to be applied at one time	26.5	37.5	30.3
Do not know	23.5	6.3	3.0
<b>Total (n)</b>	<b>34</b>	<b>16</b>	<b>33</b>
<b>Times of Kawach application</b>			
Once	93.8	95	89.2
More than once	5.5	4.2	8.2
Do not know	0.7	0.9	2.5
Mean no. of times of application	1.2	1.1	1.2
<b>Total (n)</b>	<b>402</b>	<b>337</b>	<b>278</b>
<b>Contact of cord with clothes after applying Kawach</b>			
Kept the cord stump untouched for sometime	89.5	92.0	84.5
The cord was not untouched	5.7	5.9	12.6
Do not know	4.7	2.1	2.9
<b>Total (n)</b>	<b>401</b>	<b>337</b>	<b>278</b>

\* Multiple response

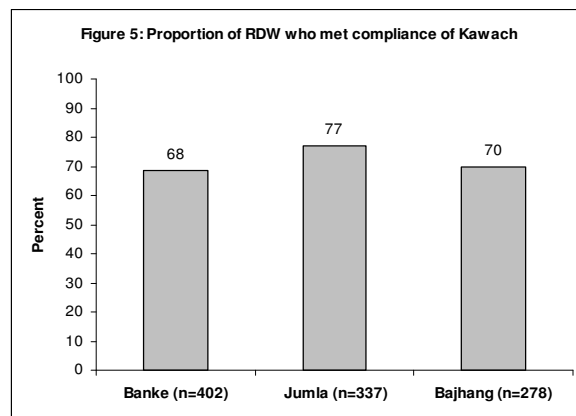
by 46 percent of RDW in Bajhang. Another reason, which was most frequently cited by 31 percent of RDW in Jumla, was that the entire tube of lotion would be a lot for one application. Less than ten RDW in each three districts said that they were not aware that the whole content of the tube had to be applied at once.

Again, among the RDW who confirmed the application of Kawach, about 94 percent from Banke and Jumla and 89 percent from Bajhang reported that Kawach was applied at a single time to the cord stump of the newborn. Nine in ten RDW from Banke and Jumla and 85 percent in Bajhang said that the cord of the child was untouched by clothes for some time after the application of Kawach. RDW reporting that the cord was not kept untouched was higher in Bajhang than in the other two districts (13% in Bajhang versus 6% in Banke and Jumla).

## 2.8 Compliance of Kawach

As per the program protocol, the correct Kawach application requires using the entire tube of Kawach in a single application to the cord stump and surrounding areas within two hours of cutting the cord.

Around seven in ten RDW (of those who had applied Kawach to their newborn) in Banke and Bajhan reported meeting the requirements of Kawach application, while this rate was slightly higher in Jumla where a little over three-quarters complied with the prescribed application (Figure 5). Table 14 shows no difference in compliance of Kawach based on age, literacy status and education level of RDW in all three districts except in Banke where a higher proportion of illiterate RDW and RDW with no education or some primary education had fulfilled the requirements. By caste, in Jumla, the upper caste group showed a significantly higher compliance rate. There was however no difference in Banke and Bajhang based on caste.



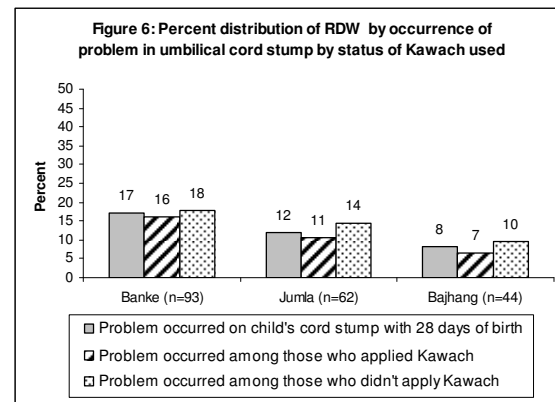
Furthermore, the household wealth quintile showed no difference in meeting the compliance of Kawach in Jumla and Bajhang, while in Banke households belonging to the lowest quintile showed a higher compliance than their highest quintile counterparts (78% versus 60%). A higher proportion of RDW who had delivered the child at home in Banke and who had delivered at a health institution in Jumla had met the requirements, whereas in Bajhang there was no difference according to where the delivery occurred (Table 14).



## 2.10 Problems Encountered in the Umbilical Cord of the Newborn

RDW with children one month or older were asked about the occurrence of problems in the child's cord stump within 28 days of birth. In response very few (17% in Banke, 12% in Jumla and 8% in Bajhang) reported a problem in the cord stump of their newborn (Figure 6).

Among the RDW reporting some problems in the cord stump, the most commonly cited problem was infection of the cord stump (94% in Banke, 84% in Jumla and 89% in Bajhang). Furthermore, seven and nine RDW from Banke and Jumla, respectively, reported a delay of the falling of the cord (Table 16).



When encountered with these problems in the umbilical cord stump, most of the RDW were found resorting to home remedies as recounted by three in ten in Banke, one-third in Jumla and over seven in ten RDW in Bajhang. RDW also reported visiting a health facility or health worker when faced with such problem. Notably 30 percent of the RDW also visited a pharmacy to consult about the problem in the child's cord stump in Banke. Some RDW also reported re-using Kawach to treat the infection of the umbilical cord stump, while as many as 24 percent in Jumla, and less than ten percent in Bajhang and Banke reportedly did nothing about the problem (Table 16).

**Table 16: Percent distribution of RDW by the types of problem encountered in the cord stump, action taken against the problem and the timing of cord stump fall**

	Banke	Jumla	Bajhang
<b>Type of Problem Encountered</b>			
Infection on the cord stump	93.5	83.9	93.2
Delay in cord falling off	7.6	14.5	0.0
Other	4.3	12.9	6.8
<b>Total (n)</b>	<b>93</b>	<b>62</b>	<b>44</b>
<b>Actions Taken for the Problem</b>			
Home remedy	28.0	35.5	75.0
Visited a health facility/health worker	22.6	22.6	9.1
Consulted a pharmacy	30.1	8.1	2.3
Did nothing	7.5	24.2	9.1
Used Kawach again	3.2	9.7	4.5
Used other medicines	5.4	0.0	0.0
Consulted FCHV/other	3.2	0.0	0.0
<b>Total (n)</b>	<b>93</b>	<b>62</b>	<b>44</b>
<b>Time of cord stump fall</b>			
Within 5 days	31.2	30.9	33.0
6-10 days	44.9	56.4	54.5
More than 10 days	23.0	11.7	11.9
Do not know	0.9	1.0	0.6
Mean number of days	8.4	7.2	7.2
<b>Total (n)</b>	<b>548</b>	<b>512</b>	<b>539</b>

The timing of cord stump fall was analyzed for children above one month of age. A majority of RDW in all districts reported the falling of the cord stump within six to ten days of cutting the cord (45% in Banke, 56% in Jumla and 55% in Bajhang) with a mean number of days when cord stump fell being 8.4 in Banke and 7.2 in Jumla and Bajhang (Table 16).

## 2.11 Opinion Regarding Kawach

All RDW were asked for their opinion regarding why they thought Kawach should be applied on the umbilical cord stump of a newborn. In response, while a considerable percent of RDW shared that they did not know why Kawach should be applied, a majority (66% in Banke, 53% in Jumla and 50% in Bajhang) expressed that Kawach should be applied in order to prevent infection

of the cord stump. Almost a quarter in Jumla said that Kawach should be applied because it had been advised by a health worker and FCHV (Table 17).

Opinions on Kawach Use	Banke	Jumla	Bajhang
To prevent infection of umbilical cord	65.8	53.3	49.8
To reduce risk of death	2.4	7.4	14.8
FCHV/health worker advised to apply	5.4	23.9	1.0
For quick healing	1.7	0.9	1.0
Do not know	31.0	37.6	49.0
<b>Total (n)</b>	<b>594</b>	<b>582</b>	<b>594</b>

### 3.0 Conclusion

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The high level of child deaths, specifically among the neonates, in developing countries has been recognized as a crucial health concern. In Nepal, 72 percent of infant deaths take place during the first month of birth (Ministry of Health and Population, New ERA, and Macro International Inc., 20011), preventing neonatal deaths can contribute in the IMR. NDHS 2011 further shows that 72 percent of the mothers in Nepal give birth at home without the help of skilled birth attendants. High home delivery, unhealthy behaviors during labor and childbirth, malpractices of handling placenta and freshly cut cord stump, and lack of knowledge and awareness about potential risks of infection, lack of health service/ providers put both mother and newborn to high risk of infection.

The study has revealed a high home delivery in all three districts (50% in Banke, 66% in Jumla and 71% in Bajhang). Although the use of CHDK is highly promoted for home deliveries, it still remains as low as 24 percent, 34 percent and 12 percent in Banke, Jumla and Bajhang respectively. However, there is an increment in use of boiled or new blade (72% in Banke, 45% in Jumla and 50% in Bajhang) in home delivery signifying the increased awareness regarding importance of using sterilized instruments during delivery. But the use of non-sterile instruments still remains alarming. A majority of home delivery who did not use CHDK, also reported of placing the cord stump in wooden vessel/log/stick to cut it.

Except for Banke, almost all newborn had their umbilical cord cut off within 1 hour of delivery. The duration is quite long in Banke as traditionally they wait for an occupational caste to come to cut the cord. After cutting the cord, the practice of not applying anything on cord stump is noted mostly in Bajhang, followed by Jumla and Banke. Among those applying something on the umbilical cord stump many in all three districts had applied medicinal substance including Kawach. Use of ghee or butter (*nauni*) is high at 23 percent in Bajhang; and use of oil and turmeric is more pronounced in Jumla at 13 percent.

Accessibility of Kawach by the RDW during pregnancy period was however very low in all three district. Only around half of the RDW in Banke, and around four in ten in Jumla and Bajhang had received Kawach. Yet the use of Kawach is reported by two-third in Banke, six in ten in Jumla and about half in Bajhang. This is mostly because the FCHV herself keep the Kawach and during the delivery visit she applied it to the newborn and also because of the application of Kawach by health workers in health institutions among those who had institutional deliveries. The background analysis of RDW shows that use of Kawach is still low in Dalit women compared to other caste and ethnic groups in all three districts. Reflecting the geographical different, Kawach was applied mostly by HW in Banke (47%), by FCHV in Jumla (46%) and by RDW herself in Bajhang (44%). For Kawach to be effective, the appropriate and timely use is an important factor. Considering this, a majority did express that Kawach was applied on the cord stump within 2 hours of cutting the cord (around 90% in all three districts). Also more than 80 percent in both Jumla and Bajhang, and almost 90 percent in Banke, among home deliveries, reported hand washed with soap and water by person applying Kawach. Again about nine in ten in all three districts reported that Kawach was used on both cord stump and the surrounding areas. In addition, majority of RDW confirmed that the whole content of tube was applied in the cord stump and that it was applied at single time. A majority also claimed that they had kept the cord stump untouched with cloth or anything for sometime to prevent Kawach being wiped of or being absorbed. Further, majority in all three districts had not applied anything on the cord stump after

applying Kawach. Almost seven in ten RDW among those who had applied Kawach in Banke and Bajhang and more than three-fourths in Jumla had met the requirement of compliance i.e. applied whole lotion of the tube at single time in the cord and surrounding area within 2 hours of cutting the cord.

Among those who had received Kawach more than 80 percent in all three districts were able to rightly point out that the purpose of Kawach is to prevent umbilical cord infection. The same group of people also confirmed that they had received series of advices on an appropriate use of Kawach, as also reflected in their practice. The remaining percent of RDW (48% in Banke, and around 60% in Jumla and Bajhang) who did not receive Kawach shared they had never heard of Kawach (50% in Banke and 62% in Bajhang) and that FCHV had kept it with her to bring at the time of delivery (40% in Jumla and 33% in Banke). It should be noted some 16 percent, 11 percent and eight percent in Banke, Jumla and Bajhang respectively reportedly did not use Kawach in spite of getting it because of reasons like delivering in health facility, thinking it was not necessary to apply or because family didn't allow to use or simply because they forgot.

Comparing the coverage and compliance of Kawach in six months interval of the program implementation, it was observed that the later six months of program implementation was better than the earlier months' inception reflecting the improvement in program as it matures. This does reflect a gradual progress in the coverage within a year itself if not an entire success.

The efforts of coverage and compliance gain significance only after they felt impact on the incidences occurrence of infection in the umbilical cord stump of the child. Consequent to the reported high use of medicinal substance as well as proper use of Kawach, as few as 16 percent in Banke, 11 percent in Jumla and seven percent in Bajhang reported of occurrence of infection in the umbilical cord stump of the child after using Kawach. For the problem, those who had earlier used Kawach reported of re-using it or other medical substance to treat it. Some reported of treating the infection or delayed cord falling with home remedies.

Most of the RDW (31% in Banke, 38% in Jumla and 49% in Bajhang) were not aware on why Kawach should be used reflecting the lack of communication about Kawach with RDW by the distributing channels which could hinder the intent of the program. Thus, effective communication to change the RDW behaviors should be the prime objective for ensuring appropriate coverage and compliance of Kawach.

The study has revealed the optimistic findings on coverage and compliance of Kawach. Further, very high proportion of the newborns were complied as per the program mandate Taking consideration of the high acceptance of Kawach in these three pilot districts, the expansion of Kawach in other districts with high occurrence of neonatal mortality or home delivery can be promoted and thus can benefit the neonates' chances of prevention from omphalitis.

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