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Shah, Rajani

aus (Geburtsort)
born in (place of birth)

Dang, Nepal

am (Tag an dem die Dissertation abgeschlossen wurde)
submitted on (day of finalization of the thesis)

30 April 2014

Supervisors LMU:	Title, first name, last name
Habilitated Supervisor	PD Dr. Rainald Fischer
Direct Supervisor	Dr. Maria Delius
3rd LMU Supervisor	Dr. Eva Rehfuess

Reviewing Experts:

1st Reviewer	PD Dr. Rainald Fischer
2nd Reviewer	Dr. Maria Delius

Dean:	Prof. Dr. med. Dr. h. c. M. Reiser, FACR, FRCR

Date of Oral Defence:	19-September-2014

Affidavit

Shah, Rajani

Surname, first name

Radha Krishna Tole, Bharatpur-12

Street

P.O. Box# 19, Bharatpur

Zip code, town

Nepal

Country

I hereby declare, that the submitted thesis entitled

Factors Affecting Institutional Delivery in Chitwan District of Nepal

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Signature PhD Student

Factors Affecting Institutional Delivery in Chitwan District Of Nepal

ABSTRACT

Background

Health facility delivery has been considered as one of the important strategies to improve maternal health. The Government of Nepal is promoting institutional delivery through different incentive programmes and the establishment of birthing centres. This study aimed to identify the socio-demographic, socio-cultural and health service-related factors influencing institutional delivery uptake in rural areas of Chitwan district where high rates of institutional deliveries and a significant number of home deliveries co-exist.

Methods

This community-based cross-sectional mixed-method study was conducted in rural areas of Chitwan district with relatively low institutional delivery rates. A total of 673 mothers who had given live birth between April 21, 2012 and April 20, 2013 were interviewed using a structured questionnaire. Six focus group discussions and twelve in-depth interviews were conducted with different categories of concerned groups of people. Multivariable logistic regression analysis and thematic analysis were performed for quantitative and qualitative data respectively to identify factors affecting institutional delivery.

Results

The mixed-method study as a whole found that the probability of institutional delivery was higher with advantaged ethnicity, support by husbands and neighbors, birth preparation, complications during pregnancy/delivery, perception that skilled health worker is always available at the health institution, adequate physical facilities/infrastructures, and physical distance to the birthing center, while decision taken by women themselves had lower likelihood of institutional delivery.

Conclusion

Among the multiple interventions to address the factors affecting institutional delivery, husband's involvement and women's empowerment, which were found to be

most influential among all the factors, need to be emphasized in a context like Nepal

Key words: Institutional delivery, maternal health, gender roles, Nepal

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ABBREVIATIONS

ANC	Antenatal care
ANM	Auxiliary nurse midwife
CB-NCP	Community-based newborn care program
DPHO	District public health office
EDD	Expected date of delivery
FCHV	Female community health volunteer
HDI	Human development index
HP	Health post
HW	Health worker
MDG	Millennium development goal
MMR	Maternal mortality ratio
NGO	Non-governmental organization
PHCC	Primary health care centre
PHC-ORC	Primary health care – outreach clinic
SBA	Skilled birth attendant
SHP	Sub health post
TBA	Traditional birth attendant
VDC	Village development committee

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1 Background

1.1.1 Global situation of maternal health

Improving maternal health, the fifth Millennium Development Goal (MDG 5), has a target of reducing maternal mortality ratio (MMR) by three quarters by 2015 from its 1990 level (UN, 2013b). The target, in turn, has two indicators, namely- reduction in the maternal mortality ratio (MMR) and increase in the proportion of births attended by skilled birth attendants (UN, 2013b). The continuum of care that includes care during pregnancy, childbirth and six weeks after birth is necessary for maternal and newborn health. The most risky period is during childbirth and the postpartum period (Kerber et al., 2007).

Globally, from 1990 to 2013- the MMR has reduced by 45 percent from 380 per 100000 live births to 210 (WHO, 2014). Almost all maternal deaths (99 percent) occurred in developing countries (WHO, 2014). The highest proportion of maternal deaths (179000) occurred in sub-Saharan Africa with MMR at 510. The next largest proportion (69000) was occupied by Southern Asia with MMR 190. In developing regions the MMR stands at 230 compared to only 16 in developed regions (WHO, 2014). The fifteen countries with very high MMR are from sub-Saharan African Countries. Though Nepal has already reduced 76 percent of the MMR between the years 1990 and 2013 compared to 64 percent in the Southern Asia, the MMR (190) is more than all other countries of Southern Asia except Afghanistan and is equal to India (WHO, 2014).

In 2011, 66 percent of deliveries were attended by a skilled person in developing countries. The proportion was 100 percent in Eastern Asia, while it was about 50 percent in Southern Asia and sub Saharan Africa which have the highest maternal mortality (UN, 2013a). Fewer women in rural areas give birth with the assistance of SBAs compared to women in urban areas, with 53 percent and 84 percent respectively in 2011 (UN, 2013a).

Among the global estimated deaths of women during pregnancy and childbirth, most occurred due to lack of access to skilled routine and emergency care (WHO, 2013). Attending home births is difficult for a SBA if she does not live close to the home of the women (Chowdhury et al., 2006). Delivery in a health facility has been considered as the most effective intervention to prevent maternal death (Campbell and Graham, 2006).

Most of the maternal deaths occur due to five often unpredictable causes- excessive bleeding, infections, hypertensive disorders, obstructive labour and complications of unsafe abortion. The complications in 15 percent of pregnancies are critical and unpredictable which require emergency obstetric care (UNFPA, 2004). Emergency obstetric care is the most effective measure to save life of a mother and baby, therefore, this service should be available 24 hour every day and health workers should be adequately trained and equipped. Normal childbirth also requires skilled care and continuous presence of health professional (Kerber et al., 2007).

Between 1990 and 2013, a decrease in maternal mortality was recorded in all regions, with Southern Asia- 64%, and sub-Saharan Africa- 49%, among others (WHO, 2014).

Many countries in these regions have introduced some programmes to increase the utilization of safe motherhood services especially by the poor. The countries adopted the strategies to address financial barriers in accessing institutional delivery. For example, community health insurance , voucher schemes, conditional cash transfers, free delivery service, financial incentives to users along with incentives to health workers (De Brouwere et al., 2010).

Among them are: 80 percent subsidy in public facilities for deliveries and caesarean sections in Burkina Faso, free delivery and caesareans at health centre and hospital levels respectively in Senegal (Soe-Lin et al., 2014), community-based health insurance scheme in Ghana (Abiiro and McIntyre, 2012) and performance-based financing in Rwanda and Zimbabwe (Soe-Lin et al., 2014).

Some countries in South Asia have implemented financing programmes like cash transfer (Nepal and India), voucher scheme and cash transfer (Bangladesh), and voucher scheme (Pakistan) (Jehan et al., 2012). In voucher schemes, services are provided free upon payment of a certain premium, whereas in cash transfer a certain

amount of cash is paid to service users apart from free delivery service. A conditional cash transfer programme of India- Janani Surakshya Yojana (Maternal Protection Scheme) which provides cash incentive to mothers under poverty line is universal only in high focus states and conditional in the remaining states (Gupta et al., 2012, Jehan et al., 2012). In Bangladesh, vouchers to mothers, incentive to health workers, as well as cash incentive to mothers along with gifts to mothers in kind are also provided. However, only the poor mothers with two or less children are covered with the programme. In Pakistan, vouchers to women, apart from cash incentive to health workers, were provided to only women with low-income and no prior institutional delivery. In Nepal, the Aama Surakshya Karyakram (Safer Mother Program) that provides free delivery service and cash incentive to both mothers and service providers, is different than the other countries of the Southern Asia in terms of maintaining equity because of its unconditional universal programme throughout the country (Jehan et al., 2012).

1.1.2 Status of maternal and neonatal mortality in Nepal

The MMR in Nepal dropped by almost half in a decade: from 539 per 100000 live births in 1996 (95 percent confidence interval of 392-686) to 281 in 2006 with a range of 178 and 384, (MOHP, 2007). Nepal maternal mortality and morbidity study 2009 found MMR declined to 229 per 100000 live births ranging from 153 to 301 (Pradhan A, 2007). A study by the WHO, UNICEF, UNFPA, the World Bank and the United Nations estimated the MMR of Nepal at 190 in 2013 (WHO, 2014).

In the last five years period, between 2006 and 2010, neonatal mortality rate did not decline, unlike the reduction in under-five mortality rate and infant mortality rate (MOHP, 2012). Neonatal mortality is very high within 24 hours after childbirth and complications during labour are important risk factors for the survival and health of the newborn. Among these complications, obstructed labour and malpresentation are the biggest risk factors which need skilled care (Lawn et al., 2005).

1.1.3 Status of institutional delivery in Nepal

Although there has been significant improvement in delivery at health facilities in the past 10 years, from 9 percent in 2001 to 35 percent in 2011 (urban rural differences of

71 percent versus 32 percent), still nearly two third of births (65 percent) take place at home (MOHP, 2012).

There might be several factors contributing to low health facility delivery. More than 3 in 5 women (62 percent) do not believe that giving birth at a health facility is necessary. For a little less than half of the women (45 percent) it took more than one hour to reach a health facility for delivery (MOHP, 2012).

1.1.4 Policies/programs related to maternal health in Nepal

Encouraging institutional delivery and 24-hour emergency obstetric care services at selected public health facilities in every district is one of the major strategies that Nepal has adopted to reduce the risk of dying during childbirth (MOHP, 2013a). New birthing centers are being added to rural health posts/sub-health posts to increase the number of institutional deliveries (MOHP, 2013a). These centers provide a 24-hour service to manage normal deliveries and to refer complicated cases to hospitals (MOHP, 2013a). By the end of 2015, 70 percent of the primary health care centres (PHCCs) will be providing basic emergency obstetric care services and comprehensive abortion care, and delivery services will be provided by more than 80 percent of health posts (HPs) (MOHP, 2010).

Safer Motherhood Programme

Under Safer Motherhood Programme, which came into effect since 2009, all kinds of deliveries- uncomplicated deliveries, deliveries with complications and deliveries that require caesarean section- are provided free of charge at a health facility under the government of Nepal, at private and NGO run health facilities, and teaching hospitals that have received permission from the government of Nepal (FHD, 2009). For providing the free delivery service, for each delivery the government provides a certain amount of money to the health facilities (MOHP, 2013a). An incentive of Nepalese Rupees (NRs) 300 ($ 3.07) is provided to health workers for assisting births at a health institutions, while only NRs 100 ($ 1.02) is provided to health workers if they assist in home deliveries (MOHP, 2013a).

Further, a cash incentive is being provided to women for delivering in health facilities

to support in their transport cost under a safe delivery incentive programme since 2005 (MOHP, 2013a). Since 2012, an additional NRs 400 ($ 4.08) is provided for having 4 ANC on time and institutional delivery together (MOHP, 2013a). After the introduction of the Motherhood Programme health facilities providing delivery service and the number of health facility deliveries have substantially increased (MOHP, 2013a).

Female community health volunteers (FCHVs), who are selected by the mothers' group formed for health in each ward, are local women. They are supposed to promote safe motherhood, child health, family planning and community-based health services with the support of health workers of the local health facility (MOHP, 2013a). There is at least one FCHV per each nine wards of every VDC throughout the country but 28 districts have FCHVs on the basis of population rather than ward basis (GoN, 2007).

Community-Based Newborn Care Program (CB-NCP)

To reduce neonatal mortality through community-based interventions, the ministry of health and population Nepal has started CB-NCP since 2007 and is currently implemented in 34 districts including Chitwan district with the plan of expanding it in all 75 districts of the country by 2015 (MOHP, 2013a). In this program, FCHV has very important roles and responsibilities at the community level, for which she is provided with a cash incentive after completing a set of activities to be carried out in her respective ward. She is primarily supposed to identify and counsel pregnant women, encourage institutional delivery, advise for or accompany the mother to the health facility for delivery and provide home based newborn care making home visits on day 1, 3 and 7 after birth, assess newborn and refer sick one to appropriate health facility on time (MOHP, 2013b). While carrying out these tasks, FCHV keeps recording of all pregnant women and their place of delivery- home or health institution along with the status of neonatal death, and she eventually gives this report to the local health institution (MOHP, 2013a).

There are great disparities in maternal health service utilization by ethnicity, rural/urban location, and eco-geographical regions (MOHP, 2012). Socio-cultural factors such as elders and other family members suggesting to follow the tradition of

seeking help of TBA during childbirth, and belief that for childbirth health system are to be utilized only when women experience complications (Titaley et al., 2010). Socio-economic status of the family, age and parity of women, birth preparation, antenatal care, decision-making by women (Gabrysch and Campbell, 2009), distance to health institution (Kesterton et al., 2010), incentive to mothers for delivering at health institution (Powell-Jackson et al., 2009) and perceived quality of health service (Hulton et al., 2000), among others, influence whether the women deliver at a health institution or at home.

1.2 Rationale of the study

Chitwan is the third most developed district among the 75 districts of Nepal in the ranking of poverty and deprivation index. Similarly, of the 75 districts, Chitwan comes in the fourth most developed rank in the socio-economic and infrastructural development index. Similarly, the district secured the eighth highest rank in women's empowerment index. In the overall composite index the district happened to be the second most developed one after Kathmandu (ICIMOD, 2003). In 2004 the human development index (HDI) of Nepal was 0.504, while Chitwan district came in the category of districts with the second highest ranks of HDI along with other eleven districts- with HDI ranging from 0.500 to 0.549 (UNDP, 2004).

However, still a significant proportion of deliveries happen at home. Though several previous studies have examined the various predictors of institutional delivery as mentioned above, social and cultural contexts influencing this may vary from place to place in terms of ethnicity, beliefs, preferences, social networks, women's autonomy, etc. (Say and Raine, 2007). The study settings- the six village development committees (VDCs)- included in this study comprise mostly people from disadvantaged caste as classified by the Ministry of Health and Population, Nepal in the health service delivery system (Pandey, 2013). The goal of the National Safe Motherhood and Newborn Health Long Term Plan, 2006-2017 is to increase the utilization of the maternal health services especially among the poor and excluded people (FHD, 2006) who generally belong to the disadvantaged caste.

In efforts to further enhance institutional delivery, especially in rural areas, it is important to understand the socio-cultural, economic and health-service factors that

influence the choice of the place of delivery.

i. In Chitwan district, where the percentage of institutional delivery is much higher (83%) (DPHOa, 2013) compared to the nation (35%) (MOHP, 2012), a significant proportion of home delivery exists in some rural areas. The district therefore also provides a particularly interesting setting to explore factors that limit as well as factors that favour institutional delivery in a better way than a district where very few people pursue institutional delivery.
ii. Like many other districts, several peripheral health institutions have been providing birthing facility in Chitwan district with the government's strategy of gradual expansion of birthing centres in rural health posts to improve physical accessibility. Still some women in rural areas may not be using birthing service due to their socio-cultural factors and perceived low quality of service towards the one available at the local birthing centre. Therefore, the present study examines the socio-cultural factors and perceptions of women and other people of the community towards the birthing facility.
iii. In Nepal, there have been few studies conducted specifically on the place of delivery (Wagle et al., 2004, Shrestha et al., 2012, Karkee et al., 2013). Further, they have mainly focused on variables like socio-economic and physical accessibility. The present study, in addition, also examines the role of family, the role of the community and perception on delivery service made available to them.
iv. The studies of Nepal on place of delivery have used quantitative research techniques only, while this study uses both quantitative and qualitative research techniques that will provide an in-depth information on the potential predictors for choosing a particular place of delivery, i.e., health institution or home, as well as breadth of information by including study population representing different levels- family members, community members, health workers, and health managers.

1.3 Objectives of the study

Using the mixed-method approach, this study, in general, examines the priority factors affecting institutional delivery in rural areas of Chitwan district of Nepal. Specifically, this study aims:

i. To measure the strength of association of the socio-demographic, socio-cultural and health service factors with the place of delivery. (Objective of quantitative study)
ii. To explore the socio-cultural and health service factors regarding institutional delivery from the perspective of different study subjects. (Objective of qualitative study)
iii. To make recommendations on the basis of the integration of quantitative and qualitative insights.

1.4 Organization of thesis

This thesis report contains six chapters. Chapter one is the introduction of the study which includes background, rationale, and objectives of the study. Chapter two discusses the available literatures related to maternal health service utilization and the place of delivery, and different theories related to the use of maternal health services. Then on the basis of these theories and evidence, the conceptual framework of the study has been presented. Chapter three describes the methodology of the study. This chapter has been divided into three sections: study design and setting of the whole study, methodology of qualitative study and methodology of quantitative study. Chapter four again includes two sections- results of qualitative study and results of quantitative study. Chapter five focuses on the discussion of the results of both quantitative and qualitative study locating these in the literatures. In addition, the discussion chapter includes limitations and strengths of the study. Lastly, chapter six presents the conclusion of the study along with implications for policy and further research.

CHAPTER TWO: LITERATURE REVIEW

This chapter includes mainly four sections:

- Situation of maternal mortality and maternal health
- Theoretical framework on factors influencing maternity service utilization
- Empirical evidences, and
- Conceptual framework of the study

2.1 Situation of maternal mortality and maternal health

There are eight MDGs: eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria and other diseases, ensure environmental sustainability, and develop a global partnership for development 2011 (UN, 2013a). The target of achieving the MDG 5, reduction in maternal mortality, is related to many other MDGs as well including MDG 1 and MDG4 (Filippi et al., 2006).

Improved maternal health services reduce the economic burden on poor families of the service utilization, and it also helps in the economic condition of the family by preventing death of a mother who is a productive member in a house. Improving maternal health is associated with MDG 4 as childbirth and postpartum services would prevent neonatal deaths and also young children are more likely to survive and be in good health if their mother is surviving (Filippi et al., 2006).

Among the 287000 maternal deaths happened globally in 2010, only ten countries-democratic republic of Congo, Pakistan, Sudan, Indonesia, Ethiopia, United Republic of Tanzania, Bangladesh, and Afghanisthan occupied 60 percent of the deaths (WHO, 2014).

Achieving the MDG target would need further access to emergency obstetric care and more deliveries assisted by SBA, along with other measures (UN, 2013a). SBA is “an accredited health professional-such as a midwife, doctor or nurse-who has been

educated and trained to proficiency in the skills needed to manage normal pregnancies, childbirth and the postnatal period and in the identification, management and referral of complications in women and newborns" (WHO, 2004).

Nepal has set the target of reducing MMR to 213 maternal deaths per 100000 live births by 2015, and increasing the proportion of births attended by skilled birth attendants to 60 (UN, 2013b).

National Safe Motherhood and Newborn Health Long Term Plan, 2006-2017 has been developed with the goal of improving maternal and neonatal health and survival especially among the poor and socially excluded communities. The indicators developed for this goal are reduction in MMR to 134 per 100000 live births and neonatal mortality rate to 15 per 1000 live births by 2017. The indicators developed to assess the increase in the use of maternal and neonatal health services are: increase in the number of deliveries assisted by skilled birth attendants to 60 percent by 2017, and increase in the number of health facility delivery to 40 percent by 2017, along with increasing met need for EOC by 3 percent every year and met need for caesarean section by 4 percent each year (FHD, 2006). Nevertheless, with the rapid improvements concerning maternal health indicators, the time for the targets to be achieved has been shortened to 2015 instead of 2017 (MOHP, 2010).

In Nepal the government provides a certain amount of money to the women as an incentive for having institutional delivery. The incentive varies by ecological regions considering the difficulties in accessing health facilities- in mountain districts: NRs 1500 ($ 15.3), in hill districts: NRs 1000 ($ 10.2), and in terai (plain) districts: NRs 500 ($ 5.1). This is paid to women at the time of discharge from health institution (MOHP, 2013c). A principle of the scheme is cost sharing rather than full subsidy (Ensor et al., 2009). The recommended times for 4 ANC visits, for which an additional NRs. 400 is provided after giving birth at a health institution are - first in the fourth month, second in the sixth month, third in the eighth month and fourth in the ninth month (MOHP, 2013a).

2.2 Theoretical frameworks

Two models namely, 'Andersen's behaviour model'(Andersen, 1995) and Thaddeus and Maine's 'three delays model'(Thaddeus and Maine, 1994) explain the factors influencing utilization of health service which are applicable to the factors affecting place of delivery.

i. Andersen's behaviour model of health services use

The Andersen's behaviour model (Andersen, 1995) depicts that people's use of health service is influenced by multiple factors and the interplay between them.

These factors include: predisposing characteristics such as demographic characteristics, social structure, and health beliefs; enabling or impeding factors related to family and community; perceived need of health service; and health care system. Among the different factors, the predisposing factors comprise of demographic characteristics, social structure and health beliefs. Demographic factors such as age and gender; social status of the person; and access to resources play important roles. The social status of the person is reflected by education, occupation, ethnicity, and culture. Health beliefs influence the perception of need of service and consequently the use of service. Social structures influence person's, family and community's role. An enabling community means the availability of health workers and facilities, accessibility and affordability of the service including incentives and distance to health service. Other enabling factors such as knowledge about the services available and social relationships also influence the use of health service. The health care system including health policy and organization of health services affect the use of health services along with the people's satisfaction on the services. External environment like physical, political and economic factors also influence the use of health service.

ii. The 'Three delays' conceptual framework

The three delays framework indicates that the barriers to the utilization of obstetric care are classified into three phases of delay (Thaddeus and Maine, 1994).

i. Delay in deciding to seek care: The factors that determine this delay arerelated with socio-economic status such as decision-making by individual/ family/ relatives, status of women, previous exposure to facility, direct and indirect costs, distance to facility, perceived quality of care.
ii. Delay in reaching to health facility: This refers to accessibility to health facility in terms of physical accessibility which is influenced by availability/distribution of facilities, time required to reach to facilities, availability and cost of transportation, and condition of road.
iii. Delay in receiving adequate and appropriate care: It is related with the quality of care at health facility which includes shortages in supplies, equipment, and skilled health workers, and competency of available health workers as well as adequacy of referrals.

Though the variables in the three phases have some interrelationship, they can work independently.

2.3 Empirical evidences on factors influencing place of delivery

The Nepal demographic and health survey 2011 found that delivery in a health facility varies by the socio-demographic characteristics of women. A higher proportion of women in the age group less than 34 years and with the first birth delivered in a health facility. Similarly, more women having education of SLC, higher education (75 percent) and highest wealth quintile delivered in a health facility (78 percent) compared to women without education (19 percent) and in the lowest wealth quintile (11 percent) respectively (MOHP, 2012).

Ethnicity: The further analysis of the Nepal Demographic and health survey 2011 has shown that women from the more advantaged castes- Brahman from upper caste and Newar that is advantaged Janjatis – had the highest percentage of institutional delivery, whereas it was lowest among Terai/Madhesi Dalits (Pandey, 2013).

A study in Nigeria showed that ethnicity had a very important role in women's decision-making, even more than their individual characteristics. The ethnicity influenced their access to resources as well as their characteristics affecting decision-making. Women's employment contributing in family's income, education, and their age with older women having more autonomy in decision-making influence their

decision-making (Kritz and Makinwa-Adebusoye, 1999).

Education: Women with secondary and above education are significantly more likely to deliver at a health institution compared to women with primary or below education (Teferra et al., 2012, Amano et al., 2012). A study in India by Kumar et al. carried out by using data of national family health survey of India found the parallel increase in the use of maternal health services with the increase in educational status of women (Kumar et al., 2013).

Age : A systematic review on determinants of delivery service use in the context of low- and middle-income countries has found that older women have more control in decision-making on using health service but at the same time are also influenced more by the traditions that makes them less likely to use health services like delivering at a facility (Gabrysch and Campbell, 2009). Institutional delivery is higher among women in the age below 20 years than among the older ones (Amano et al., 2012). Similarly, another review article of Nepal finds that older women make less use of maternal health services than the young ones (Baral et al., 2010).

However, in some studies younger women were found to be more likely to give birth at home than older ones. For example, a study of Pakistan found that women in the age group 25-34 years and 35-49 years were 0.82 times (OR 0.826; 95%; CI 0.695-0.983; $p \leq 0.05$) and 0.65 times (OR 0.638; 95%; CI 0.508-0.803; $p \leq 0.000$) less likely to give birth at home compared to women in the age group 15-24 years (Javed et al., 2013). The same study found that the probability of home birth was higher for the fifth and higher birth order than the birth order of less than three (Javed et al., 2013).

Birth order: Many studies have found that lower birth order is associated with health facility delivery (Gabrysch and Campbell, 2009, Baral et al., 2010). Health institution delivery is significantly higher for first birth compared to subsequent births (Amano et al., 2012, Ono et al., 2013).

Geography: Use of maternal health services including the place of delivery varies greatly by the geographical location of residence. In most groups use of maternal health service is usually lowest among hill Dalits, hill and terai Janjati and hill Chhetri (Pandey, 2013). The place of residence is associated with parity, education, economic

status, ethnicity, religion, availability of information, availability, quality and accessibility of services.

Economic status: Many prior studies have found that economic status is associated with the use of maternal health services (Gabrysch and Campbell, 2009). The study by Kumar et al. (2013) showed that women with better household economic status were more likely to deliver at a health facility (Kumar et al., 2013, Amoako Johnson et al., 2013).

A systematic review in 2007 has found mixed results about the influence of economic status measured by either mostly household assets or materials used for the construction of house, income levels or expenditure per capita, having no effect or a strong effect in the use of maternal health services (Say and Raine, 2007). For example, a study in rural Bangladesh found that women in the highest wealth quintile were more likely to use maternal health services compared to the women in the poorest wealth quintile (Amin et al., 2010).

A study in Namibia concluded that inequalities in the delivery assisted by skilled birth attendants remain due to the inequalities in education and economic condition. It further suggested that, therefore, a multi-sectoral intervention is required to overcome the inequalities in delivery care (Zere et al., 2011).

Birth preparation: Women who are well prepared for the birth are more likely to give birth at a health institutions (Nawal and Goli, 2013). To reduce delays in receiving delivery services the ministry of health and population, Nepal has launched a birth preparedness package focused especially on rural women. The birth preparation includes five components: saving money, arranging transportation - whatever is available in the local situation, identifying a health institution, contacting the health worker that would provide delivery service, identifying a person who could donate blood if needed, and having a clean delivery kit (MOHP, NEW ERA & Macro Int'l, 2012).

ANC: In Nepal, a minimum of four ANC check-ups are recommended (DoHS, 2013). Antenatal care during pregnancy is linked to childbirth assisted by skilled birth attendant (Kerber et al., 2007). However, in some places, even women living near a

health facility visit this for ANC check-up but do not go there for childbirth. Cultural beliefs or perceptions about the quality of the delivery service might hinder them giving birth at a health facility (Kerber et al., 2007).

Many studies have reported that a higher number of ANC is significantly associated with health facility delivery (Teferra et al., 2012, Amoako Johnson et al., 2013, Amano et al., 2012).

Decision-making : A study carried out using nationally representative surveys of Nepal, India and Bangladesh showed that women's autonomy in decision-making increases with the increase in their age, education, number of living children, and if women are employed in a cash earning job (Senarath and Gunawardena, 2009). A study of demographic and health survey data of 33 developing countries found that women's empowerment score is associated with giving birth assisted by skilled birth attendant (Ahmed et al., 2010).

Support of family and community: A study in Pakistan found that women discussing the place of delivery with their husbands were more likely to deliver at a health facility (OR for home delivery: 0.397; 95%; CI 0.348-0.451; $p \leq 0.000$) than those who did not discuss (Javed et al., 2013).

Incentive : A study in Nepal found that the programme in which mothers are provided with a certain amount of money as an incentive for health institution delivery had positive impact on the use of governmental delivery services in terai and mountain districts but not in the hill districts (Powell-Jackson et al., 2009).

Health service-related factors

Distance to health institution: Longer distance to a health institution measured in terms of time usually in hours taken to reach the facility or by kilometre is associated with a lesser chance of delivering at a health facility. For example, the distance to the health facility was found to be strongly associated with the health facility delivery in Malawi and Zambia (Lohela et al., 2012), in rural area of India (Kesterton et al., 2010), Ethiopia (Teferra et al., 2012), rural Zambia (Gabrysch et al., 2011) etc.

Perceived quality of health facility: Women develop perceptions towards the quality

of health services from their own experience during their previous visits or through the experiences and narratives of others. To define the quality of service the following variables count: behaviour of health workers, availability of skilled health workers, availability of drugs and equipments and infrastructure of the health facility.

A study from Bangladesh suggests that cultural and community barriers can be reduced if services are made geographically, financially and culturally acceptable to women (Chowdhury et al., 2006).

Similarly, a systematic review on 'third delay', which is the delay in receiving appropriate care at the health facility (Thaddeus and Maine, 1994), has categorized health service related factors causing third delay: human resources, drugs and equipment, facility infrastructure, policy and guidelines, and referral. With regard to hospital infrastructure the poor supply of power or water, or both of these were the most commonly mentioned factors that would delay in getting emergency care. Other factors such as space of the health facility and surgical services being irregular and not available for 24 hours every day were also issues of concern, among others (Knight et al., 2013). Among all the health service-related factors causing 'third delay', human resource was the most commonly cited one which includes inadequate training of health workers, their shortage, not being available for 24 hour, absenteeism and their motivation (Knight et al., 2013). The quality of care has also been described by Hulton and others (Hulton et al., 2000). Their framework for assessing the quality of institutional delivery services includes ten elements of quality of care, among which six are related to provision of care, while the four relate to the experience of women at the health facility that includes human and physical resources, cognition, respect/dignity/equity, and emotional support (Hulton et al., 2000).

A study in Ghana found that provision of free delivery service in the country helped to increase the number of health facility delivery and especially among the poor by reducing the poor-rich gap in the use of health services (Dzakpasu et al., 2012).

2.4 Conceptual framework of the study

The figure 2.4 depicts the conceptual framework of this study that includes many variables from the Andersen's behaviour model (Andersen, 1995) and the Thaddeus

and Maine's 'three delays model' (Thaddeus and Maine, 1994), review of empirical evidences as well as from findings of qualitative study. The conceptual framework of the study presented below shows the variables affecting place of delivery and also the interrelationships between the independent variables. In the framework, the socio-demographic characteristics have been considered as playing the role of confounding factors in the effect of all other independent variables on the place of delivery.

The independent variables/predictors have been presented as contextual and relatively proximate factors. The *proximate* factors (Krieger, 2008) like age at child birth, parity, decision-making/role of family/role of community, perceived need related variables and health service related factors- perceptions on available maternity service/distance have been assumed to be influenced by the *contextual* factors (Link and Phelan, 1995), i.e socio-economic factors- place of residence (hill or plain), ethnicity, economic status of family and educational status of women.

Altogether five sets of independent variables were supposed to influence the place of delivery, i.e., the dependent variables of the study. The place of delivery in turn influences the outcomes maternal and neonatal health.

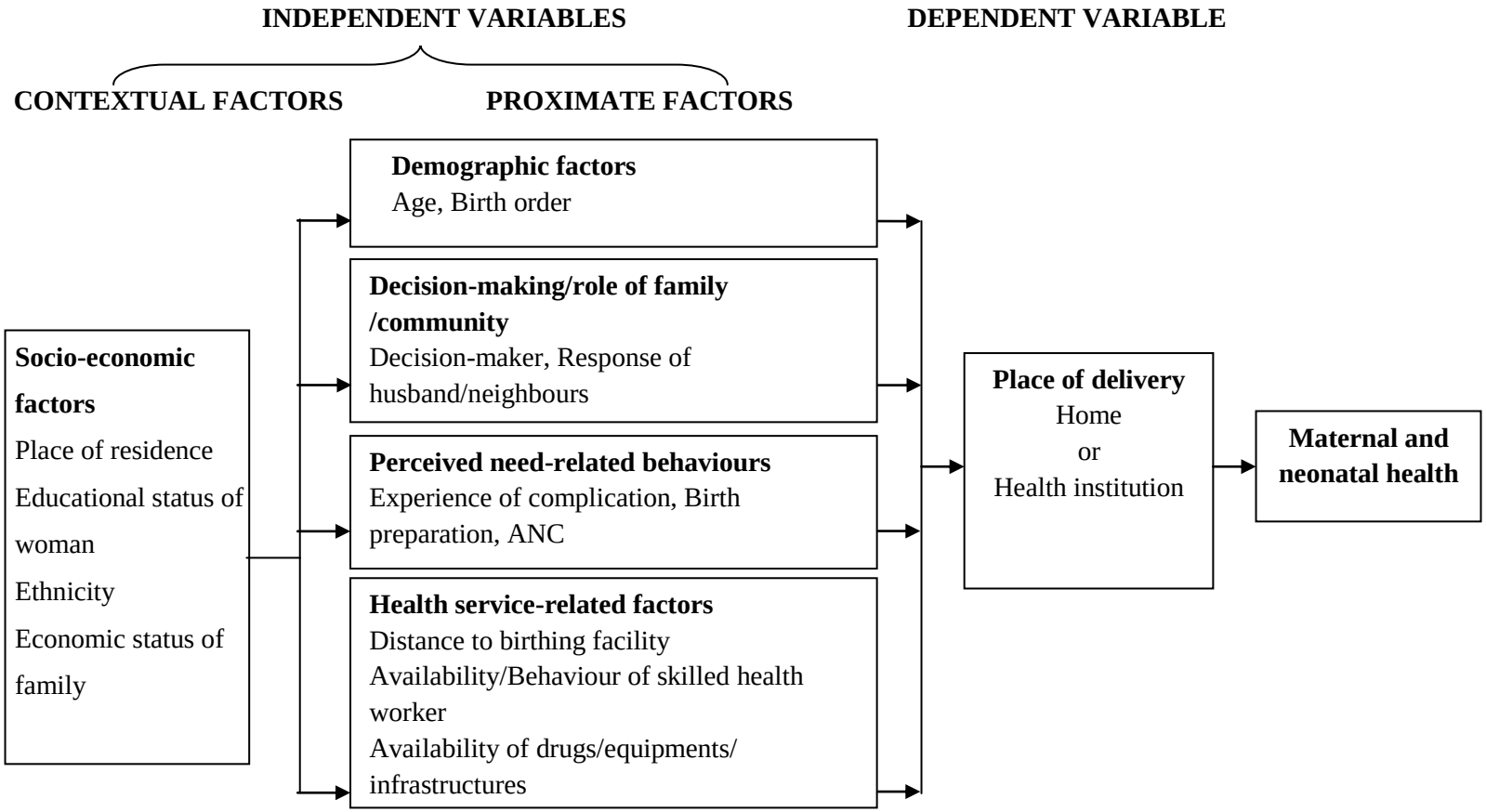

Figure 2.4 Conceptual framework of the study

CHAPTER THREE: METHODS AND DATA COLLECTION

3.1 Overview

3.1.1 Study design

This is a cross-sectional mixed-method study. This study was carried out in two phases (a) qualitative study, and (b) survey (quantitative study). First, a qualitative study was conducted for the purpose of exploring various factors associated with institutional vs. home delivery. Then, a survey was conducted to collect information from respondents using a survey instrument that was developed based on the preliminary findings of the qualitative study that included analysis of about 25 percent of qualitative data. After analyzing survey data, analysis of the remaining qualitative data was done.

A mixed-method study is the one in which quantitative and qualitative research techniques are used for a single study. Integration of quantitative and qualitative data is done at some stage of the study (Yin, 2006, Creswell et al., 2004). The purposes of the mixed-method study were *development*- using findings of one method to develop the other method, and *complementarity*- illustrations and clarifications of the results of one method from the results of another method (Johnson and Onwuegbuzie, 2004). Among the two major types of mixed-method research designs, namely, sequential and concurrent (Driscoll et al., 2007), this study followed the sequential design. Among the sequential designs, the sequential exploratory design has been adopted in this study with qualitative and quantitative components of equal status (Johnson and Onwuegbuzie, 2004). The development of the instrument, the collection and analysis of the qualitative data lead to the development of the instrument for quantitative data collection so that the study as a whole identifies the views of the study population. A more complete and detailed assessment of a situation takes place because of mixing of the methods, with one complementing to the other (Creswell et al., 2004). The integration of qualitative and quantitative results has been done in the interpretation of the data in the discussion section (Hanson et al., 2005) as a coherent whole (Johnson and Onwuegbuzie, 2004). The results of the qualitative study explain and interpret the results of quantitative and the quantitative results generalize the results of the qualitative (Pluye and Hong, 2014).

The study is a strong mixed-method as there are integrations of qualitative and quantitative methods in the different procedures of the study such as- in research question, unit of study, instrumentation and analytic strategies. The objective of both quantitative and qualitative research was similar, i.e., to identify the factors influencing place of delivery. The unit of analysis were woman who had given birth in the last one year in both the designs, the items in the instruments of both methods overlap and complement each other, in terms of analytic strategies, both designs having almost the same major dependent and independent variables (Yin, 2006).

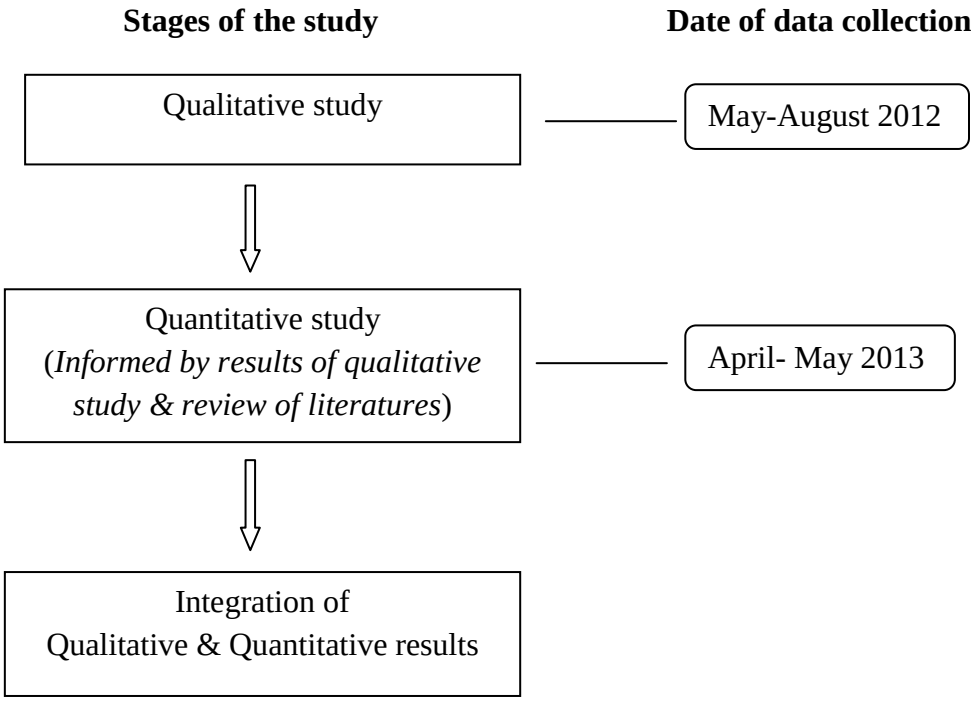

Figure 3.1.1 Design of the study

3.1.2 Study setting

As shown in figure 3.1.2, geographically, Nepal is divided into three ecological regions - mountain, hill and plain. The country is divided into 75 districts, and each district is further divided into village development committees (VDCs) and municipalities that are classified as rural and urban respectively (CBS, 2012a). The

rural population occupies 83 percent of the total population of the country (CBS, 2012b). Each VDC and municipality is further divided into smaller administrative units called wards. There are nine wards in each VDC, while the number varies for municipalities.

Chitwan district is located 148 kilometres from the capital Kathmandu (figure 3.1.2) and has a population of 579,984 (CBS, 2012c). A composite index based on poverty and deprivation, socio-economic and infrastructural development, and women's empowerment indices show Chitwan to be the second most developed district in Nepal (ICIMOD, 2003). About two thirds of the population aged five years and above are literate, three quarters of males compared to 57 percent females (CBS, 2012b). One third of males do not live at home, with most of them living and working abroad (CBS, 2012b). The district has a total of 36 VDCs and 2 municipalities. The distribution of different castes in the district is: advantaged caste- 41.36 percent, and the remaining proportion is occupied by the disadvantaged caste among which Chepang (4.99 percent), Dalits (8.67 percent), Chaudhary (10.92 percent), Muslims (1.17 percent), etc. (annex 5), are included (CBS, 2014). Out of 36, 9 VDCs are located in the hills, while the remaining 27 VDCs are located in the plain (DPHOa, 2013).

There are several hospitals in Chitwan: one government sub-regional level hospital, two teaching hospitals and 36 private hospitals, almost all located in the district headquarter, Bharatpur, all with birthing facilities. In rural areas, health services are provided through four primary health care centers, 24 health posts and 12 sub-health posts (DPHOa, 2013). Three hill and eleven plain VDCs have birthing centers within the local health institutions.

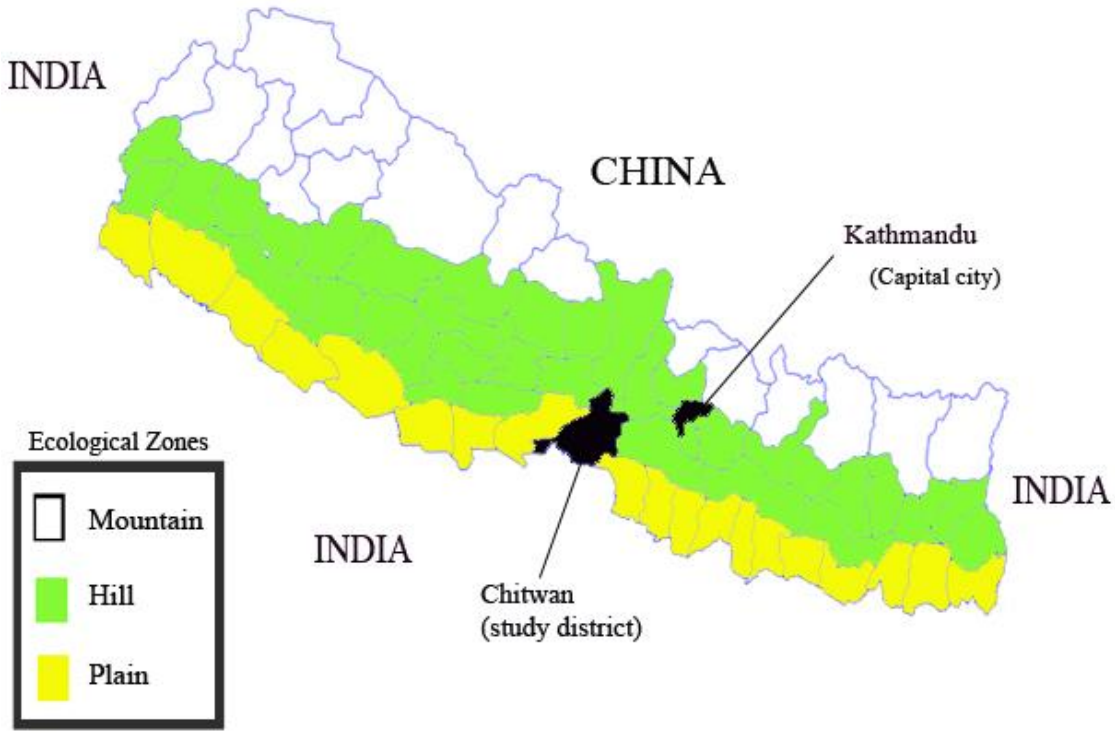

Figure 3.1.2 Map of Nepal

Source: (http://en.wikipedia.org/wiki/File:Nepal_districts.png)

3.1.3 Selection of study area

Chitwan has 9 hilly and 27 plain rural VDCs (figure 3.1.3). The hilly VDCs have a much lower percentage of institutional delivery compared to that of the plain VDCs where the percentage is quite high. However, the percentage in some VDCs of the plain was lower relative to other similar VDCs. Therefore, both hilly and plain VDCs were included in the study. Although the VDCs were selected purposively, sample size for the study had been estimated to select the wards within each VDC and also to ensure the study be scientifically sufficient to make inferences from. The three VDCs of the plain, namely, Piple, Ayodhyapuri and Padampur, with the lowest percentage of institutional delivery among all the plain VDCs, even though two of them had birthing facility at the local level were selected for the study. There were only two VDCs in the hilly area with birthing facility where the percentage of institutional delivery was also very low. Another hilly VDC was selected which had no birthing facility so that the equal number of VDCs were selected from both plain and hill. In this way three hill VDCs- Chandivanjyang, Kaule and Kabilas were selected for the study. The total

population of the six VDCs was 57479 (CBS, 2012c). The percentages of institutional delivery in all the selected VDCs increased in the fiscal year 2011/2012 (DPHOb, 2013) compared to the percentages in the fiscal year 2010/2011when this study was planned (DPHOc, 2012) (annex 4).

During the periodic review meeting at the DPHO, I discussed with all the in-charges of the peripheral level health institutions of the selected VDCs and did the planning of the study with the help of them such as preparing the map of the specific study area including all the details required for the study which became very useful particularly for hilly VDCs. At the same occasion, cooperation needed from them was ensured.

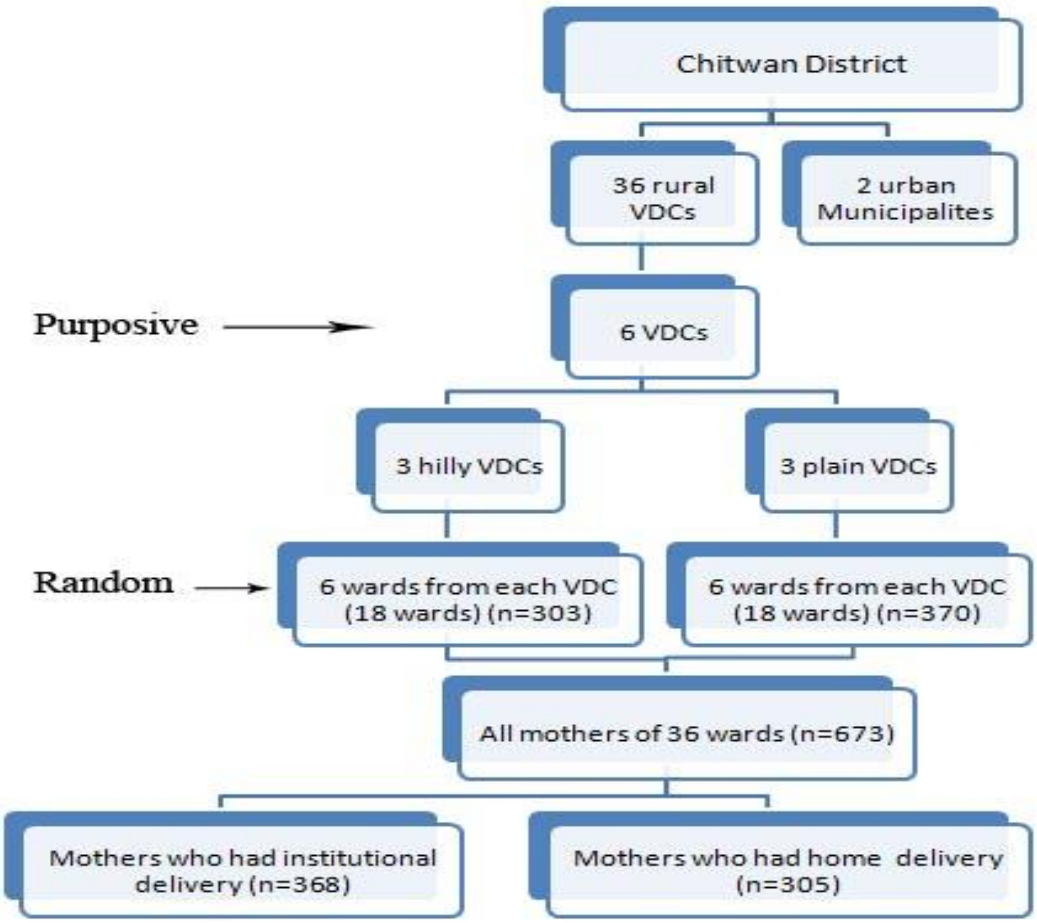

Figure 3.1.3 Sample size and sampling procedure

3.1.4 Ethical consideration

The Nepal Health Research Council provided ethical clearance (annex 2) to carry out this study after reviewing the proposal of the study along with the tools, and consent forms to be used in the study. The study was also approved by the Center for International Health, Ludwig-Maximilian University, Munich, Germany. Later at the local level, the district public health office granted a written permission to conduct the study in the district. For the informed consent from the respondents, a consent form was used (annex 3) which had been prepared on the basis of informed consent form templates made available by the World Health Organization under research policy in the website: http://www.who.int/rpc/research_ethics/informed_consent/en/.

During quantitative survey, the enumerators read the consent form to each respondent, and for qualitative study I myself did this job. The respondents were allowed to read the form themselves when they wished to. We tried to get written informed consent from each respondent, but most of the respondents preferred to provide verbal consent due to various reasons like being illiterate, feeling more comfortable, and safer to give oral consent than the written one. Just after the completion of data collection in any of the VDCs, I collected all the filled-in-questionnaire from all the enumerators and kept them in a cupboard of my house and locked, and I was the only person to have access to them. Each questionnaire was then coded with serial numbers which were entered during data entry that would help to identify the particular person when needed. The names of the respondents, though recorded during data collection to identify the person, have not been mentioned anywhere. The respondents were given freedom not to participate in the study or to discontinue whenever they wanted, however, this did not happen with any respondent except postponing the date for some qualitative data collection to find the time appropriate to the respondents.

3.2 Methods of qualitative study

3.2.1 Study participants and data collection

Data collection for qualitative study was carried out during May - August, 2012. Focus group discussions (FGDs) were conducted with women who had given birth in

the last one year preceding the survey and their mothers-in-law. In-depth interviews were done with purposively selected (Patton, 1990) husbands, traditional birth attendants (TBAs) who had assisted in childbirth during that period, FCHVs and health workers of the local health posts, along with district managers. The qualitative data collection was done in all the six village development committees with the distribution of the collection as provided in table 3.2.1.

Data collection

FCHVs were requested to help in the study to gain cooperation from the study population of the respective wards. The predetermined inclusion criteria were explained to the FCHVs.. The criteria set to identify possible study participants were: only women who had given birth in the year preceding the survey, locals of the selected area, at least 6 to maximum 10 in number, from any caste, of any age and parity, willing to participate in the study after being introduced to the study objectives. The place of delivery, whether at home or at a health institution, was also emphasized to be considered as one of the criteria for FGDs . On average six to seven persons were included in each FGD.

The FCHVs of the respective wards explained the objectives of the study to the population and asked for their support. The help of FCHVs was invaluable especially in identifying and gathering mothers and mothers-in-law at one venue for the focus group discussions. The FCHVs also helped in contacting husbands and TBAs. Collection of data from both places: close to the birthing facility- within one hour distance, and further from the facility- more than one hour was taken into account.

The three FGDs conducted in two places in the beginning of the data collection were used as pretest of the tools and the questioning process. The FGD and in-depth interview guidelines had been prepared on the basis of available literature with qualitative studies in the majority and priority was given to those from Nepal. The guidelines were further modified to explore information in the context of Chitwan district and the study area like availability of birthing centers in rural health posts. The guidelines included socio-cultural and health service related aspects together with a format to record demographic characteristics of the respondents (annex 1.1). The whole qualitative data collection was carried out by myself in local Nepali language

using the guidelines prepared in Nepali language. Two of my bachelor public health students accompanied me in the field, one at a time, to help in taking notes of the in-depth interviews and FGDs. Before start the field study, I oriented them in taking notes properly. In addition to note taking, audio-recording was also done for all the in-depth interviews and FGDs with the informed permission of the participants. For this purpose, a special recorder was used which recorded all information very clearly.

A total of 6 FGDs and 12 in-depth interviews were conducted with different categories of people- women; family members- husband and mother-in-law; community members- TBAs and FCHVs; health workers of local health institution-in-charge of the health post and auxiliary nurse midwife (ANM) of birthing centre; and district health managers- district public health officer (DPHO), and focal person for safe motherhood at the district public health office, with the distribution as given in the following table number 3.2.1. Due to time and financial constraints the sample size was small but inclusion of people who would have a big influence on the decision-making and service utilization was done. One FGD or in-depth interview was conducted with each group mentioned above in both hill and plain areas, so that the contexts and situations of both hill and plain could be identified.

Six FGDs with the following distribution were conducted because I thought it would help to explore the views of mothers who had given birth at home and those who had given birth at health institution as well as of mothers-in-law living in both plain and hill areas where the situations and conditions are different due to geography. In each two FGDs with mothers-in-law, those whose daughters-in-law had home delivery and institutional delivery were included together almost in fifty-fifty percent. The reason for combining was that unlike young women the in-laws by their age are not shy at all and are confident to speak in front of others. Another reason was that in a specific community it was difficult to find at least 6 mothers-in-law of women having institutional delivery, especially in hill and home delivery, especially in plain. Moreover, few women did not have mothers-in-law as they had already died, or few had some kind of hearing or speaking impairment, while few mothers-in-law had been living separate from their daughters-in-law and, therefore, having no role in decision-making.

Table 3.2. 1 Distribution of qualitative data collection

FGDs	**FGD/KII number**		
Category of participants	**Hill**	**Plain**	**Total**
Mothers delivered at home	1	1	2
Mothers delivered at health institution	1	1	2
Mothers-in-law	1	1	2
Total	**3**	**3**	**6**
In-depth interviews			
Category of participants	**Hill**	**Plain**	**Total**
Husband	1	1	2
TBA	1	1	2
FCHV	1	1	2
Health facility In-charge	1	1	2
ANM	1	1	2
DPHO			1
District focal person			1
Total	**5**	**5**	**12**

Apart from mothers-in-law, husbands have a very important role in household decision-making. TBA is the one who assists deliveries at home. FCHV is responsible for encouraging and promoting institutional delivery in her respective ward. Health facility in-charge is responsible for the management of health institution as a whole, while ANM handles/assists deliveries at birthing centres in rural area. DPHO and focal person of safe motherhood at the district public health office manage the health service delivery and services related to safe motherhood respectively. Therefore, these people were recruited for the qualitative study.

Many husbands could not be available for FGDs because of their labour work, field work or work in other places. There were too few TBAs to be sufficient for a FGD since, it was difficult for the FCHVs to get them together in one place in the hilly area where they would have had to walk many hours. For these reasons, in-depth interviews were conducted with the TBAs.

3.2.2 Data analysis

Thematic analysis was done for qualitative data. Thematic analysis is searching or identifying themes or patterns in the data of FGDs, in-depth interviews or in any texts that describes phenomenon (Braun and Clarke, 2006) and then summarizing the results under the headings of the themes (Dixon-Woods et al., 2005). A theme is that which gives a meaning in the data with regard to the research question of our study (Braun and Clarke, 2006). To explore something by interpretations thematic analysis is understood as the most appropriate method.

The whole process of qualitative data collection and analysis was done by myself. Data were transcribed from the audio recording and note-taking. All the data were transcribed in Nepali language by myself and then translated into English. Few translations were done by other persons who were lecturer of major English subject, but were later cross-checked with the Nepali transcription by me.

The six steps of thematic analysis (Braun and Clarke, 2006) were followed for analyzing qualitative data of the study manually by using Microsoft word processor in computer: familiarizing with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report.

The whole transcript was read to identify the meanings in data but because I had collected and transcribed the data myself, I easily conceptualized the whole text. In the coding process two persons were involved- me and another person who had masters of public health degree and had also a special training on qualitative data analysis. We both coded the same transcripts of two FGDs and three in-depth interviews independently. Then we discussed on the codes provided to the texts and decided upon the final codes. Thereafter, I coded for all the remaining transcripts using those finalized codes (Bradley et al., 2007). Line-by-line inductive coding was done throughout by writing the names of coding on the margin of the page. Every sentence or sometimes even a word if gave some meaning, a code was given to it on the margin of the page indicating the sentence. All codes were written in a paper and the codes having similar meaning were grouped together to form a common theme. The themes were reviewed and some separate themes were again combined to form a broad single theme, for example, in the study four themes, namely, perception on

institutional delivery, decision-making, role of family, and role of community which were different themes were later combined into one, i.e., culture. All the texts related to the sub-themes of each particular themes were brought together and kept under that specific sub-theme. The texts were read carefully and their meaning was written in narrative texts for each sub-theme and theme. As I had different categories of study participants, similarities or contrasting views of these different categories of people was compared. Therefore, in each theme the responses of different categories of study subjects were kept in order: starting with women themselves, their family members, community members, health workers and lastly health managers, so that the sequence helps to understand the problem of women and response of others to it. Finally, the connections or relations between different themes as well as sub-themes were explained to find the factors influencing institutional delivery. Evidence of themes was provided by including the examples of the respondents' verbatim.

At the end, a thematic network analysis was done (figure 4.1) which illustrates the different themes and sub-themes embedded and hidden in the text and shows the relationships among them in the form of network (Attride-Stirling, 2001, Miles and Huberman, 1994).

3.3 Methods of quantitative study

3.3.1 Study population, sample size and sampling

As shown in figure 2 after selecting six VDCs, in the next stage, in each VDC six out of nine wards were selected randomly. The estimated number of study mothers was estimated per ward of a VDC by dividing the total number of deliveries by nine, as every VDC has nine wards. Two third of wards were supposed to sufficiently represent a VDC and also for getting the required number of deliveries. Therefore, six wards were selected randomly in each six VDCs. At the ward level, all mothers having given birth during the one-year-period of the study- from April 21, 2012 to April 20, 2013- and residing in the sampled wards were interviewed though a few of them were missed. Sample size was calculated for the study to confirm the adequacy of the study population from the randomly selected wards to represent the study settings and also to ensure the study be scientifically sufficient to make inferences from. Altogether 673 mothers were included, among whom 368 had delivered at a

health facility and 305 had delivered at home. The limiting sample size of the study is more than adequate to meet the ratio of observations, i.e., 15 per predictor variable (Babyak, 2004).

The sample size for the study was calculated with 83 percent prevalence of institutional delivery of Chitwan district, 3 percent margin of error, and assuming a non-response rate of 10 percent. This resulted in a final sample size of 669. Though the study was carried out in purposively selected settings, the sample size was enough to represent the district as a whole.

3.3.2 Data collection and data collection procedure

Chitwan is one of the districts where the CB-NCP is implemented; in which FCHVs keep a record of all pregnant women and mothers who have given birth. The FCHVs of the selected wards were visited at their homes and a list of mothers who had given birth between April 21, 2012 and April 20, 2013 was taken from their records. In addition, other eligible mothers of the study area not reached by the FCHVs, primarily due to geographical or distance reasons, were also included in our study. They were identified by asking the FCHVs themselves, and other local people. The non-response rate of mothers who could not be recruited as they had gone to their maternal home, to work or could not be accessed due to heavy rains did not exceed the 10 percent included in the sample size estimation. It is unlikely that any bias was introduced through non-responders, as they were from similar socio-economic status and ethnic group as the included mothers. This was assessed by cross-checking the information with FCHVs, other local people and social mapping for the geographic location of the houses in each ward.

The structured questionnaire, which had been prepared in local Nepali language on the basis of the findings of preliminary qualitative data analysis conducted in the first phase and review of relevant literatures, was modified further after pretesting. The pretesting was carried out in the VDCs of Chitwan similar to the study settings. The questionnaire was pretested at 35 women. These 35 questionnaires were not included in the data analysis of the study, they were just for pre-testing and were discarded after using this information in modifying the questionnaire. After pretesting, options of some questions were modified and some were added as well as reordering of some

questions was done. The questionnaire included socio-economic, demographic, variables related to decision-making, variables related to perceived need, and health service related variables (annex 1.2).

Data collection for the survey was carried out between April and May, 2013, through face-to-face interviews with the participating mothers by visiting them at their homes. Eight enumerators with similar data collection experience were selected to collect data of the study. Most of them were bachelor students of public health and two were masters students of sociology. I provided them with two days' orientation and they were also involved in the pretesting of the questionnaire. They were oriented about the objective, methodology including the introduction of study areas. Each question of the questionnaire was clarified to them one by one, the technique of asking each question was explained and confirmed by making them do simulations of asking. In addition to these, they were explained how they would contact FCHV and make a list from her register. One copy of such register was shown to them. How they could ensure so that none of the study population is missed, checking the filled in questionnaire soon after interview to make sure of completeness of data, etc. were discussed in the orientation. Lecture, discussion and practice of asking questions were done for orientation.

In the community, the FCHVs of the respective wards were a great help to the enumerators especially in identifying and locating the respondent mothers. The enumerators were supervised by myself by visiting them in the field or meeting them in the evening. However, in some part of hilly areas sometimes meeting could not be done every day as it was difficult for enumerators to return to my place due to difficult topography with very narrow, sloppy path and with much ups and downs, but particularly when they had to go to another ward of the VDC in one direction. However, the quality of their data collection was confirmed by contacting them every day by mobile phone and also through contacting the FCHVs. The work of the enumerators was also confirmed at the health posts through health workers and local people visiting the health post. Later, I checked the filled questionnaires for completeness, accuracy and consistency in the presence of the respective enumerator.

3.3.3 Measurement of variables

I will first describe the outcome measure (dependent variable), i.e. the place of delivery. Then I will describe the measurements associated with the explanatory variables.

Dependent variable: The outcome/dependent variable is the place of childbirth. This variable is measured as a dichotomy: whether a baby was delivered at home vs. at the institution. This variable is measured as whether a woman delivered a baby at the institution coded '1' and delivered at home coded '0'. A home delivery is referred to as whether a delivery happened at home, and on the way to health institution, vs. delivery at the health institution referred to as a delivery happened at any kind of birthing facility such as government hospital/private hospital, primary health care centre (PHCC), birthing centre of health post (HP)/sub health post (SHP) or private clinic/nursing home.

Independent/Explanatory variables: Not all information collected in the questionnaire was examined for association with the place of delivery. For example, knowledge related questions such as knowledge on danger signs, knowledge on incentives were not assessed due to the problem in their temporal association, though they were included in the questionnaire. Similarly, variables such as complications during previous pregnancies or deliveries and the place of previous childbirth had a large number of missing data, i.e., 287, that was the number of women who had given birth for the first time. Similarly, means of transportation was analyzed only descriptively because distance and place of residence, whether hill or plain were analyzed for their association with place of delivery, and would, therefore, reflect the means of transportation as they were different by place of residence.

The independent variables of the study that were examined for their association with place of delivery have been divided into five categories, namely, (i) socio-economic variables, (ii) demographic variables, (iii) decision making/response of husband and response of community, iv) perceived need related variables, and (v) health service-related variables.

(I) Socio-economic factors

The measurement of four socio-economic variables, namely, place of residence, ethnicity, economic status of the family, and education of mother is described below.

Ethnicity: The Ministry of Health and Population, Nepal has categorized different castes into 6 categories, namely, Brahman/Chhetri (upper caste), disadvantaged Janjati, advantaged Janjati, Dalits, religious minorities and disadvantaged non-Dalit terai caste (Pandey, 2013, Paudel, 2013). In the present study, I have categorized ethnicity into: Advantaged ethnicity: upper caste (Brahman/Chhetri) and advantaged Janajatis; Disadvantaged ethnicity: disadvantaged Janajatis, Dalits, and religious minorities. The variable is coded as '1' for advantaged caste and '0' for disadvantaged caste.

Economic status of the family: To measure the economic status of the respondent's family, a wealth index was created using a number of indicators of assets- radio, television, mobile phone, other kind of telephone, and watch; dwelling characteristics- material of roof and wall of house, availability of toilet and type of toilet and access to drinking water and electricity. A principal component analysis was done in SPSS version 16 using factor analysis procedure. (Filmer and Pritchett, 2001). The population was distributed in two halfs and categorized into 'poorer wealth index' (coded 0) and 'better wealth index' (coded 1).

Education of woman: The frequency distribution of the study data showed the majority of women to have education between 1 to 5 years, and very few respondents having secondary education. Primary education means up to 5 years of schooling, within this range any class from one to five may have been completed. Secondary education means having had at least 6 years of education up to 10 years. Based on the descriptive findings of education and also on convention of categorizing the variable (Karkee et al., 2014, Anyait et al., 2012, Kabakyenga et al., 2012), a dichotomous variable was created for the educational status of the respondents as 'primary or none' coded as '0' and 'secondary and above' coded as '1'.

Place of residence: The place of residence of the women was categorized on the basis of its geography into plain (coded 1) and hill (coded 0). Women residing in hill were

used as the reference category.

(II) Demographic variables

The demographic variables included in the study are the age of women and the parity of the last birth.

Age of women: Completed years of age at the time of last delivery were counted. It was checked by asking mother her date of birth, her age at the time of delivery, and also her age at the time of data collection. It was categorized in three groups based on the literature (Shrestha et al., 2012) and birth practice of the study area: 15-19 years (coded '0'), 20-29 years (coded '1'), and 30 and above years (coded '2').

Parity: Refers to the birth order of the last child of the respondent. The parity was divided into three categories: one, two to three, and four or more, based on the available literature (Das et al., 2010, Kesterton et al., 2010) and evidence from the qualitative study. The categories were coded as '0', '1' and '2' respectively.

(III) Decision-making/response of husband/response of neighbours

Influence of other people on the place of delivery was measured by three variables: last decision maker for the place of delivery, response of neighbours and response of husband on the place of delivery.

Last decision-maker: The last decision-maker on the place of child birth was categorized as 'self' (coded 1) when the mother made the decision herself, and 'others' (coded 0) when the decision was taken by other than the woman herself, i.e., by husband, in-laws, other family members or FCHV.

Response of husband: The response of the husband was measured as 'encouraged institutional delivery' (coded 1) and 'encouraged home delivery or no response' (coded 0).

Response of neighbours: The response of neighbours was also measured as 'encouraged institutional delivery' (coded 1) and 'encouraged home delivery or no response' (coded 0).

(IV) Perceived need related variables

The perceived need was measured by three variables that affect the perception of women on the need of institutional delivery, namely, birth preparation, antenatal check-up, and experience of complications during pregnancy/childbirth.

Birth preparation: Women were considered as prepared for birth when at least one of five components of birth preparation had been done. The five components of birth preparation include: saving money, arranging transportation, identifying health institution and contacting health worker, identifying person who can donate blood if need be, and having a clean delivery kit (MOHP, 2012). In the present study, a dichotomous variable was created to measure birth preparation which was categorized into: 'no preparation' if a family had not done any of the preparations mentioned above, which was coded '0', and 'preparation' if the family had prepared at least one of the five things mentioned above, for which code '1' was assigned.

Antenatal check-up (ANC): The ANC that a woman had received was measured in terms of the number of antenatal care check-up. The variable for ANC check-up was categorized as '1 to 3 ANC', '4 or more ANC', and 'no ANC'. Coding was done as '0', '1', and '2' respectively.

Suggestion on institutional delivery during the last ANC: It was analyzed as 'yes' if the respondents were suggested for institutional delivery by health worker during the last ANC check-up, and 'no' otherwise.

(V) Health service related variables

In health service related variables five variables, namely, availability of skilled health worker, behaviour of health workers, availability of drugs and equipments, sufficiency of physical facilities/infrastructure and distance to birthing facility.

Distance to birthing facility: Physical accessibility to birthing facility was assessed by the distance to health facility measured on the basis of time required to reach to the nearest health institution with birthing facility from the home of a mother. A dichotomous variable was created (Kabakyenga et al., 2012) as 'less than one hour' (coded '0') and 'one or more hours' (coded '1').

Availability of skilled health workers: The responses of mothers were dichotomized into two categories: 'always available' (coded 1) and 'sometimes/don't know' (coded 0). 'Sometimes and don't know' category indicates that the women were not sure of the availability of skilled health worker at the birthing facility if they had to visit the facility.

Behaviour of health workers: Behaviour of health workers was measured as whether health workers always care and respect women at health institution. The responses of mothers were dichotomised into: 'always care and respect patient' (coded 1) and 'never/sometimes/don't know' (coded 0).

Availability of drugs/equipments: The availability of necessary drugs/equipments in the nearest birthing facility was assessed as 'always available' (coded 1) and 'sometimes available/don't know' (coded 0) responses of mothers. The category 'sometimes available/don't know' was used as the reference category.

Availability of physical facilities/infrastructures: A dichotomous variable was created for the responses of mothers on the availability of physical facilities/ infrastructures: 'sufficient' (coded 1) and 'insufficient/don't know' (coded 0).

For logistic regression analysis, in all variables, the 'more unfavourable category' of mothers was used as the reference category.

3.3.4 Data analysis

I checked each filled-in-questionnaire for its consistency and completeness every day. I prepared a codebook including all the questions serially as they were in the questionnaire and their options. Each option of each questionnaire was given a code number to make data entry easier. A data entry software , called Epi data version 3.1 (Lauritsen and Bruus, 2008) was used for the data entry . First thirty percent of data were entered by two persons- by myself and another person and frequency distribution was run and cross-checked for consistency. The rest of the questionnaires were entered by myself and I run frequency distribution to check whether data were entered correctly. Later for analysis, the data entered in Epi data were exported to the SPSS version 16 (Sweet and Grace-Martin, 1999, Norusis, 2008). The data were

analyzed in three steps:

Description of the setting

First descriptive statistics was used to describe the different characteristics of study population in terms of frequency and percentage distribution.

Pearson chi-square test

Pearson chi-square test was performed. The test tests the association between categorical variables, in which the resulting p-value indicates whether there is an association between them or not (Chan, 2003, Curtis and Youngquist, 2013, Bolboacă et al., 2011). The Pearson chi-square test was applied to find the association between the place of delivery and all the predictor variables, in which also the frequency and percentage distribution of the variables among women delivered at home and at health institution have been shown. A significance level of 5 percent was considered.

Logistic regression

As the dependent variable is dichotomous- whether women gave birth at a health institution or at home, a binary logistic regression analysis was used. Logistic regression estimates the odds of occurrence of a binary outcome from a binary predictor. In all the logistic regression analysis, odds ratio with 95% confidence interval was estimated for each of the independent variables of the study.

The logistic regression analysis was performed in two steps:

Univariate logistic regression: first, a simple logistic regression analysis was carried out to estimate an odds ratio between each individual predictor and outcome variable, which is called a crude odds ratio.

Multivariable logistic regression: In the next stage, multivariate analysis was performed in which sets of variables were added one by one on the basis of the conceptual framework of the study (table 3.3.4). Adjusted odds ratios were calculated for institutional delivery with 95 percent confidence interval. In addition to examining the effect of a category of the predictor in the outcome in comparison to the reference

category, in the multivariate analysis the potential confounding effects of other predictor variables are also controlled. The multivariate analysis is based on the standard logistic regression equation that is given below:

$$\text{Log } [p/(1-p)] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots + \beta_n X_n + \epsilon$$

Where,

p is the probability of experiencing an event, and 1-p is the probability of not experiencing an event. The ratio of p to 1- p is the odds of experiencing the event. β_s are the regression coefficients associated with the predictor variables, and X_s are the predictor variables used in the analysis, and ε is an error term, the effect of all other factors not included in the model.

The equation describes how the probability of institutional delivery changes with the addition of each predictor variable, while controlling the effect of other predictor variables.

The analysis strategy used in this study is based on the hierarchical model that has been suggested by Victora et al. (Victora et al., 1997). The table 3.3.4 shows that five models have been developed and the order of selecting the sets of independent variables in each model for the multivariate analysis was based on the conceptual framework of the study described in chapter two. First the socio-economic variables- economic status of the family, ethnicity, place of residence- hill or plain, and education of women- were included. In the second model, demographic variables, i.e., age of women and birth order of the last delivery were added, in model 3 the independent variables that were related to decision-making such as final decision-maker for the place of delivery, response of husband and response of neighbours with regard to the place of delivery were added, and in model 4 variables related to the perceived need of institutional delivery such as birth preparedness, antenatal check-up, and perceived experience of complication during current pregnancy/childbirth were added. Finally, a full model, i.e., model 5 was developed in which in addition to all the variables of model 1 to model 4 showing significant association with institutional delivery, health service related variables, namely, distance to health institution, and perceptions on the availability of skilled health worker, behavior of

health workers, availability of required medicines and equipment and availability of physical facilities/infrastructures at the nearest birthing facility, were added.

Table 3.3.4 Order of the selection of variables in the multivariate models

Models	**Set of independent variables**	**Variables included in the sets**
Model 1	Socio-economic variables	economic status, ethnicity, education of the women, place of residence
Model 2	Socio-economic variables + *Demographic Variables*	All of the above plus: age of woman and birth order of the last child
Model 3	Socio-economic variables + Demographic variables + *Variables related to decision-making*	All of the above plus: last decision-maker for the place of delivery, response of the husband, and response of neighbours
Model 4	Socio-economic variables + Demographic variables + Variables related to decision-making + *Variables related to perceived need*	All of the above plus: birth preparedness, antenatal check-up, perceived complications during pregnancy/childbirth
Model 5	Socio-economic variables + Variables related to decision-making + Variables related to perceived need + *Health-service related variables*	All of the above plus: Perceptions on the availability of skilled health worker, behavior of health workers, availability of drugs and equipment, and availability of physical facilities/ infrastructures; and distance to the nearest birthing facility

To diagnose potential multi-collinearity problems among the independent variables, I run a diagnostic collinearity test in SPSS among the independent variables of a set/block. The presence or absence of the multi-collinearity was concluded on the basis of the size of the tolerance statistics and variance inflation factor (VIF), and

tolerance statistics above 0.2 and VIF value above 5 were considered to indicate a multicollinearity among the variables. The tolerance statistic and variance inflation factor (VIF) "measure an independent variable's collinearity with the other independent variables in the analysis and is connected directly to the variance of the regression coefficient associated with this independent variable" (O'brien, 2007). O'brien quotes from book of Menard (Menard, 1995) "A tolerance of less than 0.20 is cause for concern; a tolerance of less than 0.10 almost certainly indicates a serious collinearity problem" (O'brien, 2007). O'brien explains "Since VIF is the inverse of tolerance a tolerance of 0.20 corresponds to the rule of 5 and a tolerance of 0.10 to the rule of 10" (O'brien, 2007).

Reason for choosing this procedure for multivariate analysis

The analysis of data carried out by this procedure assesses the effect of each predictor on the institutional delivery, after controlling the potential confounding effect of other independent variables. It also assesses whether such an effect is direct or mediated through other factors. The selection of variables to be included in the multivariate model and the sequence of inclusion is based on the conceptual framework of this study that describes the interrelationships between the explanatory variables. The procedure for this kind of multivariate analysis has been explained in 'the role of conceptual frameworks in epidemiological analysis' as described by Victora and others (Victora et al., 1997).

Selection of variables in multivariate analysis

Fewer numbers of independent variables were included in multivariate analysis than those in descriptive analysis as there would be more chances of multi-collinearity problem among the variables when the variables are large in number (Greenland, 1989). The selection of the variables was based on their known influence on the place of delivery, their relative contribution an increase in the Nagelkerke R^2 value and in the reduction of log likelihood. The Nagelkerke R^2 shows the proportion of variance in the outcome variable predicted by the independent variables in a model (Nagelkerke, 1991, Chan, 2004). The variables were selected for the multivariate analysis also on the basis of findings of qualitative study, for example, though I did not find much literature showing the relationship between the encouragement by

community people and husband and place of delivery, it was measured in the quantitative survey and was also included in the multivariate analysis. In the qualitative study encouragement from community members and the husband were found to be among the big influencing factors to determine whether the women delivered at a health institution or at home.

CHAPTER FOUR: RESULTS

4.1 Results of Qualitative Study

For qualitative study, altogether 6 FGDs and 12 in-depth interviews were conducted. The objectives of the qualitative study were to identify factors influencing institutional delivery as well as to supplement the findings of quantitative study. The results of the qualitative study include first the demographic characteristics of the respondents, followed by the results of data analysis presented in four major themes.

Table 4.1a shows the socio-demographic characteristics of 44 participants (women and their mothers-in-law) out of 50 included in the qualitative data, while the remaining 6 comprised of local health workers- ANMs and in-charges of local birthing facility and district health managers. The table shows that the majority of women having had home delivery were older, with higher parity, all of them were from a disadvantaged caste and the majority without education or having only primary level education. Almost all mothers-in-law were illiterate, the majority was from a disadvantaged caste and below the age of 60. Both husbands were from a disadvantaged caste, involved in both agriculture and labour work. Four FGDs were conducted in classrooms of schools on days when schools were closed (holidays), while two FGDs, one with mothers-in-law and one with daughters-in-law, were conducted in rooms of community buildings. The lengths of FGDs ranged from 65 minutes to 90 minutes, while that of the in-depth interviews ranged from 45 minutes to 75 minutes.

Table 4.1 Characteristics of participants of qualitative study

1. Characteristics of mothers participating in FGDs, Number of FGD= 4			
Variables	**Frequency**	**Place of delivery**	
		Institution (N=12)	**Home (N= 13)**
Age			
<19 yrs	7	5	2
20-24 yrs	14	6	8
25 yrs and above	4	1	3

Parity			
1st	11	7	4
2nd	10	4	6
3rd or more	4	1	3
Ethnicity			
Disadvantaged caste*	18	5	13
Advantaged caste	7	7	0
Educational status			
None or primary	14	5	9
Secondary or higher	11	7	4

2. Characteristics of mother-in-laws participating in FGDs, Number of FGD= 2

Age group	**Frequency**
Upto 49 yrs	7
50-59 yrs	4
60 and above	2
Education	
Illiterate	12
Primary	1
Ethnicity	
Disadvantaged	8
Advantaged	5

3. Characteristics of husbands participating in in-depth interviews, Number of interviews= 2

Age	**Education**	**Occupation**	**Ethnicity**	**Venue of interview**
40 years	8 class	Agriculture/ labour	Disadvantaged Janjati (Chepang)	Home of participant
33 years	6 class	Agriculture/ labour	Dalit	Community building

4. Characteristics of TBAs

62 years	Illiterate		Upper caste	Community

			building
68 years	Illiterate	Disadvantaged Janjati	Home of participant
5. Characteristics of FCHVs			
43 years	Above than secondary	Upper caste	Home of participant
48 years	Primary	Disadvantaged Janjati (Chepang)	School building

Four major themes emerged from the data analysis, namely, culture, access to birthing facility, birth preparation and ANC, and health service related factors. These major themes had several sub-themes as given below:

Culture: perception of institutional delivery, shyness, decision- making, role of family, role of community (Neighbours/FCHV/TBA)

Preparation for birth and ANC

Access to HI: Physical and Financial/incentives access

Health service-related factors: Behaviour/Competency/Availability of ANMs, Availability of materials/equipments/drugs/physical facilities

CULTURE

Perception on institutional delivery

The women and their family members perceived that it was not necessary to go to health institution for childbirth in the absence of complication until the women were confident in giving birth at home. Women who had institutional delivery had gone to health institution only when complications were observed. Complications were perceived to exist if there was prolonged labour, no movement of the baby, transverse position of baby, heavy bleeding and labour not starting even many days after the expected date of delivery.

"In my condition, I went to hospital as there was watery discharge for three days."

(Mother, Plain, Institutional delivery)

"We should take women to health institution in complications such as prolonged labour, no movement and transverse position of baby. And also when women do not have confidence to give birth at home." (Husband, Hill, Home delivery)

Prolonged labour, which was the most commonly experienced complication, was generally defined if labour lasted for more than 24 hours, whereas in most of the hill areas about 72 hours of continuous labour was considered as prolonged labour.

"If a woman cannot give birth even after 2 to 3 days, then we must take her to health institution. Yesterday who went health post for delivery was also suffering from labour for 3 days." (Mother, Hill, Home delivery)

Some family members reported that availability of people in the community to assist in home delivery (normal delivery) was also a reason of not going to health institution.

"If none is able to assist delivery at home, we must take them to health post, we should not let her die." (Mother-in-law, Hill, Home delivery)

TBAs had also a strong belief that women should be taken to a health institution for childbirth if they are any complication as otherwise she found no difference between home delivery and institutional delivery

"We must take women to health institution if the baby doesn't move and if she feels very difficult, bleeding does not stop, if it is first birth. Otherwise whether it is at HP or at home, they have to give birth themselves. In second and third childbirth if they are nearly to die then only we need to take them to health post." (TBA, Hill)

Women living very close to health post did not go for institutional delivery as they thought they could easily get health workers if complications arise. One husband of a woman living within 10 minutes' walking distance said,

"My wife had no complication to go to health post. Even in case of complications, we have health workers of health post always available to assist in home deliveries."

(Husband, Hill, Home delivery)

Health workers also confirmed this perception of people:

"Even people living very near to health post don't come for institutional delivery. They think that they can call us any time if the case gets complicated. As far as possible, they want to have home delivery." (In-charge, Hill)

SHYNESS

Shyness at health institution

Most mothers expressed that one of the reasons for them not willing to go to health institution for delivery was their shyness to show the genital parts of their body to male doctors. Some of the women expressed feeling shy with also a female nurse or any other women.

"*There are lots of people in hospital and main doctor is male, we feel shy*."(Mother, Plain, Home delivery)

"I feel shy to show genital organ even to females such as nurse." (Mother, Plain, Home delivery)

This was also confirmed by family members, i.e., mothers-in-law:

"Daughters-in-law say, "many male health workers sit around us, and many women who are relatives and neighbours come there. We have to show our private parts to nurses and male health workers of health post. So, we don't want to go"." (Mother-in-law, Hill, Home delivery)

"They didn't say anything like that, and were ready immediately when we asked to go." (Mother-in-law, Hill, Institutional delivery)

Women from Chepang caste- a disadvantaged Janjati caste- were reported to be shyer than women from other castes. FCHVs also confirmed the concerns of women with respect to privacy during childbirth and further added that shyness among women was decreasing.

"Chepang women are very shy, even some mothers-in-law are shy. They say that they will not show their genitals to anyone which should be exposed only after their death and would prefer to deliver in the corner of their house." (Mothers-in-law, Hill, Institutional delivery)

One husband attributed lack of privacy in the nearest local birthing centres, which was the only easy option for institutional delivery, as the cause of their shyness at health institution. However, health workers reported that privacy of women during childbirth was maintained in a better way nowadays than in the past, prohibiting the entry of male health workers and other community women in the delivery room. However, health workers also mentioned that there was a problem in maintaining privacy at the health post due to inadequate rooms or no partition of rooms.

"There is no separate room for delivery. Other neighbour women are allowed to see women delivering". (Husband, Hill, Home delivery)

"In the past the women of this village used to come to the health post and see the woman during her delivery. Now such women and even husband are not allowed. Only one person of the choice of the mother can be sent in. No male health worker is allowed to enter the delivery room. This might be the reason that delivery cases are increasing, but those who don't know the changes done in this practice don't understand." (In-charge of health post, Hill)

<u>Shyness to talk at home</u>

Some of the women, especially Chepang, indicated that they were shy even to talk with their family members about going to health institution for delivery.

"Pregnant women want to come to health post, but they cannot say this to family members. They say at the last stage when they are unable to deliver babies." (Mother, Hill, Home delivery)

Some mothers-in-law also accepted that there was a lack of communication between them and their daughters-in-law.

"My daughters-in-law didn't give any information about their labour. How would I

know their condition unless they tell me." (Mother-in-law, Hill, Home delivery)

This was also confirmed by the FCHVs that women hesitated to talk with their family on the place of delivery when the FCHVs asked the women for and also that Chepang women were shy to talk on anything. ANM attributed the reason for shyness and hesitation to talk to early marriage and low education of women.

"Pregnants can't say that they want to go to health institution for delivery. They feel shy and awkward to talk to family members about the place of delivery when I ask them to talk with about. Especially some Chepang women don't speak even a single word. They feel shy to talk with others" (FCHV, Hill)

DECISION-MAKING/ROLE OF FAMILY/ROLE OF COMMUNITY

Most of the women who had home delivery, family members and TBAs reported that women themselves did not want to go to health institution as they were confident in being able to give birth at home and there was no pressure from the family members on the selection of the place of delivery.

"We didn't go because of our confidence, not due to pressure of husband or mothers-in-law. We should ourselves say whether we can give birth at home or not. Husbands ask how our condition is." (Mothers, Plain, Home delivery)

"If we say, our in-laws don't stop us going to hospital." (Mother, Plain, Institutional delivery)

"If I ask my daughters-in-law to go to health institution, they go deaf and ignore it. Then what can I do?" (Mother-in-law, Hill, Home delivery)

"I have let them go if they wanted to go to health institution, but they didn't want to go themselves, so, I assisted their delivery." (TBA, Plain)

FCHVs indicated that women's perception of no necessity of institutional delivery was influenced by hearing their mothers-in-law and their own mothers that they had given birth to many children easily at home.

"I think, the main cause for not going to HP is that women think delivery is a normal

condition. Women hear mothers-in-law saying –'we delivered more than 12 babies while cutting grass, cut the cord with sickle & put baby on lap'." (FCHV, Hill)

Women from plain area who had home delivery reported that their preference for home delivery was influenced as some neighbours demonstrated fear of health institutions that suturing at the hospital would create problems later, and that it was also shameful to show genitals to health workers.

"Some elder women laugh at us saying 'we have delivered a dozen of children at home. If we go to health institution, we have to show our genital organ and that is a shame'. That's why women deny to go." (Mother, Plain, Home delivery)

"I'm afraid to go to hospital. Doctors and nurses first cut the genital part and then suture it. It becomes difficult to walk after delivery. Whatever happens, we will give birth at home." (Mothers, Plain, Home delivery)

Women, particularly from hill who had home delivery, mentioned that they had to be busy with household work and gave birth while working. Giving birth was not that difficult for them.

"When we go to jungle for collecting fodder and firewood, or during household chores and field work, we give birth. I have given birth to two elder children in jungle. Labour is short with little pain as we don't notice labour until the last stage" (Mother, Hill, Home delivery)

Some women reported that the birthing facilities being far away coupled with shyness among women were the reasons women did not want to go rather than the pressure of the family.

"Family members are not the obstacles for institutional delivery, but hospital is far away and women feel shy to show genital part of the body in health institution." (Mother, Hill, Institutional delivery)

Women from plain who had given birth at home also reported opportunity to have a massage after delivery from TBA as one of the reasons for their preference to home delivery which would be difficult due to suturing at hospital.

Some women of the hill living nearby the road and for whom travelling to the district hospital was physically more accessible than the peripheral local birthing facility as well as the women of plain areas who had home delivery expressed inconvenience to travel due to vehicle jerkings.

"If we go to hospital, there would be jerkings in the bus because of poor roads, our body shakes, blood moves. It's convenient to give birth at home." (Mothers, Hill/Plain, Home delivery)

The majority of the women who had home delivery reported that their preference for home delivery was influenced by family and community people's perception towards institutional delivery and institutional delivery not being customary in the community.

"We don't say we want to go to health institution. We don't have a habit of going. Everyone stays in their own home." (Mother, Hill, Home delivery)

"Neither mother-in-law nor other community people say anything about going or not going to health institution. They don't talk anything about going to health institution." (Mother, Hill, Home delivery)

Family members had a great faith in neighbours as an assistant in childbirth.

"I ask the neighbours first whether there is a need to take my wife to HP. If they can handle the delivery, there is no need to go to HP, otherwise we should take her to the HP" (Husband, Hill, Home delivery)

Family members and FCHVs reported that women who had institutional delivery were encouraged for by the other women of the community who had had already given birth in a health institution.

"The women in the community who had institutional delivery have played a great role in encouraging other women to go for institutional delivery by advertising health institution." (FCHV, Plain)

Role of family members

Role of in-laws

Both the women and their mothers-in-law reported that the mothers-in-law were careful on safe delivery because of their own experience of health problems, knowledge of use of services by others, and also from the training provided to mothers-in-law at the health post.

"*My mother-in-law is afraid much from potential complications as she had experienced problems herself. So, she was willing to take me to the hospital, but I didn't wish to go*." (Mother, Plain, Home delivery)

"A training was provided in the health post to mothers-in-law and pregnant sisters-in-law. We were taught that we should take care of our sisters-in-law, get her checked 4 times during their pregnancy, bring her for institutional delivery, etc." (Mothers-in-law, Hill, Home delivery)

However, some women also reported that in-laws, particularly mothers-in-law encouraged them for home delivery and that fathers-in-law always supported the views of the mothers-in-law. The in-laws' perception of no necessity of institutional delivery as well as the expenses associated with institutional delivery were the reasons for encouraging home delivery. The women who had home delivery indicated that the place of their delivery depended upon the preference of mothers-in-law.

"Because mother-in-law doesn't like if I want to go to HP for ANC check-up and delivery, I didn't go to health post." (Mother, Hill, Home delivery)

"*My mother-in-law said 'I gave birth to so many children at home, why do you have to go to hospital to give birth'."* (Mothers, Plain/Hill, Home delivery)

"The main cause of delivery at home is the family pressure. First they didn't want to take me to hospital, but when I argued about the risk of my life they accepted to take me. They were worried of the expenses on food, transportation, etc." (Mother, Hill, Institutional delivery)

The FCHVs reported that family members were also more concerned about the disturbance in household work if they go to health institution for delivery than the safety of mother and baby.

"Family members think that work like cutting grass, cultivating crops will be halted if they take woman to health institution." (FCHV, Hill)

However, the mothers-in-law disagreed this and said that household work was given importance in the past, not now.

"In the past, mothers-in-law used to think that going to health institution hampers their work at home and in the field as for them work was much more important than anything else. But nowadays mothers-in-law don't say such things. But in our time our mothers-in-law used to say such things." (Mother-in-law, Hill, Home delivery)

Role of husband

Most of the mothers reported that husbands wanted to take their wives to a birthing facility. The majority of women who had given birth in a health institution expressed that husbands had encouraged and supported them to have institutional delivery.

"My husband took me to the hospital saying TBA does only massage with oil at home. But actually TBAs know many more things." (Mother, Plain, Institutional delivery)

However, most of the women who had home delivery reported not having received the support of husband for institutional delivery as husbands were not available at home to take the women to birthing facility and that there was also a lack of communication between them and their husbands with respect to the place of delivery.

"Husband was not at home, mother –in-law is old and father –in –law is already dead, who will take me." (Mother, Hill, Home delivery)

However, some husbands who were living together with wives were also reported of not being concerned much about the delivery of their wives. Perceiving childbirth as a normal event and giving second and thereafter births as a very easy job were cited as

their indifference to the place of delivery.

"I asked husband of a woman not to go to work when his wife was in labour. I told him anything may happen to his wife, but he didn't stay at home. He said 'What will I do staying at home.' With the help of villagers baby was born, husband didn't know anything about it." (FCHV, Hill)

"Husbands say that-'It is difficult for 1st birth, but in 2nd or 3rd parity child can be born even by coughing, women pretend of having a problem in delivering." (FCHV, Hill)

Women who had institutional delivery were taken to the facility when complications were observed.

"Husbands bring women to health institution only in complicated condition after women suffered a prolonged labour of some days or heavy bleeding." (ANM, Hill)

It was reported that husbands were influenced by their mothers' perception.

"My husband was willing to take me to hospital, but my mother-in-law said it can be at home. At 12 o'clock labour started and I gave birth at 2 pm. My husband was so afraid at first." (Mother, Plain, Home delivery)

"My mother used to assist in deliveries in the past. My mother asked to wait for 24 hours for delivery to happen at home, but it did not happen even on the second day and many days had already crossed EDD. So, we went to health post." (Husband, Plain, Institutional delivery)

Husbands and FCHV both reported that the difficulties to carry the women to the health institution due to unavailability of roads and vehicles were the reasons for their unwillingness to take women to the institution.

"One person cannot carry a woman; 3-4 persons are required to carry her. We think if delivery can happen at home, then why to give unnecessary burden to neighbours. But if labour is prolonged we should take women to health institution" (Husband, Plain, Institutional delivery)

"Health facility is far, it takes 3 hrs to reach the nearest birthing facility. It's difficult for one man to carry a woman in a bamboo basket. Carrying in a hammock is difficult due to the narrow path. These are the reasons men do not want to take women to health post." (FCHV, Hill)

Role of neighbours

Women of hilly areas and few from plain areas who had to be carried to the road and who had home delivery said that as many males were required to carry a woman to a health institution, and males were usually not available due to their work, women had to give birth at home. The available males in hill were also unwilling to take women fearing delivery to happen on the way because of their past experience of such events.

"Only one man cannot carry a woman to health institution. Most of the males of the community go to work, so it is not possible to go to HP." (Mother, Hill, Home delivery)

"Last year one mother gave birth on the midway while going to HP. Villagers think that same event may happen again. They say that women can give birth in their own home." (Mother, Hill, Home delivery)

Role of FCHVs

All mothers, irrespective of institutional or home delivery, were encouraged for institutional delivery by FCHVs.

"Once FCHV knows about the pregnancy, she comes immediately to the village to visit the pregnant. She is the person to ask us to go to health institution, she herself takes women to HP for ANC, I went with her two times during this pregnancy." (Mother, Plain, Home delivery)

Role of TBA

Family, community, health workers and health managers all reported that in most of the places no specific TBAs were available nowadays. Most home deliveries were attended by female neighbours or family members who used to assist in the past.

"The experienced persons in a community assist women in childbirth. We don't have any particular well-known TBA in our VDC." (In-charge, Plain)

Even in places where TBAs were available, most of the family members and TBAs themselves reported that seeking help of a TBA to assist in childbirth was decreasing over time due to the availability of birthing service in the local health post though there was much flexibility in payment to TBAs. People could pay her as much as and whenever they wanted to and TBAs especially in plain areas were ready to assist in childbirth any time.

"Nowadays, not many people would call TBA as there is a practice of going to HP." (Mothers-in-law, Plain, Institutional/Home delivery)

"In the past people used to call me soon after start of labour. Nowadays, sometimes I know about the women only after they return with baby from health institution." (TBA, Plain)

"TBAs do not ask for anything. Rich people give around NRs. 500. Those who are poor give small clothes like blouse. These can be given at naming ceremony or even 1 or 2 years after birth." (Mothers, Plain, Institutional/Home delivery)

However, some women and family members had a strong belief on the TBAs for normal deliveries. TBAs were also confident in handling normal deliveries, but hesitated to assist deliveries with potential complications due to the fear to be blamed if something goes wrong with mother or baby.

If TBA can assist the birth, she says it will happen after some time, we don't need to take to health institution. If she cannot conduct delivery, she would ask to take to health institution as soon as possible." (Mothers-in-law/women, Plain, Home delivery)

"We should not take risk of other's life saying "I can handle; you should keep her at home", like that. I just examine and suggest them to take if it is not going to be a normal delivery. It is very difficult to work nowadays. If something happens to the woman, her family members would blame me as a killer and if she can give birth, they appreciate by saying"you saved our money." (TBA, Plain)

BIRTH PREPARATION

All women and family members reported that saving money was the most common practice as preparation for birth because they might have to go to a health institution if delivery did not take place at home. The money, otherwise, could also be used for foods required for the mother during her postpartum period as well. Arranging food items was also a very common practice considered as birth preparation.

"If we save money, fruits, ghee can be bought for the postpartum period. Sometimes there might be difficulty in childbirth and we may have to go to hospital." (Mothers, Plain, Home/Institutional delivery)

"We do not get money immediately when we look for it in the village if we have to go to health institution. We must save Rs. 4000 to Rs. 5000. We also keep oil, ghee, money, clothes, thyme seeds, spices, something to keep baby warm such as coal or firewood to provide heat to mother and baby after birth." (All mothers-in-law, Plain)

However, apart from saving money, arranging transportation or contacting health worker in advance were not done in almost all families. Women who had home delivery reported that they had already contacted TBAs or had own mothers-in-law as TBA. TBAs brought delivery kits with them. Regarding transportation, in the hills, women were carried usually in bamboo basket, hammock or stretcher only after two to three days of labour. In plain, a call to an ambulance was made if they wish to go to health institution.

"We ask TBA to bring safe delivery material kit when our delivery time is near." (Mother, Plain, Home delivery)

"In my home my mother –in-law is TBA. We keep delivery kit and money. Delivery kit is available at HP and private clinic." (Mother, Plain, Home delivery)

"None has a habit of looking for people to carry women in labour in advance, none has done that up to now." (Mother, Hill, Home delivery)

"My husband and neighbours carried me to health post in a hammock when delivery did not happen after three days of labour." (Mother, Hill, Institutional delivery)

"After the start of little pain, we call for an ambulance and rush towards hospital." (Mother, Plain, Institutional delivery)

Some mothers-in-law in hilly areas whose daughters-in-law had home deliveries said that no birth preparation at all was done since their daughters-in-law had already expressed unwillingness to go to health institution for delivery.

"If daughters-in-law tell us about their interest to go to health institution, we ourselves would do the preparations. But they don't say anything and don't become ready to go. So, why and what we make preparations for?" (Mothers-in-law, Hill, Home delivery)

The FCHV of the hill also confirmed the response of mothers-in-law that preparation for birth was not done.

"People do not make any preparation, not even money. I suggest them to be prepared and go to health institution. They are not interested in and at the same time there is a lack of money. Very few women of this village have given birth at health institution" (FCHV, Hill)

ANC

FCHV and health workers reported that ANC service utilization was increasing, but institutional delivery was relatively low.

"During ANC we counsel every woman and suggest them for institutional delivery. But very few women come for delivery" (ANM, Hill)

The in-charge of a health post said that ANC use had increased also due to the increase in the ANC service outlets.

"Previously not many women used to come for an ANC check-up. They had to walk four to five hours to arrive at the health institution from their home. Now there are three primary health care outreach clinics (PHC-ORCs) running every month in different sites of the VDC. The number of women receiving ANC is increasing with the increase in services." (In-charge, Hill)

The women indicated that ANC service was sought as the knowledge of baby's position would help them to identify potential complications of childbirth.

"The position of the baby may be in the opposite direction and during delivery it may be dangerous. So, it is important to know this earlier." (Mothers, Plain, Institutional/Home delivery)

ACCESS TO BIRTHING FACILITY

Physical access: distance/transportation/communication/condition of road

All the study subjects reported that an ambulance service was available in every VDC and so were public vehicles except in few hilly VDCs. The respondents also mentioned that an ambulance was easily accessible through mobile calls. Public vehicles usually did not want to board people from on the way, especially to women in labour.

"Ambulance comes immediately after we call. Other public vehicles are available in every 5 minutes." (Mothers, Plain, Home/Institutional delivery)

"Chitwan district has many facilities in transportation. There is an ambulance service in many VDCs." (District focal person)

"Public bus very often doesn't stop here, they deny to pick up people, especially to women in labour, from the highway." (Mother, Hill, Institutional delivery)

A few of mothers in plain who had given birth at home reported that sometimes ambulance took a long time to arrive when it was away with other patients. Most mothers of the hill also reported that it took time to call an ambulance and had no phone number of the ambulance either. In addition, though the ambulance came down on the road, many people were required to carry a woman to the road and it would also take time to find the people out.

"When we called ambulance it had gone to drop another patient, so it was late. Labour pain occurred only for three hours, delivery happened before the arrival of the ambulance." (Mother, Plain, Home delivery)

"It takes about one or one and half an hour time to call the ambulance and we don't have the phone number of ambulances either. It also takes time to search people to carry a woman down to the road." (Mother, Hill, Institutional delivery)

It was reported that ambulance was the most common vehicle to go to a health facility for delivery because women were taken to a health facility after the appearance of complications (usually after a prolonged labour) and wanted to reach hospital as soon as possible.

In hills as well as in a few plain areas women had to be carried most commonly in a bamboo basket, hammock and stretcher. Due to narrow and sloppy paths in hills people feared of accidents in a stretcher. It was difficult for one person to carry a woman alone in a bamboo basket, especially when the birthing centre was far. The FCHV of the hill added that the available bamboo baskets were also not appropriate to carry a woman.

"We have taken a bamboo basket from health post and kept it with us. We had kept stretcher too, but a pregnant woman nearly died falling from the stretcher. Roads are narrow, sloppy and steep." (FCHV, Hill)

"Bamboo basket is very large, and not strong enough. It's like the one to carry other things like manure. We complained at health post, they have told us that they would ask local people to prepare it." (FCHV, Hill)

"One of the main reasons for low institutional delivery is the difficult geographical topography, 50 percent don't come due to this factor." (In-charge, Hill)

Financial access and Incentives

Most of the women and family members reported that there was no difference in institutional delivery by the economic status of the family as people who could afford a big amount of money went to a bigger hospital at a further distance, while the poorer ones went to local birthing centre as it did not cost much to them. A very small amount of money would be spent on transportation and on food during stay in health institution if delivery took place at the nearest birthing centre.

"People with low economic status are going to the local birthing centre." (Mothers, Plain, Institutional delivery)

"As foods can also be taken from home, a lot of money is saved if we go to the nearest birthing centre. Nepali rupees 100 is enough for delivery here" (Mother, Plain, Institutional delivery)

"If we have to go further than HP, it would be difficult for us, we have to look for money also." (Mother-in-law, Plain, Institutional delivery)

Apart from financial reason, the possibility of having fresh food of the home was also an attraction of local birthing centres.

"In the HP health workers are not always available. They go to their homes frequently. If they handle delivery here, it would be better because women can go to their home soon and they can take fresh food in their home, other family members can also bring food from home." (TBA, Hill)

Health workers indicated that those who went to a bigger facility at a further distance were richer as well as perceived the service of the nearest birthing centres to be of low quality. Some family members reported that apart from financial reason unfamiliar environment at a distant birthing facility were the reasons for preferring the nearest ones.

"Those of higher economic status go to hospital. Some of them don't have belief on the services of HP. Middle and lower class women visit local health facility for delivery." (In-charge, Plain)

"Local birthing centres are appropriate for poor as bigger hospitals are inaccessible due to financial barrier and the environment would be unfamiliar as well." (Husband, Hill, Home delivery)

Incentives

Women and their family members indicated that incentives were not that important for most of the people. The safety of mother and baby was the reason for institutional

delivery.

"It's not that we go for money, rather it's for the safety of mother and baby." (Mother-in-law, Plain, Institutional delivery)

Almost all respondents indicated that the incentive was too little to meet the expenses related to institutional delivery, such as in transportation fare, foods during a stay at health institution and to people carrying women in the hill. A mother-in-law of a woman who had home delivery and living within one hour distance from the local birthing centre also reported that people didn't give importance to the incentive as they could easily earn that much amount of money with their skills.

"If we are short in money, it could be added to the amount. Otherwise incentive is not sufficient for all expenses" (Mothers, Plain, Institutional delivery)

"When I tell women that for four timely ANC and delivery at HI NRs. 900 is provided at health institution, they say "what it will do?" Whatever they say is true. Actually, many people are required to carry a woman. Those who carry need to be provided with alcohol and other snacks in hotel. Postpartum mothers need 'Jaulo'- a soft food made from rice and pulse soon after birth. About NRs. 2000 is needed. So, they don't care about NRs. 900." (FCHV, Hill)

However, mothers-in-law in plain indicated that the incentive of NRs 900 was sufficient for transportation if they went to the nearest birthing centre.

"We had managed to have four ANC visits as I used to remind my daughter-in-law that ANC visits should be four times as recommended. We received NRs. 900. We paid Rs. 500 while returning from Basantpur PHCC (the nearest PHCC), we had gone there by public bus." (Mother-in-law, Plain, Institutional delivery)

FCHVs of both hill and plain areas reported that lack of money was not the reason for home delivery; rather it was due to the low importance given to health care.

"All families of this VDC have almost same economic status. Money is not the reason for not going to health institution. When a traditional healer comes they immediately sacrifice rooster and serve him and also give him at least NRs. 500 for helping them."

(FCHV, Hill)

"Women buy and drink alcohol daily, but when it comes to spending money on health care they are careless." (FCHV, Plain)

Other types of incentives

Most of the study subjects reported that material incentive was valued more than monetary incentive may be because the money could be spent by husband or other family members and not used by women themselves.

"Under equity and access program, one non-governmental organization (NGO) had provided clothes to mother and baby- a blanket for mother and clothes and blanket for newborn- to first 10 deliveries from the start of its program. It might be also the reason for the increased health institution delivery in the last two months. We had informed of this to women visiting for ANC." (ANM, Plain)

"My husband took that money! I don't know what he did with that." (Mother, Plain, Institutional delivery)

"The money we give may not reach to the hand of the mother, husband may spend on drinking or mother-in-law may use it in smoking. Clothes have impressed the mothers more. When a person gets money, it also creates conflict in the family." (In-charge, Hill)

The in-charge of a health institution in hill suggested for also other kinds of material incentives to mothers such as rice and ghee which would be useful for postpartum mothers.

"VDC can help in increasing institutional delivery by providing incentives to the mother. In adjoining hill district, Dhading, two of the VDCs provide about one kilogram of ghee and four kilograms of rice to each woman who give birth at health institution. The mothers group of the VDC should visit the mother with the four kilograms of rice." (In-charge, Hill)

Some of the respondents also expressed that incentive should be provided to people

who bring a woman to health institution for delivery, especially for those carrying the woman.

"It would be a very good idea to mobilize youths of the community for carrying women to health institution for delivery but the youths of this VDC can't go anywhere leaving their daily work. Otherwise, they would face hand-to-mouth problem, they are daily wage labourers. If they are mobilized to carry women to health institution, they should be given incentives for." (In-charge, Hill)

HEALTH SERVICE RELATED FACTORS

Behaviour and Competency of ANMs/HWs

Almost all women and their family members reported that the behaviour of health workers was good to them. The ANMs also reported that they behaved well with all patients as the number of deliveries in the local birthing facility was very few and they needed to increase the number of deliveries.

"Health workers behaved well during ANC at health post." (Mothers, Plain, Home/Institutional delivery)

"Women want us to stay with them all the time holding them. When this does not happen, they get angry, but even then we behave with them without getting angry because the number of women coming for institutional delivery is very low, and they would not come if we get angry." (ANM, Hill)

Most of the women and family members who did not visit the local birthing centre for childbirth gave the reason that ANMs were not competent and were just learners. They further added that ANMs referred women to another higher level birthing centre of PHCC as they were not confident in handling deliveries and therefore, some women either went to the higher one directly bypassing the nearest one or some delivered at home.

"If we cannot give birth at home, we think that we should go to Bharatpur (district headquarter). We don't want to go to HP thinking that the staff of this HP cannot conduct delivery." (Mother, Hill, Home delivery)

"We think that ANMs at health post are learners, we are not sure whether they can handle delivery, we have not yet gone there for delivery, I think hospital is better. " (Mother, Plain, Institutional delivery)

FCHV agreed this and further added that the ANMs being young little girls was also a reason for people having doubts on their competency.

"May be either due to lack of tools/equipments, or lack of confidence, they referred many cases to a higher level birthing facility in Basantpur PHCC (nearest PHCC). Perhaps the sisters are not confident enough and get afraid of handling normal case as well. Especially, the women giving birth for the first time are sent to the PHCC." (FCHV, Plain)

"Some people say that ANMs are young, and that small girls cannot perform well. People say they are learners and are here to learn." (FCHV, Plain)

The ANMs agreed on the referrals made and attributed this to lack of SBA training and necessary materials.

"We have not received SBA training, so, we lack skill to manage complicated case. We lack materials even like epi set, placenta bowel, hand washing pot, etc." (ANM, Hill)

District health managers reported that there were a very few ANMs with SBA training in birthing centres of peripheral level.

"I have not calculated the years that it would take to provide SBA training for all ANMs of birthing centres who all work in contract. We have about 20-30 ANMs but there are only about three with SBA training till now." (District public health officer)

<u>AVAILABILITY OF HEALTH WORKERS, DRUGS/MATERIALS/ EQUIPMENT, PHYSICAL FACILITIES</u>

Family members of few women who had home delivery reported that ANMs were not available in local birthing centres when people needed them, as they either went to attend trainings or to their homes due to some work at home or during festivals.

"Sometimes people don't find health workers. People first confirm about the availability of health workers over mobile phone. They don't find health workers at the local birthing facility. So, they go to Bharatpur (district headquarter) when complications are seen." (TBA, Hill)

However, the ANMs and in-charge of HP reported that there was always at least one of the ANMs at a birthing facility turn by turn. The ANMs of plain, however, reported that in a few cases people did not find any person at the birthing facility either because ANMs had gone out for a tea break or lunch or to their residence very close to the birthing facility. The in-charge of a birthing centre added that improvements were done and at least one person (office assistant) should now stay with birthing centre open.

"We are always available at the health post, we stayed here turn by turn even in Dashain (the biggest festival of Hindus). People may have developed their perception of absence of health workers from their past experience before we came here." (ANM, Hill)

"ANMs manage their duty turn by turn. I had heard the door was found locked while they were out for tea and people had to go to higher level health institution. Nowadays the rule is that it can't be locked, peon should stay there, so that s/he can call ANMs." (In-charge, Plain)

Women did not mention un/availability of drugs at health post as a factor influencing the place of delivery, except two mothers-in-law saying medicine is provided from health post to stop bleeding. However, service providers expressed that there was a lack of necessary materials in local birthing facilities even for normal delivery.

"We had first taken to this health post, they said they didn't have required materials and could not conduct delivery and asked us to take to Basantpur." (Mother-in-law, Plain, Institutional delivery)

"We don't have delivery bed, we just use ANC bed. We don't have alternative sources of light and autoclave." (In-charge, Hill)

However, family members referred the lack of equipment and facilities for the ones

which were not supposed to be provided from that level of birthing centres such as facilities for caesarean section.

"If women need to do surgery, they don't have the tools and instruments for surgery at health post. So they don't believe health post." (Mother, Hill, Home delivery)

"There are fewer facilities at HP; facilities like in hospital are required." (Husband, Hill, Home delivery)

The district public health officer responsible for the management of the whole district reported that the low budget allocated by the government for the birthing centres of the health posts was one of the reasons for inadequate and inappropriate facilities.

"We have been providing delivery beds in all places. Modern beds can be found in some. Nepali rupees 100000 is entrusted for the opening of two birthing centres per year. But it is difficult to upright the whole infrastructures in that budget. Managing the infrastructures, beds, other materials in fifty thousand is very difficult. Even only a delivery bed costs thirty to forty thousands." (District public health officer)

The district safe motherhood focal person added that the poor management at the health posts was a reason for the unavailability of required things.

"We had provided them with sterilizing instruments and others which are needed for normal deliveries. We can't send the operation materials, vacuums because government does not supply it in health posts. Only normal deliveries and normal complications are managed there. They have to manage the materials. They have to also demand at store of district public health office." (District focal person)

Having no knowledge of the sufficiency of physical infrastructure was mentioned by most of the women who had home deliveries.

"Other people say that there are good facilities. I have not gone to the local birthing facility, so I don't know about facilities." (Mother, Hill, Home delivery)

The family members and health workers expressed that due to inadequate buildings there was a problem in accommodating women and people accompanying the women

at the health post.

"There is no accommodation for keeping mother for 3 to 4 days after birth. There are no warm beds/clothes for mothers and no room with warm environment such as fire heat." (Husband, Hill, Home delivery)

"One of the reasons people in the village do not want to carry women to health post is that they worry about how they would stay at health institution. If people get good food and shelter they'll be encouraged to come here. If we have supporting environment like utensils to cook, they may bring the basic things like rice, vegetables etc. by themselves and cook food here. We're neither given order from the authority, nor prepared to manage those things." (In-charge, Hill)

The health managers added that even the staff had problems with accommodation but due to low budget allocated for the birthing centres it was not possible to construct buildings.

"Eleven sub health posts have been upgraded to health posts in Chitwan but no building infrastructures have been added except little higher level health workers. SHPs and HPs are being run in two rooms. If the VDC provides at least two rooms and requests that they can manage birthing centres, we set up birthing centres at a minimum distance of one and half hours. It is said that in PHCC and HP Birthing Centre is compulsory. It is not possible for the government to construct buildings at the same time." (District public health officer)

Apart from buildings and infrastructure, health managers also reported that there was a problem of having food and fuel even for health workers, particularly in the hills.

"The women may want hot foods, but there is no such facility. Even our staffs working in hilly VDCs don't have cylinder gas to cook food. They don't have rice to eat, how they can give to patients. The Nepal Government should have special provision for hilly VDCs". (District focal person)

Summary of qualitative results

The summary of results of qualitative study have been presented in figure 4.1. The figure shows the facilitating and hindering factors for institutional delivery. Because of long established traditions of giving birth at home with the help of neighbours and family members having skills in assisting births or with TBAs, most of the people felt no necessity to go to health institution for delivery unless perceived complications were observed. Some women, especially in the hilly area, had to be busy in and continued their work when they were in labour and then gave birth without suffering longer. The perception of no necessity of institutional delivery among family and community members had influenced the perception of women in similar way. Shyness among women, particularly more among Chepang caste, was one of the reasons women were not willing to go to facility. Distance to birthing facility coupled with poor roads and no transportation, which was a bigger issue especially in the hill, was a very important factor for family members, community members and women themselves preferring home delivery. Most of the husbands and some mothers-in-law were supportive in most of the families. However, some mothers-in-law preferred and encouraged for home delivery due to her perception of no need of institutional delivery as well as the expenses associated with institutional delivery. Some husbands preferred home delivery because of the difficulties in carrying women to birthing facility in addition to their perception of no need, while some were influenced by the decision of their mothers also. Saving money was the most common practice of birth preparation with very few arranging transportation and contacting health worker for delivery. In some families, no birth preparation at all was done as women were determined not to go to the institution for delivery. Incentive provided was insufficient particularly in hill where a larger amount was needed especially to provide foods to the people carrying women. It was insufficient in plain area to go to a facility at a further distance . However, incentive was sufficient to access the nearest birthing facility. Due to low budget allocated for birthing centres as well as poor management at birthing centres, the facilities and infrastructure were inadequate and inappropriate. Despite the availability of ANMs at birthing centres and their good behaviour to patients, many women bypassed the nearest birthing facility and went to a higher level or delivered at home because of their perception that the ANMs were incompetent and not confident in handling deliveries.

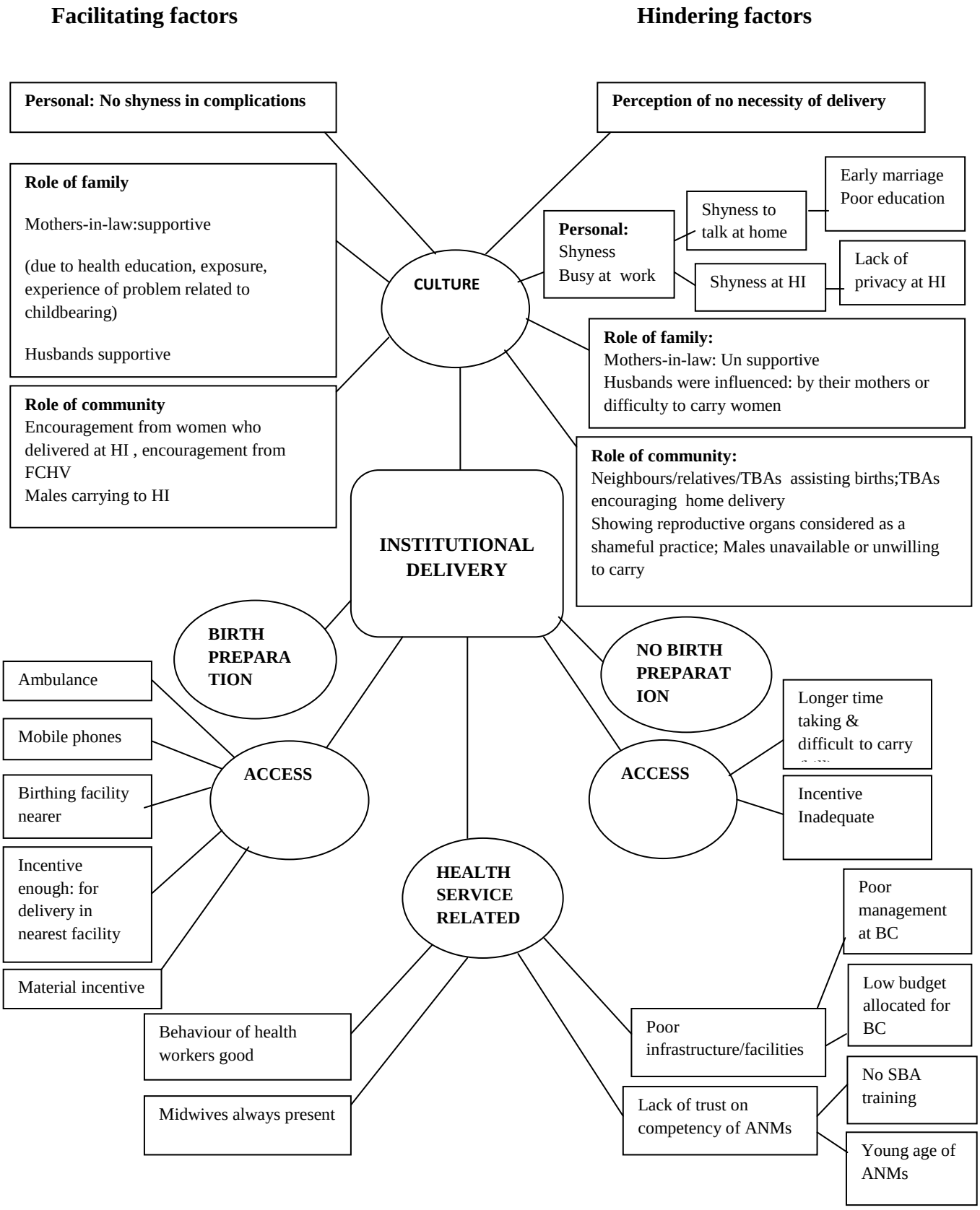

Figure 4.1 Summary of qualitative results

4.2 Results of the quantitative study

Chapter four reports the results of quantitative data analysis of the study. It is divided into two chapters in which the first chapter describes the characteristics of the study area as a whole and also that of the hilly and plain settings included in the study. The chapter two shows the association between different explanatory variables and the outcome variable, which is again divided into bivariate and multivariable analysis.

4.2.1 Chapter one: description of the study setting

This chapter describes the study setting by different variables such as socio-demographic, birth preparation, ANC service use, experience of complications, knowledge and attitude to free maternity service, health service related variables, etc. In addition, reasons for home delivery and institutional delivery and also what women expected from the family, community and health care system for a woman to have an institutional delivery, have been described. The results have been presented in table 1 to table 9.

Socio-economic and demographic characteristics

Among the total respondents, 71 percent were from disadvantaged caste and 29 percent from advantaged caste, and the distribution of the proportions was the same in both plain and hill areas. There were equal proportions of respondents with lower (50 percent) and higher (50 percent) economic status of the family, but the proportion of respondents with lower economic status of the family was more than double in hill (76 percent) compared to that in the plain (29 percent). Overall, the average parity was 2.25, with 1.85 in plain and 2.73 in hill.

Table 4.2.1 Socio-demographic characteristics of respondents

Variables	**Frequency (%)**		
	Total (673)	**Plain (N= 370)**	**Hill (N= 303)**
Ethnicity			
Upper caste (Brahman/Chhetri)	103 (15)	87 (24)	16 (5)

Disadvantaged Janjatis	435 (65)	231 (62)	204 (67)
Advantaged Janjatis	91 (14)	19 (5)	72 (24)
Dalits	44 (7)	33 (9)	11 (4)
Economic status of family			
Lower	336 (50)	106 (29)	230 (76)
Higher	337 (50)	264 (71)	73 (24)
Education of woman			
Primary or none	167 (45)	226 (75)	393 (58)
Secondary or above	203 (55)	77 (25)	280 (42)
Average schooling years	*4.72 (4.03)*	*5.87 (3.99)*	*3.32 (3.62)*
Occupation of woman			
Agri/Housewife/student	643 (95)	353 (95)	290 (96)
Service/business/labour	30 (5)	17 (5)	13 (4)
Occupation of husband			
Agriculture	323 (48)	131 (35)	192 (63)
Foreign employment/Service/business/labour	350 (52)	239 (65)	111 (37)
Age group of woman			
15-19	160 (24)	104(28)	56 (19)
20-29	445 (66)	241 (65)	204 (67)
30 and above	68 (10)	25 (7)	43 (14)
Average age of woman- mean (SD)	*23.23 (4.87)*	*22.62 (4.45)*	*23.97 (5.26)*
Birth order			
1	287 (43)	176 (48)	111 (37)
2 to 3	278 (41)	166 (45)	112 (37)
4	108 (16)	28 (8)	80 (27)
Average birth a woman had- mean (SD)	*2.25 (1.64)*	*1.85 (1.06)*	*2.73 (2.05)*

Birth preparation and ANC service utilization

Table 4.2.2 shows that nearly half of the families (46 percent) did not do any birth-preparation. The proportion was 30 percent in plain and more than double of this in hill (65 percent). The overall proportion of women having ANC 4 or more times was

45 percent. It was only 30 percent in hill and 57 percent in plain. More than two third of women (69 percent) received ANC service from PHCC, HP or SHP. Four in five women (80 percent) were suggested to give birth at a health institution.

Table 4.2.2 Birth preparation and ANC service utilization

Variables	**Frequency (%)**		
	Total	**Plain**	**Hill**
	(673)	**(N= 370)**	**(N= 303)**
Birth preparation			
No preparation	307 (46)	110 (30)	197 (65)
Poorer preparation	236 (35)	146 (40)	90 (30)
Better preparation	130 (19)	114 (31)	16 (5)
ANC Number		N= 336	N= 268
<4	304 (45)	127 (34)	177 (58)
4 or more	300 (45)	209 (57)	91 (30)
No ANC	69 (10)	34 (9)	35 (12)
Average ANC visit	*3.1 (1.63)*	*3.39(1.73)*	*2.72(1.43)*
Place of last ANC			
Government/Private Hospital	137 (20)	91 (25)	46 (15)
PHCC/HP/SHP	467 (69)	245 (66)	222 (73)
No ANC	69 (10)	34 (9)	35 (12)
Person last ANC was received from			
SBA	540 (80)	313 (85)	227 (75)
Non SBA	64 (10)	23 (6)	41 (14)
No ANC	69 (10)	34 (9)	35 (12)
Suggestion received to deliver at health institution	541 (80)	306 (83)	235 (78)

Response of others, time required to reach nearest birthing centre, means of transportation

Table 4.2.3 shows that nearly half of the births in hill were assisted by neighbours and relatives (48 percent) compared to 20 percent in plain, SBAs assisted in 37 percent of

births in hill and 71 percent births in plain. Overall 42 percent respondents had decided themselves for the place of delivery, and it was only 25 percent in plain and 63 percent in hill. Around two thirds of women were encouraged for institutional delivery by both their neighbours (66 percent) and husbands (67 percent).

Table 4.2.3 Place of delivery, response of others, distance and transportation

Variables	Frequency (%)		
	Total (673)	**Plain (N= 370)**	**Hill (N= 303)**
Place of delivery			
Home	305 (45)	113 (31)	192 (63)
Government hospital	212 (32)	147 (40)	65 (22)
PHCC/HP/SHP	119 (18)	78 (21)	41 (14)
Private hospital	37 (6)	32 (9)	5 (2)
Birth assistant			
SBA	371 (55)	262 (71)	109 (36)
TBA	33 (5)	33 (9)	0
FCHV	35 (5)	0	35 (12)
Neighbour/friend	220 (33)	73 (20)	147 (49)
Self	14 (2)	2 (1)	12 (4)
Last decision-maker			
Self	284 (42)	94 (25)	190 (63)
Husband	84 (13)	73 (20)	11 (4)
Husband & self	188 (28)	122 (33)	66 (22)
In-laws	84 (13)	57 (15)	27 (9)
Others*	33 (5)	24 (7)	9 (3)
Response of neighbours			
Encourage health institution delivery	446 (66)	282 (76)	164 (54)
Encourage home delivery	146 (22)	47 (13)	99 (33)
No response	81 (12)	41 (11)	40 (13)
Response of husband			
Encourage health institution delivery	448 (67)	297 (80)	151 (50)
Encourage home delivery	134 (20)	46 (12)	88 (29)
No response	91 (14)	27 (7)	64 (21)

Time needed to reach nearest BC			
Less than 30 minutes	152 (23)	131 (7)	21 (35)
30 to 59 minutes	244 (36)	191 (18)	53 (52)
1 to 2 hours	75 (11)	20 (5)	55 (18)
More than 2 hours	202 (30)	28 (8)	174 (57)
Means of transportation			
Walking	48 (7)	31 (8)	17 (6)
Public vehicle	10 (1.5)	3 (0.8)	7 (2.3)
Ambulance	287 (43)	248 (67)	39 (13)
Hammock	10 (1.5)	1 (0.3)	9 (3)
Bamboo basket	203 (30)	2 (0.5)	201 (66)
Stretcher	31 (5)	11 (3)	20 (7)
Cycle/Rickshaw/Motorcycle	48 (7)	48 (14)	0
Others**	36 (5)	26 (7)	10 (3)

*Others include other family members than husband, in-laws; FCHV and neighbours
**Others include use of both vehicles and either bamboo basket/stretcher/hammock, and carrying by other people without using anything

Reasons for home delivery, institutional delivery and for bypassing the nearest birthing facility

Reasons for home delivery

The most commonly mentioned reason for home delivery was: it is 'easy' to give birth at home (47 percent), followed by the birthing facility being 'far or lack of transportation' (38 percent), 'a big amount of money is spent' (21 percent), not customary (16 percent), shyness (15 percent), no need (14 percent), none to carry to the facility (14 percent), etc. 'Easy' at home was the most common reason in plain (63 percent), followed by birthing facility 'far or lack of transportation' (25 percent), among others; whereas 'far or lack of transportation' was the most common reason in hills (45 percent), followed by 'easy' giving birth at home (38 percent). 'Availability of TBA' was the reason for 23 percent of women in plain, while it was the reason for only 1 percent in hills. (Table 4.2.4)

Table 4.2.4 Reasons of home delivery

Reasons of home delivery (N= 305)	Frequency (%)		
	Total (305)	**Plain (113)**	**Hill (192)**
Easy	143 (47)	71 (63)	72 (38)
None to carry to HI	43 (14)	5 (4)	38 (20)
TBA is available in village	27 (9)	26 (23)	1 (1)
Family members take care very well	9 (3)	7 (6)	2 (1)
Shyness	45 (15)	6 (5)	39 (20)
A big amount of money is spent	63 (21)	27 (24)	36 (19)
HWs not available	4 (1)	3 (3)	1 (1)
Far/lack of transportation	115 (38)	28 (25)	87 (45)
No need	44 (14)	15 (13)	29 (15)
Not customary	49 (16)	15 (13)	34 (18)
Family members did not allow	5 (2)	1 (1)	4 (2)
Baby delivered by the time ambulance arriveed	6 (2)	6 (5)	0
Baby delivered while being ready to go to HI	7 (2)	7 (6)	0
Others*	20 (7)	5 (5)	15 (8)

*No trust in HI, baby delivered while looking for people to carry woman, lack of money, delivered before expected date of delivery

Reasons of institutional delivery

Safety of mother and newborn was the most common reason for delivering at a health institution (69 percent), followed by 'complication in pregnancy and childbirth' (36 percent), 'health workers had asked to come' (31 percent), etc. Free delivery service/transportation incentive was the reason for 14 percent of women. (Table 4.2.5)

Reasons for bypassing the nearest birthing facility

Lack of 'facility for caesarean section, video x-ray, and blood test' was the reason for 52 percent of women bypassing the nearest birthing facility; drugs and equipment not available (44 percent), skilled health worker not available (43 percent), good physical facilities not available (33 percent), among others. In plain, unavailability of good

physical facilities and low confidence in health workers were reported by 36 percent and 23 percent of the women respectively, whereas these were not the reasons for a single woman in hills. (Table 4.2.5)

Table 4.2.5 Reasons of institutional delivery and bypassing nearest one

Reasons of institutional delivery	**Frequency (%)**		
Reasons for HI delivery (N= 368)	**Total**	**Plain (257)**	**Hill (111)**
Complication in pregnancy/childbirth	132 (36)	83 (32)	49 (44)
Health workers had asked to come	114 (31)	80 (31)	34 (31)
Safety of mother and newborn	255 (69)	196 (76)	59 (53)
Near from home	26 (7)	18 (7)	8 (7)
Free delivery service/transportation incentive	53 (14)	29 (11)	24 (21)
Skilled health worker	56 (15)	48 (19)	8 (7)
Good behavior and care from HW	56 (15)	55 (21)	1 (1)
EDD had crossed	10 (3)	10 (4)	0
FCHV had asked to go	8 (2)	1 (0.4)	7 (6)
Reasons of bypassing the nearest birthing facility (N= 356)	**Total**	**Plain (335)**	**Hill (21)**
Unavailability of HW	4 (2)	2 (1)	2 (20)
Unavailability of skilled HW	71 (43)	67 (43)	4 (40)
Low confidence in HW	35 (21)	35 (23)	0
Unavailability of necessary drugs/equipment	73 (44)	72 (47)	1 (10)
Unavailability of good physical facilities	55 (33)	55 (36)	0
Lack of C/S facility/video x-ray/blood test	85 (52)	83 (54)	2 (20)
Referral from nearest BC	24 (15)	20 (13)	4 (40)
Others*	9 (3)	1 (1)	8 (4)

*On saturday health post is closed, health post not open for 24 hours

4.2.2 Chapter two: Factors affecting institutional delivery

The purpose of this chapter is to find out the association and the strength of association between dependent and independent variables. To meet this purpose the chapter is divided into two sections: the first section includes results of Pearson Chi-

square test, while the second section shows the results of logistic regression, i.e., univariate and multivariable logistic regression. All significant and non-significant associations have been shown, and wherever proportions have been presented they are shown in rounded figure, as a result, the total might not always equal to hundred. A significance level of 5 percent has been taken into account.

The independent variables have been divided into five categories: i) socio-economic variables, ii) demographic variables, iii) variables related to decision-making/role of family/role of community, iv) perceived need related variables, and v) health service related variables.

Place of residence, ethnicity, wealth index and educational status of women were all significantly associated with the place of delivery. Among the socio-economic factors, a higher proportion of women living in plain VDCs, of advantaged castes, of greater wealth index and having secondary or higher education gave birth at a health facility. Among the demographic factors, a higher proportion of younger women gave birth at a health institution. Similarly, the percentage of institutional delivery decreased with increasing birth order. With respect to the role of family and neighbours, women who were encouraged to deliver in an institution by their husbands and neighbours were more likely to do so than women who were not encouraged. Those who decided the place of delivery by themselves were more likely to deliver at home. With respect to the perceived need, a higher proportion of women who had prepared for birth, had ANC check-up or experienced complications during the current pregnancy or delivery gave birth at a health facility; whereas the suggestion provided during the ANC visit to deliver at a health institution did not seem to influence on the place of delivery. All five variables related to health services were significantly associated with the place of delivery.

Table 4.2.2a Results of Pearson Chi-square Test

Variables	Place of delivery			Chi-square
	Home (n= 305) n (%)	Health facility (n= 368) n (%)	Total (N=673) n	p-value

SOCIO-ECONOMIC				
Place of residence				<0.001
Plain	113 (31)	257 (70)	370	
Hill	192 (63)	111 (37)	303	
Ethnicity				<0.001
Disadvantaged caste	260 (54)	219 (46)	479	
Advantaged caste	45 (23)	149 (77)	194	
Wealth index				<0.001
Poorer wealth index	221 (66)	115 (34)	336	
Better wealth index	84 (25)	253 (75)	337	
Educational status of woman				<0.001
Primary or none	237 (60)	156 (40)	393	
Secondary and above	68 (24)	212 (76)	280	
DEMOGRAPHIC				
Age group of woman				0.008
15-19 years	59 (37)	101 (63)	160	
20-29 years	206 (46)	239 (54)	445	
30 and above	40 (59)	28 (41)	68	
Birth order				<0.001
1	81 (28)	206 (72)	287	
2 to 3	139 (50)	139 (50)	278	
4 or more	85 (79)	23 (21)	108	
ROLE OF FAMILY AND NEIGHBOURS				
Final decision-making				<0.001
Others	102 (26)	287 (74)	389	
Self	203 (72)	81 (28)	284	
Neighbours encouraged				<0.001
Home delivery/no response	180 (79)	47 (21)	227	
Institutional delivery	125 (28)	321 (72)	446	
Husband encouraged				<0.001
Home delivery/no response	199 (88)	26 (12)	225	
Institutional delivery	106 (24)	342 (76)	448	
PERCEIVED NEED-RELATED				

Birth preparation				<0.001
No preparation	204 (66)	103 (34)	307	
Preparation	101 (28)	265 (72)	366	
Number of ANC visit				<0.001
1 to 3	179 (59)	125 (41)	304	
4 or more	66 (22)	234 (78)	300	
No ANC	60 (87)	9 (13)	69	
Suggestion for institutional delivery during antenatal care				0.507
No	28 (44)	35 (56)	63	
Yes	217 (40)	324 (60)	541	
No ANC	60 (87)	9 (13)	69	
Experience of complications				0.01
No	252 (52)	237 (49)	489	
Yes	53 (29)	131 (71)	184	
HEALTH SERVICE-RELATED				
Availability of skilled health workers				<0.001
Sometimes/don't know	135 (82)	30 (18)	165	
Always available	170 (34)	338 (67)	508	
Health workers care and respect patient				<0.001
Never/sometimes/don't know	121 (80)	31 (20)	152	
Always	184 (35)	337 (65)	521	
Availability of drugs/equipments				<0.001
Sometimes/don't know	152 (60)	100 (40)	252	
Always available	153 (36)	268 (64)	421	
Availability of physical facilities/infrastructures				<0.001
Insufficient/don't know	198 (58)	141 (42)	339	
Sufficient	107 (32)	227 (68)	334	
Time to reach birthing facility				<0.001
< 1 hour	94 (24)	302 (76)	396	
1 hour or more	211 (76)	66 (24)	277	

Logistic regression

Table 4.2.2b shows the results of logistic regression. Except ethnicity, all the socio-

economic (model 1) and demographic (model 2) variables lost their significance after adjusting the effects of variables related to the role of family and neighbours (model 3). Ethnicity retained its significant association throughout all the models and after adjusting the effects of all the variables [AOR: 1.88; 95% CI: 1.03-3.45; p=0.041] in model 5.

The variables related to the role of family and neighbours had almost consistent significance through the models 3, 4 and 5. In model 5, final decision by women themselves [AOR: 0.17; 95% CI: 0.099-0.28; p<0.001], encouragement for institutional delivery by neighbours [AOR: 2.19; 95% CI: 1.19-4.02; p=0.011] and husbands [AOR: 6.79; 95% CI: 3.49-13.17; p<0.001] - had significant associations with institutional delivery (model 5).

All the three variables related to perceived need had a significant association with place of delivery in model 4. When health service related variables were added, ANC check-up lost its significance, while birth preparation had a marginal association [AOR: 1.69; 95% CI: 1.001-2.87; p=0.049], while experience of complication during the current pregnancy/delivery retained its significance with even slightly more strength [AOR: 2.62; 95% CI: 1.51-4.52; p<0.001] (model 5).

Among the five health service related factors, perceptions on the availability of skilled health worker [AOR: 2.57; 95% CI: 1.09-6.07; p=0.03] and availability of physical facilities [AOR: 2.01; 95% CI: 1.16-3.51; p=0.013], and time required to reach birthing centre [AOR: 3.11; 95% CI: 1.49-6.49; p=0.002] were significantly associated with higher odds of institutional delivery (model 5).

The Hosmer-Lemeshow goodness of fit statistics indicate all the models fitting the data well (Peng et al., 2002).

To sum up, the results of multivariable analysis, in the final model, nine variables were found to be associated with institutional delivery with their strength of association in the decreasing order: husband's encouragement, final decision maker, availability of skilled health worker, experience of complication, neighbours encouragement, distance to birthing facility, ethnicity, availability of physical facilities/infrastructures and birth preparation.

Table 4.2.2b Univariate and multivariable logistic regression

Variables	Unadjusted OR (95% CI)	Multivariable Models [AOR (95% CI][a]				
		Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
SOCIO-ECONOMIC						
Place of residence						
Plain	**3.93 (2.85-5.43)** (p<0.001)	**2.58 (1.74-3.83)** (p<0.001)	**2.58 (1.74-3.83)** (p<0.001)	1.3 (0.76-2.22) (p<0.001)	1.28 (0.71-2.28)	0.768 (0.365-1.616)
Hill	1.00	1.00	1.00	1.00	1.00	1.00
Ethnicity						
Disadvantaged caste	1.00	1.00	1.00	1.00	1.00	1.00
Advantaged caste	**3.93 (2.69-5.74)** (p<0.001)	**2.84 (1.83-4.42)** (p<0.001)	**2.7 (1.72-4.24)** (p<0.001)	**1.95 (1.11-3.41)** (p= 0.020)	**1.85 (1.02-3.33)** (p= 0.041)	**1.88 (1.03-3.45)** (p= 0.041)
Wealth index						
Poorer wealth index	1.00	1.00	1.00	1.00		1.00
Better wealth index	**5.79 (4.14-8.09)** (p<0.001)	**2.37 (1.58-3.56)** (p<0.001)	**2.11 (1.39-3.2)** (p<0.001)	1.44 (0.84-2.47)	1.02 (0.57-1.83)	0.701 (0.373-1.315)
Educational status						
Primary or none	1.00	1.00	1.00	1.00		1.00
Secondary and above	**4.74 (3.37-6.65)** (p<0.001)	**2.15 (1.45-3.18)** (p<0.001)	**1.57 (1.04-2.39)** (p= 0.034)	1.14 (0.68-1.92)	1.01 (0.58-1.74)	1.024 (0.58-1.807)
DEMOGRAPHIC						

Age group of woman					
15-19 years	**2.45 (1.37-4.37)** (p= 0.003)	**0.4 (0.17-0.94)** (p= 0.035)	0.44 (0.15-1.32)	0.41 (0.13-1.29)	0.335 (0.1-1.127)
20-29 years	1.66 (0.98-2.78)	0.54 (0.26-1.1)	0.48 (0.19-1.2)	0.43 (0.16-1.16)	0.396 (0.14-1.119)
30 and above	1.00	1.00	1.00	1.00	1.00
Birth order					
1	**9.4 (5.55-15.93)** (p<0.001)	**5.87 (2.8-12.3)** (p<0.001)	2.23 (0.89-5.61)	1.85 (0.72-4.74)	2.343 (0.861-6.375)
2 to 3	**3.7 (2.2-6.2)** (p<0.001)	**2.26 (1.17-4.35)** (p= 0.015)	1.06 (0.47-2.42)	0.86 (0.37-2.01)	0.96 (0.392-2.347)
4 or more	1.00	1.00	1.00	1.00	1.00
DECISION-MAKING/ROLE OF FAMILY/NEIGHBOUR					
Final decision					
Others	1.00		1.00	1.00	1.00
Self	**0.14 (0.10-0.2)** (p<0.001)		**0.18 (0.11-0.29)** (p<0.001)	**0.17 (0.10-0.28)** (p<0.001)	**0.17 (0.10-0.28)** (p< 0.001)
Neighbours encouraged					
Home delivery/no response	1.00		1.00	1.00	1.00
Institutional delivery	**9.84 (6.71-14.41)** (p<0.001)		**2.64 (1.52-4.57)** (p= 0.001)	**2.53 (1.41-4.54)** (p= 0.002)	**2.19 (1.19-4.02)** (p= 0.011)
Husband encouraged					
Home delivery/no response	1.00		1.00	1.00	1.00
Institutional delivery	**24.69(15.54-39.24)**		**10.68 (5.82-19.61)**	**7.93 (4.17-15.07)**	**6.79 (3.497-13.179)**

	(p<0.001)	(p<0.001)	(p<0.001)	(p<0.001)
PERCEIVED NEED RELATED				
Birth preparation				
No preparation	1.00		1.00	1.00
Preparation	**5.2 (3.74-7.23)**		**2.09 (1.27-3.44)**	**1.698 (1.001-2.879)**
	(p<0.001)		(p= 0.004)	(p= 0.049)
Number of ANC visit				
1 to 3	**4.66 (2.23-9.73)**		2.17 (0.78-6.01)	1.69 (0.537-5.316)
	(p<0.001)			
4 or more	**23.64 (11.14-50.14)**		**4.3 (1.47-12.56)**	3.012 (0.909-9.983)
	(p<0.001)		(p= 0.008)	
No ANC	1.00		1.00	1.00
Complications				
No	1.00		1.00	1.00
Yes	**2.63 (1.82-3.79)**		**2.54 (1.51-4.28)**	**2.62 (1.518-4.524)**
	(p<0.001)		(p<0.001)	(p<0.001)
HEALTH SERVICE RELATED				
Availability of skilled health worker				
Sometimes/don't know	1.00			1.00
Always available	**8.947 (5.78-13.84)**			**2.578 (1.093-6.079)**
	(p<0.001)			(p= 0.03)
Health worker care and respect patient				
Sometimes/never/don't know	1.00			1.00

Always do	**7.15 (4.63-11.03)**					1.323 (0.508-3.445)
	(p<0.001)					
Availability of drugs/equipments						
Sometimes/don't know	1.00					1.00
Always available	**2.66 (1.93-3.67)**					0.584 (0.303-1.127)
	(p<0.001)					
Availability of physical facilities/infrastructures						
Insufficient/don't know	1.00					1.00
Sufficient	**2.98 (2.17-4.1)**					**2.018 (1.16-3.509)**
	(p<0.001)					(p= 0.013)
Distance to birthing facility						
<1 hour	**10.27 (7.16-14.73)**					**3.118 (1.498-6.492)**
	(p<0.001)					(p= 0.002)
1 hour or more	1.00					1.00
OUTPUT OF MODELS						
Nagelkerke's R-square		0.317	0.362	0.614	0.653	0.684
Hosmer and Lemeshow statistics		0.423	0.256	0.110	0.516	0.250

[a] OR= odds ratio, AOR= adjusted odds ratio, 95% CI= 95% confidence interval, p= p-value, 1.00= Reference category

CHAPTER FIVE: DISCUSSION

In the context of provision of free delivery service, maternity incentive and gradual establishment of birthing centres in peripheral level health posts and sub-health posts to improve the physical and financial accessibility to maternity service, the present study was carried out to assess the influence of socio-cultural and health-service related factors on the place of delivery in rural areas of Chitwan district. The study found that the percentage of women having institutional delivery in the study population was 55 percent, which is higher than the 35 percent national average (MOHP, 2012) but less than that of Chitwan district (83 percent) (DPHOa, 2013). This institutional delivery rate is a direct consequence of our purposive sampling strategy, which comprised a large proportion of women from disadvantaged castes (71%) and living in hilly areas (45%).

The quantitative part of the mixed-method design of the study has found association of several socio-demographic, socio-cultural and health service related factors such as ethnicity, decision-making (final decision-maker on place of delivery, encouragement of husband and neighbours on place of delivery), birth preparation, experience of complication during the current pregnancy/delivery, and health service related factors (perceptions on the availability of skilled health worker, physical facilities/infrastructures, and distance to birthing facility) with institutional delivery. The qualitative study also showed similar results along with in-depth insights on why and in what way they influenced. In addition to this, the qualitative study found several other issues related to the place of delivery.

Locating findings in the literature

Socio-demographic factors:

The available literatures show inconsistent results with regard to association of socio-demographic factors with place of delivery. A study in Nepal carried out on the data of Nepal Demographic and Health Surveys 1996, 2001, 2006 and 2011 concluded that socio-demographic factors had made no effect on the use of maternity services except education (Shrestha et al., 2014). In some studies of Nepal, both age and parity had no association with the place of childbirth (Karkee et al., 2013, Shrestha et al., 2012).

However, in another study in Nepal parity was found to influence the place of delivery (Wagle et al., 2004). The caste/ethnicity was found to be associated in one study of Nepal (Shrestha et al., 2012), whereas in other studies of Nepal no association was observed (Wagle et al., 2004, Karkee et al., 2013). In the present study, all the socio-economic and demographic variables had significant influence on place of delivery when they were included together in the multivariate analysis in the model 2. However, all the variables except ethnicity lost their significant effect when the variables related to the role of family and community members were introduced in the next model. It indicates that role of family and community had stronger influence than and suppressed the effect of socio-economic and demographic factors.

A study of rural India showed economic status influencing place of delivery (Kesterton et al., 2010). In this study, only the socio-economic and demographic variables and distance to the birthing facility had been included in the multivariate analysis showing the significant association of all the variables with the place of delivery (Kesterton et al., 2010) similar to the model 2 of the present study. In the present study, among the total institutional deliveries, 90 percent happened in the government health institutions with only 10 percent in private hospitals. In the study of India, 77 percent of the institutional births took place in government facility and 23 percent in private facilities (Kesterton et al., 2010). Like in Nepal, women in India are also provided with the maternity incentive for institutional delivery. However this incentive program started only since 2005 (Modugu et al., 2012) and the study of India has been based on the data of the National Family Health Survey of 1998/99 (Kesterton et al., 2010), thus not influenced by maternity incentive scheme. Therefore, a large amount of out-of-pocket money would be required to give birth at a health institution.

Similarly, the studies in Nepal showed mixed results with respect to effect of economic status in the place of delivery, with association in study conducted before introduction of free delivery services (Wagle et al., 2004) and no association after (Karkee et al., 2013). The present study shows no association of economic status of family with the place of delivery. That might be due to the introduction of free delivery services and maternity incentives in Nepal, as well as the expansion of birthing facilities to rural areas. Given these circumstances, it may be inferred that birthing service is currently accessible for both poor and rich people. The study

conducted by Karkee et al. (2013) which was also carried out after the introduction of safer mother programme (MOHP, 2013a, FHD, 2009) showed result in agreement with the finding of the present study. However, the study by Wagle et al. (2004) was carried out before all these interventions and people had to pay themselves all the costs incurred with institutional delivery. All the respondents in the qualitative part of the present study also indicated that poorer people were visiting the nearest local birthing centres as it was much cheaper and enough to be covered by the maternity incentive. The maternity incentive provided to them was sufficient, especially if they had managed to have four ANC visits on time. Mothers-in-law reminded frequently to their daughters-in-law for timely ANC visits for which one of the reasons was to get the full maternity incentive; this was in plain area or living very close to the birthing facility in hilly areas. However, the incentive was considered only by some people who had planned to have birth at the nearest birthing centers. For most of the people the incentive was not important. The reasons for low value given to the incentive were due to a combination of factors like the insufficiency of the incentive as they had to go to a higher level birthing facility usually by ambulance paying a much bigger amount of money when complications were observed, particularly in plain areas. In the hills, more expenses occurred in people carrying a woman to the birthing facility. It was also mentioned that people had some kinds of skills nowadays to earn that much amount of money easily. However, a material incentive like clothes to mother and baby was given more importance than monetary incentive. The reason might be that the money could have been spent by other family members, whereas the materials were very useful ones to both mother and baby at that point of time and the women may not have access to these otherwise and also nobody else could spend these incentives like with the money.

The reason that caste/ethnicity retained its significant influence unlike in the other studies could be that the caste/ethnicity has been classified into only two categories: disadvantaged and advantaged. Even more importantly, the disadvantaged caste included Chepangs, the highly marginalized Janjati caste/ethnicity having poverty, illiteracy, food insecurity and lack of resource ownership (Maharjan et al., 2010), along with Tamang/Rai/Tharu and lower caste (Dalits), whereas the advantaged caste included mostly Brahman/Chhetri who are considered to be the most privileged castes in Nepal (World Bank, 2006) along with Gurung. Consequently, the differences

between advantaged and disadvantaged castes are likely to be much more distinct than in other studies.

Decision-making/role of family/community

In this study we found that there was less probability of institutional delivery when women themselves decided the place of delivery than when the decision was made by others. Similar results were observed in a study in Uganda (Anyait et al., 2012) and a study in Ethiopia (Hagos et al., 2014). In the qualitative part of the present study women who had home deliveries were found very strongly determined not to go to a health institution for delivery. The reasons for this were given as institutional delivery not being customary in the community, shyness to show genitals to male health workers, while some especially from Chepang caste were shy even with female nurses or to any other persons. These women were shy and had hesitation to talk with family members about the place of delivery because of their getting married at an early age and with poor education, usually not more than primary level which is evident from the quantitative results as well. The decision of women was also found to have been influenced by their mothers-in-law's experience of having given birth at home as well as due to their dependency on family members, especially the mothers-in-law and husbands, for their permission and financial support and in arranging transportation. In hills, some also reported to have taken decision of not going for institutional delivery considering the difficulties in reaching to birthing facility due to longer distance and difficult terrain. In plain, majority had no problem in accessing vehicles, however, vehicle jerkings due to poor road condition leading to bleeding was given as a reason for not willing to go to a health facility by some. Perceived poor quality of delivery service provided at the local nearest birthing facility had also played a role in the decision of women on the place of delivery. Similar results were observed in a qualitative study conducted in Tanzania that women's decision on the place of delivery was influenced by the perceived quality of care at the birthing facility (Mrisho et al., 2007).

Both the qualitative and quantitative results of the present study showed that women who were supported for institutional delivery by their husbands had higher probability of institutional delivery compared to those who were not supported. Those women who had given birth in a health facility were either carried by their husbands, arranged

ambulance or public vehicles or encouraged for institutional delivery when they were living in other places. The perception of husbands on the need of institutional delivery was more important than his availability. Even though husbands were available at home, they were reluctant to take women to birthing facilities unless they perceived complications that could not possibly be managed by TBAs, neighbours or relatives of the community. Similar results were observed in a study in Tanzania which indicated that the probability of institutional delivery was greater when both husband and wife agreed that delivering at a health facility is important and if they both agreed that the skills of health workers are higher than the skills of the TBA (Danforth et al., 2009). In a qualitative study in Bangladesh it was also found that women who received support from their husbands about the birth attendant and place of delivery, and support like arranging transportation and money required for health institution delivery were more likely to give birth at a health institution compared to women who did not receive these kinds of support (Story et al., 2012).

Role of community people (Neighbours/TBA/FCHV)

The present study found women's place of delivery to have been influenced by the community people directly or indirectly. Those who had institutional delivery were encouraged by the other women of the community who themselves had experienced institutional delivery. A study in Uganda showed that TBAs and neighbours had influenced the decision of the place of delivery (Amooti-Kaguna and Nuwaha, 2000). Similar results were observed in a study from Kenya. Here women who were advised by family members or neighbours had 2.5 times higher probability to give birth at a health institution than those who were not advised (Ono et al., 2013). In the study area of the present study, FCHVs had played a very important and hard work in encouraging women and family members for institutional delivery by several home visits. Though in many cases suggestions of FCHVs were not followed by women and their family members, though slowly, there was a positive change in the attitude towards and practice of health facility delivery among people. Specific TBAs did not exist in most of the places with home deliveries being assisted by neighbours or relatives having the skill of handling deliveries. Seeking help of the available TBAs was also declining with the birthing facility being more accessible to people due to easy transportation, availability of birthing service near to people's homes,

development of positive knowledge and attitude towards safety of mother and baby, etc. However, most of the women who had given birth at home and their family members had a strong belief on the skills of TBAs or neighbours/relatives for normal delivery. The care of neighbours and relatives during childbirth at home was also a reason for preference to home delivery, which they would not receive if they went to health institution for delivery.

In the present study, availability and readiness of other males in the community to carry women to health facility also determined women's place of delivery to a larger extent in hilly areas where women had to be carried in bamboo basket, hammock or stretcher usually by the husband taking the help of other neighbours/relatives.

Birth preparation, ANC and complications during pregnancy/childbirth

The current study found a very marginal association between birth preparation and institutional delivery. The reason for this finding could be that the birth preparation activities were very poor with a large majority of women only saving money. Money was saved in most families to go to birthing facility if emergency arises, or otherwise to use for foods during postpartum period. No preparation at all, not even saving of money, was done in some families which was more prevalent in hilly area than in plain. The reason was that women had already determined not to go to health institution for delivery due to several reasons mentioned above. In plain area, in most of the cases an ambulance was available immediately after calling it. Some people identified and kept the contact number of an ambulance when the date of delivery was near, while some did it only after delivery was perceived not to happen at home. The finding of another study in Nepal, carried out on the data of NDHS 2011 representing the whole country, was in agreement to the finding of the present study showing association of birth preparation with institutional delivery, but to a greater extent (Nawal and Goli, 2013). The reason for a marginal association in the present study could be that the proportion of the women who had done birth preparation and had had no preparation was almost equal (54 percent versus 46 percent) and also the preparation was poor with majority only saving money (53 percent) which was done for also the purpose of using this for foods in postpartum period, followed by arranging transport (17 percent) which was mainly keeping the contact number of ambulance, contacting health worker (2 percent), identifying blood donor (0.4

percent) and arranging safe delivery kit (3 percent). The study by Nawal and Goli (2013) observed a wider gap in the proportions of those having and not having done birth preparation (32 percent versus 68 percent) (Nawal and Goli, 2013)..

Unlike studies in Nepal (Wagle et al., 2004, Karkee et al., 2013), and Ethiopia (Teferra et al., 2012, Amano et al., 2012), the quantitative result of the present study found no association of ANC use with the place of delivery. The reason might be the difference in study settings. All the four studies mentioned above included both urban and rural areas, whereas the study population of the present study was from the rural areas only, including nearly half of the study population even from the hill where there was not any kind of road except narrow paths. For pregnancy check-up women could walk to the health institution themselves, whereas for childbirth, women in labour had to be either carried by other people in the hill which was very difficult due to the narrow sloppy paths or would call the ambulance (in plain) which was expensive. Since many women went to a health institution only when labour was prolonged, they needed an ambulance car to reach the birthing facility as soon as possible. Both women and family members gave more value to having ANC, except in a few cases, to identify the position and status of the fetus that would help them to know in advance the potential complications during childbirth. The mothers-in-law of most of the women had encouraged and reminded them to have ANC check-up. However, family members and some women believed institutional delivery was necessary only when complications were observed. The finding of this study that women having complications during pregnancy or/and childbirth were significantly more likely to have institutional delivery than those with no complication also supports that not all having ANC would go for institutional delivery. According to Nepal Demographic and Health Survey 2011 also, 67 percent of mothers think delivering at a health institution is not necessary (MOHP, 2012). The availability of ANC services from PHC-ORCs operating once a month on fixed days in different parts of a VDC was also mentioned as one of the reasons for higher ANC coverage. Consistent results regarding no influence of ANC in place of delivery was also observed in a study conducted in rural area in Uganda (Anyait et al., 2012) and in a qualitative study in rural Ethiopia (Bedford et al., 2013) as people had perception of need of institutional delivery if complications appeared. A review on the continuum of care in the context of developing countries mentions that in some places, even

women who live near to health facilities visit the facilities for an ANC check-up but do not go there for childbirth. Assumed reasons were cultural beliefs or doubt about the quality of the delivery services (Kerber et al., 2007). Comparable results were shown by Gabrysch and Campbell in their review of literature on determinants of delivery service use focusing on low- and middle-income countries (Gabrysch and Campbell, 2009) and in a study from Bangladesh (Paul and Rumsey, 2002). As mentioned above and in the decision-making section, most of the women had gone for institutional delivery when they perceived complications to occur. These perceived complications had been influenced, in turn, by the distance and difficulties in accessing birthing facility. Nevertheless, long-established traditions of seeking care from neighbours/relatives/ TBAs had influenced more on the selection of place of delivery. It was found that some women living very close to the birthing facility- within 15 minutes walking distance- had given birth at home citing their confidence in delivering at the home. The definition of prolonged labour, the most commonly mentioned complication, was different in plain and hill. In plain, labour lasting for more than 24 hours was generally considered to be prolonged, whereas, in hilly areas, in most of the cases, labour crossing three days was considered to be prolonged. It could be due to interplay of several factors like difficulty in accessing birthing facility, perception on the need of institutional delivery influenced by relatively lower education, etc.

Health service-related factors

The quantitative part of the present study found perceptions on the availability of skilled health workers and sufficiency of physical facilities/infrastructure to be associated with higher likelihood of institutional delivery. The qualitative part of the study also explained this relation.

The findings were consistent with a community-based study in Nigeria which indicated that competence of doctors and midwives and their 24-hour availability to provide maternity service influenced the decision to have institutional delivery (Onah et al., 2006). Results different from the current study were observed in a study from Bangladesh in which more value was given to behaviour of health workers for the satisfaction with health service provided rather than technical skills of the health workers such as explaining problem, physical examination and giving advice

(Mendoza Aldana et al., 2001). This difference in findings might be due to different study settings and the purpose of visiting the facility. The study in Bangladesh recruited only the users of service centres and visiting not specifically for maternity service but for all kinds of health services, e.g., family planning, child care, maternal care, diseases. In contrast, the current study was a community-based survey to identify the factors influencing the selection of place of childbirth. During childbirth women's life would be at risk if complications are not treated properly. Therefore, competency of the service provider must have been an important factor in the present study. The present qualitative study also found that service providers had behaved well equally with all visitors during their ANC visits and other times as well. Almost none of the ANMs (midwives) appointed for the local birthing centres had SBA training. People perceived ANMs not to be confident in handling deliveries as the ANMs referred cases to a higher level birthing facility if they anticipated complications. For example, during ANC, ANMs suggested women who were pregnant for the first time to go to a higher level birthing facility for delivery as they expected complications to arise during birth because of first birth. In Chitwan, in many rural communities the birthing facilities had been built up within the last two years, having still very poor infrastructure with a problem in providing service properly, accommodating people accompanying women as well as difficulty in accommodation of staff and ANMs. The ANMs were living in a rented house near the birthing facility; in own house nearby or very congested in one room of the birthing centre. Family members of birthing women were concerned especially about the insufficient and inappropriate rooms for women to stay at the facility for about 3-4 days after delivery (in birthing centres of rural areas), especially in hilly areas where there was no possibility of having a vehicle and required long hours of walking. Warm rooms with warm beds and blankets and arrangement of something like coal to provide heat to mother and baby after delivery, which is the culture of all Nepalese, were also a concern of people. Appropriate food- soft food made from rice and pulse- on time to mother starting soon after birth was also a concern. Poor maintenance of privacy at the local birthing centres due to inadequate and inappropriate buildings and rooms along with other managerial aspects was also an important issue for women not willing to go to health institutions for delivery.

Many women bypassed the nearest birthing centre, citing lack of competency of

ANMs, lack of equipments required to handle deliveries in complications, and difficulties in lodging and fooding. Therefore, availability of birthing service is not enough to improve accessibility of the service, for which quality of the service is equally necessary, especially when referral is quite difficult from hilly area and for poor in plain areas.

In the current study women living within one hour distance from a birthing facility were more likely to have institutional delivery than women living in further distance. The finding was consistent with studies of Nepal (Karkee et al., 2013, Wagle et al., 2004). The finding was also in agreement with a study from Tanzania in which women living near to health facilities had more than four times higher odds of delivery assisted by skilled attendants (Mpembeni et al., 2007). A study conducted in Matlab, Bangladesh also found that delivery at a health institution decreased steadily with the increase in distance to the health institution (Chowdhury et al., 2006). The qualitative part of the current study also found that longer distance to birthing facility was a barrier to access the birthing service, which was a more important issue in hilly areas where women had to be carried to the facility, whereas in plain a much bigger amount of money would be spent in the ambulance to go to the birthing facility at a further distance. In addition to these reasons, easy to travel and the possibility of taking food from home to the nearest birthing center would also save expenses on food. In addition, home foods were perceived to be fresh and also the possibility of having culturally specially prepared homemade foods considered to be appropriate for the women in that condition were also the reasons of preferences to and giving birth at the nearest birthing facility.

Strengths and limitations

There might be several limitations of the study. First, like in all observational studies, this study identified associations of different factors with institutional delivery, but may not establish a causal relationship. Because of purposive sampling of the study area, the findings of the study may not represent the situation of the whole district or nation. Similarly, economic status of the respondents may not have been measured precisely as the wealth index was used for this purpose, which is only a proxy measurement of the economic status. Despite these limitations, the study has several strengths. Firstly, the questionnaire used to collect data was prepared on the basis of

evidence from preliminary analysis of qualitative data collected in the first phase of the study, existing published literature and finally pretesting of the questionnaire. Secondly, the sampling strategy included a combination of purposive technique in selecting study area with low institutional delivery, random technique within the selected area as well as study of all the mothers of the selected wards. In addition to these, there was a very low chance of missing the information of study mothers as they were identified by consulting FCHVs, reviewing their records and inquiring other local people. Although the results may not be generalizable to all settings, the study was conducted in areas with relatively low institutional delivery rates, and the study population consisted of nearly three quarters of disadvantaged caste/ethnicity, which is the priority group targeted by the government of Nepal in the provision of safe motherhood services (FHD, 2006). Moreover, though the study area was selected purposively, the sample size of the study was calculated to sufficiently represent the whole district. Lastly, a very important strength of the study lies in its mixed-methods approach. The internal validity of the findings of the study has been confirmed by the results of quantitative survey being supported and explained by qualitative study-findings of FGDs and in-depth interviews conducted with different categories of family, community, health workers and health service managers, which also provided the information of how and why the association between the predictors included in the study and the place of delivery existed.

CHAPTER SIX: CONCLUSIONS

6.1 Conclusion of findings

A little more than half of the respondents had institutional delivery. The quantitative survey found advantaged caste/ethnicity, encouragement for institutional delivery by husband and neighbours, birth preparation, experience of complication during the last pregnancy and/or childbirth, perception of respondents on availability of skilled health worker and availability of physical facilities/infrastructures and birthing facility within one-hour distance were statistically significantly associated with higher odds of institutional delivery, whereas there was less likelihood of institutional delivery when final decision on place of delivery was made by women themselves. Similarly, the findings of the qualitative part fully supported these findings with illustrations of how they occurred.

Among the multiple factors affecting institutional delivery, husband's support played the most important role in the decision for institutional delivery. Gender roles limiting women's involvement in decision-making, young women having no access to material resources and higher illiteracy rates make women dependent on their husbands and family members for having access to maternal health services including delivery in a health facility. In some rural areas, women even have to be carried by their husbands to reach health facilities due to lack of transportation and difficult topography in hilly areas in particular. Therefore, husband's involvement needs to be emphasized in a context like Nepal. Among several reasons, the perception of no need of institutional delivery due to long-established tradition of seeking the help of neighbors, relatives or TBAs, and therefore having a belief on them was among the most influential factors among all women who had home deliveries. The difficulty associated with travelling to birthing facility was another very important factor, particularly in hilly areas. These two factors influenced the decision of family members as well as women. On the other hand, expansion of birthing centres in rural areas had helped to bridge the gap between rich and poor people in accessing institutional delivery. Similarly, the counselling and suggestion from FCHVs and health workers had helped to change people's knowledge, attitude and practice of

maternity service utilization. Availability of ambulance and mobile phones played a very important role in institutional delivery, especially in plain, among many others. Material incentives attracted people for institutional delivery.

6.2 Implications for policy and practice

At community level

The study indicating husband's role having the strongest influence for women to have institutional delivery has important policy relevance. In Nepal women for generations have a lower educational level, poorer access to material resources and to any kind of information and they have culturally relatively restricted freedom in every sphere of life. The findings of the study suggest promoting the involvement of husbands in the interventions to increase institutional delivery. Another very closely related finding to this is that there was a less chance of institutional delivery when the decision on the place of delivery was taken by the women themselves. The women made the decision considering the preference of family members on the place of delivery along with other reasons such as inconvenience to travel, shyness, etc. Some family members, i.e., in-laws, especially mothers-in-law were supportive to health facility delivery, while some preferred home delivery. Women marrying young with no or little education and busy with just household chores thereafter did not have exposures to information made them believe and follow the traditions of their mothers and mothers-in-law giving birth at home. All of these factors have several policy implications:

- First, it suggests for a multi-sectoral approach of women's development, such as promoting female education, employment and income generating opportunities, especially to women from disadvantaged ethnicity, along with health sector providing them with required information and health education.

- Husbands should be involved in the programmes to increase institutional delivery in giving advice to their wives, and supporting them by arranging transportation, saving money, carrying or taking to birthing facility.

- Mothers-in-law, TBAs and other women in the community who assist in birth should be provided with information and education about potential complications and their roles in increasing facility delivery.

- Women who have given birth at health institution can be promoted to encourage other women to go for institutional delivery.

- Information and education to mothers, with more priority to disadvantaged caste/ethnicity, particularly to Chepangs, about the potential risks of childbirth.

- Appropriate means of carrying women in hilly areas should be considered. Four-wheeler-vehicles should be promoted at local level in the hill (in the VDCs connected with roads) to make referral of complicated cases easier.

  Involving family and community members in the development of the programmes to increase institutional delivery would be effective.

<u>At institutional level</u>

The next very important policy implications are related to the health service related findings. The government of Nepal has been expanding birthing facilities gradually to rural health posts and sub-health posts to make the service available within reach of the underserved people but mostly without maintaining necessary skilled human resource, physical facilities and infrastructure. Therefore, the study findings suggest that along with quantity of the birthing facilities the quality of their service should be ensured to increase institutional delivery:

- Improvement in quality of service: SBA training to ANMs, ensuring the availability of sufficient required equipment/materials, physical facilities and infrastructure.

- Material incentives should be promoted such as clothes for mother and baby and foods required during the postpartum period.

- Privacy maintenance: a separate enclosed room or some partitions during labour and delivery.

- Warm environment at health facility such as warm beds/blankets and facility to provide heat to postpartum mother and baby for health as well as cultural reasons.

- A facility to have healthy and culturally acceptable foods for mothers after birth- such as hot and soft foods- as well as foods for the people accompanying the mother.

The findings could be useful information for planning the programs at national, district and local level to increase institutional delivery. At the national level, the information could help in prioritizing safe motherhood programs for the women from disadvantaged caste/ethnicity, budget allocation for rural birthing centres of health posts and sub-health posts, SBA trainings to ANMs working in rural birthing centres, and inter-sectoral approach for the overall development of women from disadvantaged caste/ethnicity. At district level, the information could be useful to the district public health office, Chitwan to plan and implement programmes to improve the quality of the birthing service and necessary facilities appropriate in rural birthing centres of the district. The information is as well useful to non-governmental organizations working in the district on safe motherhood in developing appropriate community-based programmes to promote institutional delivery. The DPHO itself and in coordination with the NGOs; local health post and VDC can jointly design different community-based programmes.

6.3 Implications for further research

The study was conducted in rural parts of the district with disadvantaged people occupying a larger proportion. As the study was restricted to certain settings with relatively low institutional delivery, a further study on a randomly selected representative sample of the district would show the situation of the whole district with respect to institutional delivery. Secondly, operational research for the evaluation

of interventions like free maternity services/maternity incentive and effectiveness of birthing centres are necessary. Thirdly, the cross-sectional design of the study has examined the association between predictor variables and the place of delivery. Further experimental types of studies are required to establish causal relationships between the predictors and the place of delivery.

ANNEXES

Annex 1: Study tools

1.1 FGD/in-depth interview guidelines

FGD Guidelines for mothers/mothers-in-law

Background characteristics of respondents

S.N.	Name	Ethnicity/caste	Age	Education	Parity

1. How is the condition of maternal health in your VDC?
2. What are the common practices before delivery? Why? (Probe: *ANC care seeking*, *Decision making*- who and when, *Birth preparation*- preparation for money, person to assist in delivery and, blood donor, place of delivery, food for delivered mother, cloths for newborns), Any others?
3. What are the common practices during delivery? Why? (Probe: where do women give birth? Situations women deliver at health facility/home? [Probe: socio-demographic, socio-cultural and health service related factors, any others?]
4. What are the roles of TBA, husband, mother-in-law, father-in-law, and community members? Any others?
5. In your opinion, birthing centres are necessary to increase institutional delivery in your VDC or not? In what way are they useful?
6. How can we further increase institutional delivery among women of this VDC? In the birthing centres?

In-depth interview guideline for In-depth Interview with FCHV

1. How is the condition of maternal health in your VDC?
2. What kinds of women go to health institution for delivery?
3. Why are some women not delivering at health facility? [Probe: socio-demographic, socio-cultural and health service related factors, any others?]
4. Why women seek assistance from TBA? [Probe: socio-demographic, socio-cultural and health service related factors, any others?]
5. How are you promoting for health institution delivery?
6. Have you experienced any kind of problems in performing your role? (*Probe: From health system? Community people?*)
7. How will it be possible for women give birth at health institution?

In-depth Interview with TBA

1. What is the trend of maternal health care seeking behaviour in your VDC?
2. What kinds of women seek your assistance in childbirth? Why? [Probe: socio-demographic, socio-cultural and health service related factors, any others?]
3. Is there any difference in your role as a birth assistant during the last few years? In what way? Why?
4. Do you encourage women for health institution delivery or not? Why?
5. In which situations do you refer women to health institution? What could be the complications of childbirth?
6. Have you ever worked in collaboration with health system for maternal health? Would you like to be involved in promoting women to seek service in health facility and how would it be possible?

In-depth Interview with ANM

1. What is the trend of maternal health care seeking behaviour in your VDC?
2. What types of women come to health institution for delivery?
3. Why are some women not having institutional delivery? (Probe: socio-demographic, socio-cultural and health service related factors, any others?)
4. How can institutional delivery be increased in the VDC? [Probe: socio-demographic, socio-cultural and health service related factors, any others?]

5. Are there any problems to work as a midwife in this facility? (Probe: Technical problems: logistics, supervision & training, continuity/regularity of services, social problems, family and other personal problems, other problems)
6. What are the things required for you to provide delivery services effectively in the health facility? (Probe: Technical supports, logistics support, community support, family support, other supports)

In-depth Interview with health facility in-charge

1. What is the trend of maternal health care seeking behaviour in your VDC?
2. What types of women come to health institution for delivery? (Probe: socio-demographic, socio-cultural and health service related factors, any others?)
3. Why are some women not having institutional delivery? (Probe: socio-demographic, socio-cultural and health service related factors, any others?)
4. How are you managing the provision of delivery services? (Continuity/availability of midwifes, Management of maternity incentives, Referral system, any others?)
5. Have you experienced any kind of problems in providing this service in the VDC? Why? (Probe: Health service factors: regularity of midwife, retention and availability of SBA, logistic supply, infrastructure, any others? Community support?)
6. Are you getting necessary support from all? (From District Public Health Office, Community?)
7. How can women of this VDC access delivery service? [Probe: socio-demographic, socio-cultural and health service related factors, any others?]
8. What is required for the sustainability and continuity of the quality delivery service from this health facility?

In-depth interview with District Public Health Officer & district Safe motherhood focal person

1. What is the trend of health facility delivery in Chitwan?
2. Which factors are contributing to increased institutional delivery in the district? (*Probe: Socio- cultural factors?*, Health service factors: *free maternity service, birthing centres, training of health workers, CB-NCP, others?*)

3. What are the hindrances to health facility delivery in Chitwan? (*Probe: lack of skilled health worker, lack of required facilities/infrastructures, geography, etc.*)
4. In Chitwan, there is a huge difference in the percentage of institutional delivery between hilly and terai areas. What could be the reasons for the large disparity? (*Probe: Socio-cultural factors: Ethnicity, Economic status, Distance, Availability of transportation, cultural: birth preparedness, perception of childbirth risk, any others? Health service factors: Availability of health workers, medicines, other necessary facilities, Access to free maternity services, Referral systems, any others?*)
5. In hill as well as terai areas, the coverage of institutional delivery is almost same in the VDCs with birthing centres and in the VDCs without birthing centres as well. What do you think about the reasons behind no differences in the coverage? (*Probe: Socio-cultural factors: Ethnicity, Economic status, Distance, Availability of transportation, perception of childbirth risk, any others? Health service factors: Availability of health workers, medicines, other necessary facilities, Access to free maternity services, Referral systems, any others?*)
6. What are required to further improve institutional delivery in the district? How can we increase deliveries in the birthing centres?

1.2 Structured questionnaire

Factors affecting institutional delivery in Chitwan district of Nepal

Questionnaire for structured interview with mothers

Form No.

Name of VDC _____ Ward Number _____

Name of the household head _____

Name of interviewee _____

Interviewer's name _____ Date: _____

Socio-demographic factors

Q.N	Characteristics	Questions	Response	Code
1	**Ethnicity**	To which ethnic group do you belong to?	Brahman/Chhetri Advantaged janjati Disadvantaged janjati Dalit Muslim Others (specify)……	0 1 2 3 4 5
2	**Religion**	Which religion do you follow?	i. Hinduism ii. Buddhism iii. Christianity iv. Muslim v. Others (specify)……	
3	**Educational level**	What was your educational status at the time of this childbirth?	None If had schooling, Number of schooling……	
4	**Educational level of husband**	What was your educational status at the time of this childbirth?	None If had schooling, Number of schooling……..	
5	**Occupation**	In which occupation were you involved in before childbirth?	Not employed Employed for cash (specify)... Employed not for cash (specify)…	0 1 2
6		In which occupation was your husband involved in during a year before this	Not employed Employed for cash (specify)…….. Employed not for cash	0 1 2

		pregnancy?	(specify)……	

7. Economic status of the family

7.1. How many of the following animals does this household own?	
	Number
Milk cows or buffalo	
Oxen/Bulls	
Goats	
Pigs	
Poultry	
Others	
None of the above	
7.2. Does your household have	
Electricity supply?	1. Yes 2. No
A radio?	1. Yes 2. No
A television?	1. Yes 2. No
A watch?	1. Yes 2. No
A mobile telephone	1. Yes 2. No
Other telephone	1. Yes 2. No
A toilet	1. Yes 2. No
Type of toilet	1. Temporary 2. Permanent (water seal)
7.3. How much agricultural land does this household own?	1. …….Bigha 2. …….Kattha 3. …… Dhur or 4. ……Ropani
7.4.Main material of the roof Observe and record	1. Bamboo 2. Wood 3. Straw 4. Tin 5. Ceramic tiles 6. Cement

	7. Other (specify)……
7.5. Main material of the exterior walls Observe and record	1. Wood with mud 2. Bamboo with mud 3.Stone with mud 4. Plywood 5. Bricks 6. Cement blocks 7. Other (specify)……..
7.6. What is the main source of drinking water at your home?	1. Own piped water 2. Neighgour's piped water 3. Tube well 4. Well 5. Public tap 6. Spring 7. Others (specify)……

8	**Age**	How old were you at your last childbirth?	……Years	
9	**Parity**	What is the birth order of this last delivered child?	…….	
		Live birth	……..	
		Still birth	……	

10	**Birth Preparation**	Did you do any kind of preparation for this childbirth? RECORD ALL MENTIONED	- Saved money - Arranged for transport - Contacted health worker to help with delivery - Bought safe delivery kit - Found blood donor - Arranged foods/clothes - Other (specify)……	0 1 2 3 4 5 6 7 89

			- No preparation	
	Antenatal care			
11	**Number of Antenatal check-ups (ANC)**	Did you receive antenatal check-up during this pregnancy?	No If yes, Number of ANC……..	
12	**Place of last ANC service**	Where did you receive the last ANC? WRITE ALSO THE NAME OF THE PLACE. ……	- Govt. hospital/PHCC - HP/SHP - PHC-ORC - Private hospital/ clinic/ nursing home - Others (specify)……	0 1 2 3 4
13	**Person received last ANC from**	If had ANC, who did you get your last ANC from?	- Doctor - Nurse/Midwife - Health assistant/Auxiliary Health worker - TBA - FCHV - Other (specify)…… - None	0 1 2 3 4 5 6
14	**Advice on institutional delivery**	During your last ANC visit, were you advised to have institutional delivery?	- Yes - No	1 0
15	**Information on complications**	During your last ANC visit, were you told about the signs of child birth complications?	- Yes - No	1 0
	Birth assistant and place of delivery			
16	**Birth assistant**	Who assisted with the	- Doctor	0

		delivery? RECORD ALL MENTIONED.	- Nurse/ANM - HA/AHW/VHW/MCHW - TBA - FCHV - Relatives/neighbours - Other (specify)…… - No one	1 2 3 4 5 6 7
17	**Place of delivery**	Where did you give birth? WRITE ALSO THE NAME OF THE PLACE. ……	- Home (go to Question no. ...) - Govt. hospital - PHCC/HP/SHP - Private hospital/clinic/nursing home - Other (specify)……	0 1 2 3 4 5
	Reasons for choosing specific place of delivery			
18	**Reasons for health facility delivery**	Why did you go to that health facility for delivery? RECORD ALL MENTIONED	- Complications in pregnancy/childbirth - Health workers had asked to come - Safety of mother/baby - Nearby facility from home - Free delivery service - Incentive for transportation - Skilled health workers - Good behaviour and care from health workers - Other (specify)……..	1 2 3 4 5 6 7 8 9
19	**Reasons for bypassing the birthing centre**	*If delivered at health institution somewhere else but not at local*	- Health workers not available - No skilled health worker	1 2 3

	of their own VDC	*BC,* Why didn't you deliver at the birthing centre located at your VDC?	- Health workers not confident - No required drugs/equipment - No adequate physical facilities - No service for caesarean section if needed - No ultrasound/blood testing - Other (specify)…….	4 5 6 7 8
20	**Reason for home delivery**	What were the reasons for delivering at home? PROBE: Any other reason? RECORD ALL MENTIONED	- Convenience - None to take to HI - People available at home to take care - TBA is available in the community - Family members take care at home - Shyness - Cost too much - Health workers not available - Too far/No transportation - Not necessary - Not customary - Family members didn't allow - Don't trust the birthing service - Others (specify)……	1 2 3 4 5 6 7 8 9 10 11 12 13
21	**Decision-maker**	Who made the final decision for choosing the place of delivery?	- Self - Husband - Husband wife together	1 2 3

			- Mother-in-law/Father-in-law - FCHV - Neighbours/Friends - Other (specify)……	4 5 6
22	**Time taken to make decision to go to health institution?**	After how many hours of labour, did you decide to go to health institution for delivery?	After……Hours	0 1
23	**Response of community people**	What was the response of neighbours/community people about place of delivery?	- Encourage for home delivery - Encourage for institutional delivery - No response at all - Other (specify)……	1 2 3 4
24	**Response of husband**	What was the response of husband about place of delivery?	- Support for home delivery - Support for institutional delivery - No response at all - Other (specify)……	1 2 3 4
	Physical accessibility			
25	**Distance to health facility**	How far is the nearest birthing facility from your home?	- Less than 30 minutes - 30 – 59 minutes - 60-120 minutes - More than two hours	0 1 2
26	**Mode of transportation**	What mode of transportation do you use to go to the nearest birthing facility during labour?	- Walking - Public transport - Ambulance - Hammock - Bamboo basket	0 1 2 4 5

			- Stretcher/bed - Cycle/Rickshaw/Motorcycle - Other (specify)……	6 7 8
	Knowledge of & attitude towards free delivery service/transportation incentive			
27	**Knowledge about free delivery services**	Do you know about free delivery service?	- Yes - No	0 1
28	**Knowledge of transportation incentive**	Do you know about transportation incentive?	- Yes - No	0 1
	Knowledge and experience of obstetric complications and previous obstetric history			
29	**Knowledge of danger signs**	What are the danger signs during delivery?	- Vaginal bleeding (Like a period or more) - High blood pressure - Hand or facial swelling - Blurred vision, or severe or persistent headache - Waters breake>1 day before labour began - Fever during labour - Baby stops moving - Labour longer than 12 hours - Umbilical cord delivered before the baby - Umbilical cord around the baby's neck - Breech delivery - Others (specify)……..	1 2 3 4 5 6 7 8 9 10 11 12
30	**Experience of**	Did you experience	- Yes (specify)……	1

	complications	any kind of complication during the last three months of pregnancy, labour or delivery for this last birth?	- No During the last three months pregnancy? - Yes (specify)…… - No During childbirth? - Yes (specify)…… - No	0 1 0 1 0
31	**Previous experience of complication**	*(If it was second or more birth order),* had you experienced any complications during previous pregnancy/childbirth?	- Yes (specify)……. - No	1 0
32	**Place of previous childbirth**	*(If it was second or more birth order*,) where had you given birth to the previous baby?	- Home - Health institution (specify)..	0 1
	Perception on birthing service			
33	**Availability of skilled health workers**	Skilled health worker is available in the health facility	- Always - Sometimes - Never - Don't know	1 2 3 4
34	**Behaviour of the health workers**	Health workers are polite, care and respect patients	- Always - Sometimes - Never - Don't know	1 2 3 4
35	**Availability of drugs/equipment**	Drugs/equipments are available in the health facility when you need them.	- Always - Sometimes - Never - Don't know	1 2 3 4

36	**Availability of facilities (lodging, fooding, water, light) and infrastructures (waiting, accommodating rooms for women)**	The infrastructure/facilities in the nearest birthing institution are sufficient	- Sufficient - Insufficient - Nothing available - Don't know	1 2 3 4

Annex 2: Ethical clearance

Nepal Health Research Council

Estd. 1991

NHRC

Ref. No. 1042

Executive Committee

Executive Chairman
Prof. Dr. Chop Lal Bhusal

Vice - Chairman
Dr. Rishi Ram Koirala

Member-Secretary
Dr. Shanker Pratap Singh

Members
Prof. Dr. Meeta Singh
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Dr. Narendra Kumar Singh
Dr. Samjhana Dhakal
Dr. Devi Gurung

Representative
Ministry of Fin...
National Planning Commission
Ministry of Health & Population
Chief, Research Committee, IOM
Chairman, Nepal Medical Council

3 April 2012

Ms. Rajani Shah
Principal Investigator
Ludwig Maximilian University
Munich, Germany

Ref: Approval of Research Proposal entitled **Factors affecting institutional delivery in Chitwan district of Nepal**

Dear Ms. Shah,
It is my pleasure to inform you that the above-mentioned proposal submitted on 4 March 2012 (**Reg. no. 21/2012** please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on 2 April 2012 (2068-12-20).

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.

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission.

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, total research amount is NRs. 400,000.00 and NHRC processing fee is US$ 100.00.

If you have any questions, please contact the research section of NHRC

Thanking you,

Sincerely Yours,

Dr. Shanker Pratap Singh
Member Secretary

Tel.:977-1-4254220, 4227460, Fax: 977-1-4262469, RamShah Path, P.O. Box 7626, Kathmandu, Nepal.
Website: http://www.nhrc.org.np, Email : nhrc@nhrc.org.np

Annex 3: Informed consent form

Factors affecting institutional delivery in Chitwan district, 2012

Informed consent form for service user/provider

I am _____ working as an enumerator for the PhD research project of Mrs. Rajani Shah to identify factors affecting institutional delivery in Chitwan district.

Purpose of the research: The percentage of institutional delivery in Chitwan district is much higher compared to that of the nation and there are some women not delivering at the health facilities as well. We, therefore, want to identify which socio-economic, socio-cultural and health service related factors have influenced the place of childbirth. We hope this study will help to improve maternal and neonatal health. The interview/discussion will take about one hour.

Selection of participants: You are being invited to participate in this research because we feel that your experiences as service user/provider can contribute much in identifying factors affecting institutional delivery of this community.

Voluntary Participation: You can decide to participate or not to participate. Your decision to participate or not in the research will have no implication on you. Even you decide to participate you may change your mind later and stop participating further.

Risks: You may feel uncomfortable to answer some of the questions. It is possible that you may divulge information that you may not have shared earlier. We will not force you answer to questions asked to you.

Benefits: There will be no direct personal benefit to you. But the results will benefit collectively to your community.

Confidentiality I and research team will not share your responses to anybody outside of the research members. All the information collected from you will be kept private and confidential.

Right to Refuse or Withdraw: I want to say it again that you do not have to take part in this research if you do not wish to do so. I also want to repeat that choosing to

participate or not to participate will not affect you in any way. You may stop participating at any time.

Part II: Certificate of Consent (for the literate participant)

I have read the foregoing information, or it has been read to me. I consent voluntarily to be a participant in this study.

Print Name of Participant_____

Signature of Participant _____ Date _____
Day/Month/Year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands.

I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent_____

Signature _____

Date _____
Day/Month/Year

For the illiterate participant: I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness_____
Thumb print of participant

Signature of witness _____

Date _____
Day/Month/Year

Annex 4: Percentage of institutional delivery in Chitwan district

		2068 (2011/2012)		2069 (2012/2013)	
S.N	**VDC/Municipality**	Health Facility delivery N (%)	Total deliveries	Health Facility delivery N (%)	Total deliveries
1	Darechok	30 (39.47)	76	88(53.66)	164
2	Chandibhanjyang (Birthing Centre)	10 (15.38)	65	44(31.42)	140
3	Dahakhani	13(18.57)	70	35(32.71)	107
4	Kabilas	29(41.43)	70	62(52.54)	118
5	Lothar	1(1.75)	57	0	115
6	Siddhi	3(3.41)	88	11(9.40)	117
7	Korak	15(10.49)	143	32(17.58)	182
8	Kaule (Birthing Centre)	6(6.90)	87	32(20.77)	154
9	Shaktikhor	81(42.41)	191	129(49.04)	263
10	Ayodhyapuri (Birthing Centre)	97(68.31)	142	153(77.66)	197
11	Kalyanpur	84(90.32)	93	123(90.44)	136
12	Bagauda (Birthing Centre)	174(89.69)	194	261(95.95)	272
13	Gardi	91(85.05)	107	131(89.11)	147
14	Kumroj	97(82.91)	117	106(96.36)	110
15	Kathar	83(79.05)	105	141(89.24)	158
16	Bachhauli	133(97.79)	136	199(95.67)	208
17	Pithuwa	132(93.62)	141	185(95.85)	193
18	Piple	150(66.67)	225	290(83.33)	348
19	Bhandara (Birthing Centre)	161(89.94)	179	233(92.46)	252

20	Chainpur (Birthing Centre)	210(93.33)	225	359(98.89)	363
21	Khairahani (Birthing Centre)	167(97.66)	171	341(98.84)	345
22	Birendranagar	213(80.08)	266	299(90.88)	329
23	Padampur	159(78.33)	203	243(82.37)	295
24	Jutpani (Birthing Centre)	112(86.82)	129	197(97.04)	203
25	Meghauli (Birthing Centre)	195(86.67)	225	273(91.00)	300
26	Dibyanagar	114(92.68)	123	170(98.26)	173
27	Sukranagar	118(86.13)	137	142(95.94)	148
28	Jagatpur (Birthing Centre)	127(83.55)	152	209(93.30)	224
29	Patihani	171(95.53)	179	239(98.35)	243
30	Geetanagar	168(92.31)	182	242(98.37)	246
31	Parbatipur	70(95.89)	73	121(96.03)	126
32	Shivanagar (Birthing Centre)	84(94.38)	89	138(98.57)	140
33	Mangalpur	189(87.10)	217	314(87.46)	359
34	Phulbari	51(100.00)	51	70(98.59)	71
35	Gunjanagar	185((91.13)	203	268(94.36)	284
36	Shardanagar (Birthing Centre)*	135(91.84)	147	191(98.45)	194
37	Bakulahar-Ratnanagar Municipality	236(97.12)	243	372(95.14)	391
38	Panchakanya-Ratnanagar Municipality	167(92.78)	180	259(95.57)	271
Total		4261(77.74)	5481		

(Source: DPHO, Chitwan)

Annex 5: Caste/ethnic groups of Chitwan (Source: CBS, 2014)

Area, sex and caste/ethnic group	Total	Male	Female
Chitawan			
Total	579,984	279,087	300,897
Brahman - Hill	165,652	78,296	87,356
Chhetree	65,894	31,222	34,672
Tharu	63,359	29,796	33,563
Tamang	46,198	22,520	23,678
Gurung	39,155	18,205	20,950
Newar	30,256	14,574	15,682
Chepang/Praja	28,989	14,651	14,338
Kami	28,318	13,257	15,061
Magar	27,985	13,030	14,955
Damai/Dholi	12,101	5,712	6,389
Kumal	9,302	4,491	4,811
Darai	8,011	3,781	4,230
Sarki	7,218	3,450	3,768
Musalman	6,780	4,067	2,713
Gharti/Bhujel	4,430	2,103	2,327
Rai	3,962	1,953	2,009
Dashnami/Sanyasi	3,716	1,783	1,933
Thakuri	3,488	1,696	1,792
Bote	3,094	1,526	1,568
Teli	1,551	1,062	489
Kathbaniyan	1,420	817	603
Ghale	1,254	558	696
Kalwar	1,252	739	513
Danuwar	1,110	558	552
Yadav	1,099	818	281
Kanu	1,062	641	421
Koiri/Kushwaha	922	546	376
Badi	840	391	449
Sunuwar	748	393	355
Hajam/Thakur	613	416	197
Majhi	594	359	235
Haluwai	558	346	212
Mallaha	549	368	181
Dura	549	246	303
Gaine	469	234	235
Marwadi	467	255	212
Kurmi	466	361	105
Musahar	428	229	199
Limbu	372	195	177
Dusadh/Pasawan/Pasi	359	244	115
Brahman - Tarai	296	167	129
Chamar/Harijan/Ram	283	217	66
Thakali	283	133	150
Sonar	274	122	152
Kayastha	237	127	110
Bangali	217	153	64
Hyolmo	213	106	107
Rajput	183	115	68
Brahmu/Baramo	156	80	76
Sherpa	144	86	58
Dhanuk	141	100	41
Lohar	138	97	41
Sudhi	130	76	54
Mali	129	69	60

Annex 6: Publications and involvement in research

Publications

- Maternal and infant mortality in Mahottari district of Nepal. Published in Journal of Nepal Health Research Council, April 2010 issue.
- Field test results of the motherhood method to measure maternal mortality. Published in Indian Journal of Medical Research, January 2011 issue.
- Delivery practices in Bagauda VDC of Chitwan, Nepal, published in Nepal Population Journal, Population Association of Nepal, September 2011.

Involvement in Research

- Principal investigator for the study ‘factors associated with neonatal deaths in Chitwan district of Nepal’ that received faculty research grant from university grant commission of Nepal in 2011.
- Principal investigator of the study ‘Maternal and infant mortality in Mahottari district of Nepal’ conducted by Nepal Health Research Council in 2008.
- Principal investigator of the study on ‘utilization of skilled birth attendant at delivery in Divyanagar VDC of Chitwan district’ in 2005.
- District coordinator of the study ‘assessment of burden of diseases of Nepal’ conducted by Nepal Health Research Council in 2007 for two districts of Nepal.
- Research team member for the study 'health needs assessment in Sarlahi district', conducted by Patan Academy of Health Sciences for Action Aid Nepal in 2009.
- Research team member of the study “motherhood method to measure maternal mortality in developing countries” conducted in Chitwan and Bara districts of Nepal.
- Research team member of a study called “Understanding and Overcoming Barriers to Scaling Skilled Birth Attendants Utilization in Improving Maternal, Newborn and Child health in Nepal”.

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