WOMEN'S AUTONOMY AND UTILIZATION OF MATERNAL HEALTH SERVICES IN KAPILVASTU DISTRICT, NEPAL

TULSI RAM BHANDARI,

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A THESIS PRESENTED BY

TULSI RAM BHANDARI

TO

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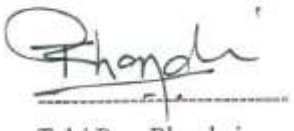
DECLARATION

I, Tulsi Ram Bhandari herby certify that I had carried out the work depicted in the thesis entitled, "**Women's Autonomy and Utilization of Maternal Health Services in Kapilvastu District, Nepal**". No part of the thesis has been submitted for the award of any other degree or diploma prior to this date.



Tulsi Ram Bhandari

CERTIFICATE

Dr. V. Raman Kutty, MD, M. Phil, MPH (Harvard)

Professor

Achutha Menon Center for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology

This is to certify that Mr. **Tulsi Ram Bhandari** in the department of Health Science Studies of this Institute has fulfilled the requirements prescribed for Ph.D. degree of the Sree Chitra Tirunal Institute for Medical Sciences and technology, Trivandrum.

The thesis entitled, "**Women's Autonomy and Utilization of Maternal Health Services in Kapilvastu District, Nepal**" was carried out under my direct supervision. No part of the thesis was submitted for the award of any other degree or diploma prior to this date.

Signature

Dr. V. Raman Kutty
Professor
Achutha Menon Centre for Health Science Studies
Sree Chitra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram-695 011, Kerala, India

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Is evaluated and approved by

.....

Dr. V Raman Kutty, Professor

Guide

.....

SURINDER JASWAL

Thesis examiner

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Tulsi Ram Bhandari

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ABBREVIATIONS

AMCHSS- Achutha Menon Center for Health Science Studies

ANC- Antenatal Care

ANOVA- Analysis of Variance

C.I. - Confidence Interval

CFA – Confirmatory Factor Analysis

CVI - Content Validity Index

CVR-Content Validity Ratio

DAAD- German Academic Exchange Service/Programme

DAC - Doctoral Advisory Committee

df – Degree of Freedom

EC- Electoral Constituency

EFA - Exploratory Factor Analysis

EmOC - Emergency Obstetric Care

GoN- Government of Nepal

IEC - Institutional Ethics Committee

KMO - Kaiser-Meyer-Olkin

MDG - Millennium Development Goal

MMR – Maternal Mortality Ratio

N – Number (Size) of Total Population

n – Number (Size) of Total Sample

NA - Not Available or Not Applicable

No. – Number

OR - Odds Ratio

PNC - Post Natal Care

Ref. - Reference

SBA - Skilled Birth Attendants

SCTIMST - Sree Chitra Tirunal Institute for Medical Sciences and Technology

SD - Standard Deviation

SDK - Safe Delivery Kit

SEAR – South East Asia Region

Sig. – Significant

SN – Serial Number

TAC - Technical Advisory Committee

TV – Television

UGC – University Grants Commission

UN – United Nations

VDC - Village Development Committee

WHO – World Health Organization

SYNOPSIS

Despite various efforts maternal mortality is still high in most low resource countries of Sub-Saharan Africa and South East Asia. Nepal has made remarkable progress in maternal mortality reduction. However, most indicators of Millennium Development Goal Five i.e. completion of four antenatal care visits, skilled care at birth, institutional deliveries and postnatal care visits have not attained set targets. The high utilization of maternal health care services makes it possible to reduce maternal and neonatal morbidity and mortality. Demographic factors, socio-economic characteristics of women, geographical location, availability and accessibility of health care services, needs of health care are some factors which determine the utilization of maternal health care services.

Women's autonomy is one of the determinants of maternal health care services utilization in developing countries. Most studies have focused on assessing the association with the demographic and socioeconomic factors and the utilization of maternal health care services rather than exploring the role of women's autonomy as a mediating factor in the utilization of maternal health care services. There are a few studies which looked at women's autonomy and its influence on the utilization of maternal health care in Nepal; however, most women's autonomy measurement tools included very limited components of women's autonomy. Only in a few cases their psychometric characteristics were assessed.

Autonomy is regarded as a multidimensional construct and difficult to quantify. However, it is explained as the capacity of a person to work independently in accordance with his/her aims and objectives. Women's autonomy has contextual meaning and it depends upon the personal attributes of women as well as norms, values and practices of the society. There is no unanimous view on women's autonomy. Most researchers prefer proxy indicators i.e. educational attainment, employment, income, spousal age difference, and type of family to measure women's autonomy and utilization of maternal health care services.

The plains area of western Nepal has access to road transportation and various health care facilities. However, there is the low utilization of maternal health care services for achieving the target of the Millennium Development Goal five in Kapilvastu district. It is a challenge for Nepal as one of the signatory members of the Millennium Declaration 2000. For assessing women's autonomy and the utilization of maternal health care services, and for better understanding of its key predictors in Nepal, we chose this district as the study area and conducted this study.

The overall aim of this study was to study women's autonomy and its influence on the utilization of maternal health care services. Specific objectives were - 1) to construct and validate a women's autonomy measurement scale based on the field evidence; 2) to examine the relationship between women's demographic and socioeconomic characteristics, and their utilization of maternal health care services; 3) to correlate women's autonomy with their demographic characteristics and socioeconomic factors;

and, 4) to examine the role of women's autonomy as a mediating factor in the utilization of maternal health care services. Our study hypothesis is- women who have high autonomy utilize more maternal health care services than women with restricted or low autonomy.

This was a population based cross-sectional study, conducted in two phases. First, we constructed a women's autonomy scale using a sample of 250 women from Rupandehi scale, and tested its psychometric characteristics as well as validated it. Second, we conducted a cross-sectional survey for assessing women's autonomy and factors associated with the utilization of maternal health care services in Kapilvastu District, Nepal, using the scale which we developed. We used the survey data also for the validation of the scale using factor analysis for assuring the construct validity of the scale.

For constructing a new scale, we defined women's autonomy (construct) as a capacity of the women to control decision-making, financial and physical resources, and freedom of mobility. We generated an items pool reviewing published literature and prepared a preliminary draft of the scale. We conducted pretest, psychometric analysis and validation test for assuring measurement capacity of the scale. Development of the scale was done on a non-random sample of 250 women of child-bearing age in Rupandehi district, which is similar to the study area in its characteristics.

Study population of the survey comprised all women of reproductive age who had full term delivery in the preceding year and completed their postnatal period preceding the

survey. We selected ten village development committees (VDCs) out of 76 VDCs of the district using simple random sampling method. The final number of women at VDC level was fixed proportionately considering the total population of VDC. We interviewed 500 women from all five electoral constituencies (ECs) areas and 10 VDCs of the district.

The sample size was computed based on the proportion of skilled care at birth (15.92%) of Kapilvastu district, with design effect = 2 and non-response rate = 20% using online OpenEpi statistics software. For identifying the respondents in each village, we identified the center of the village and chose a random direction for identifying households with subjects. We continued the household visit in the clock-wise direction until obtaining the required number of respondents.

Considering Cronbach's Alpha value (0.84), average content validity ratio/ index (0.8) and overall agreement- kappa value (0.83), we accepted all 24 items of the scale. The minimum and maximum score of the new women's autonomy measurement scale was zero and forty eight respectively. We also did exploratory factor analysis with the survey data and finalized 23 items of the scale where the items had good convergent and discriminant validity. All 23 items were loaded in five factors. All five factors had single loading items by suppressing absolute coefficient value less than 0.45 and average coefficient was more than 0.60 for each factor. The new scale is a reliable tool for assessing women's autonomy in developing countries which quantifies the possible

score of women's autonomy between zero and forty six. We suggest use and validate the scale for assuring the performance of the scale in large samples and different settings.

The mean score of the autonomy measured by our scale was 23.34 ± 8.06 out of the possible maximum scoring forty-eight. We found 83.6% pregnant women sought at least one antenatal care visit in one year preceding the study period. More than one-third (37.6%) women sought institutional delivery for their last childbirth. Antenatal care visit had strong positive association with the place of delivery (chi-square = 20.05, df = 1 and P <0.001) and postnatal care (chi-square = 16.77, df = 1 and P <0.001). Nearly six per cent deliveries were conducted by general health workers in health facilities. Out of the total institutional deliveries, nearly 58% women visited health facilities for the self-reported emergency obstetric care services. A few home deliveries (6.2%) were assisted by health workers, 14.7% households used safe delivery kit (SDK) for home delivery care and 22.0% women sought postnatal care in their last postnatal period.

We examined the association with explanatory variables and outcome variables i.e. antenatal care, delivery care and postnatal care. We found that having at least one antenatal care visit and institutional delivery care had positive association with five years or greater difference of age with the spouse, some ethnic groups, better education of couples, occupation of husband, and economic status of the household. Having at least one postnatal care visit was found to be positively associated with women's age more than 20 years at marriage, parity of two or below, some caste/ethnic groups, the better education of couple, occupation of the husband, and economic status of the household.

Women's autonomy was found to be positively associated with five years or more of age difference with the spouse at marriage, some caste/ethnic groups, better employment for the husband, women's and husband's education more than 10 years schooling, and high economic status. Out of several explanatory variables, women's education (OR = 8.14, CI = 3.77–17.57), husband's education (OR = 2.63, CI = 1.69–4.10) and socio-economic status of the household (OR = 1.42, CI = 1.01–2.03) were found as major predictors of women's autonomy.

Women's education, husband's education and women's autonomy were found to be key predictors of the utilization of maternal health care services. Women's education had strong positive association (OR = 24.11, CI = 9.43–61.64) with institutional delivery care. The stratified multivariate analysis further showed that when the husband is not educated, women's education works independently of the effect of her autonomy, and is a dominant influence. On the other hand, when the husband is educated, women's education seems to work partly through her autonomy where around 40% of the effect is explained by her autonomy.

Low education and economic status of women are significantly associated with the low utilization of maternal health care services in Kapilvastu district of Nepal. Women's autonomy seems as a mediating factor of the pathways in the utilization of maternal health care services. Women's education, husband's education and economic status of the household are key predictors of women's autonomy and the utilization of maternal health care services. Improvement of women's education, husband's education and

economic status of the household would be among the effective strategies for increasing their autonomy and the utilization of maternal health care services in Kapilvastu district of Nepal.

In spite of intensive implementation of incentive programmes to increase the utilization of maternal health care services during pregnancy, childbirth and postnatal period, we do not see an encouraging response. It points to the very basic and strong relationship between women's position in the household and the society, and their health status. There are limits to how far financial incentives can overcome these obstacles.

CHAPTER 1
INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 The extent of the problem

The Millennium Development Goal Five was set to improve maternal health and reduce maternal mortality globally by three-quarters between the years 1990 and 2015 (UN 2000). Maternal mortality is extremely high in low-resource countries of Sub-Saharan Africa and South East Asia. Around, 800 women die every day and 289000 women died in 2013 around the world of pregnancy related complications. Most maternal deaths occurred in low-resource countries which could be avoided by extending basic maternal health care services (WHO 2014a). Even though maternal mortality has declined to some extent worldwide (Hogan *et al.* 2010), the achievement is not enough to meet the Millennium Development Goal (MDG) by the year 2015. The low utilization of maternal health care services is one of the major contributing factors of the high maternal morbidity and mortality in developing countries (Prata *et al.* 2009, Bulatao and Ross 2003).

Enhancing women's autonomy is one of the effective strategies to maximize the utilization of maternal health care services in developing countries (Matthews *et al* 2003). Women who have greater autonomy over physical and financial resources are likely to manage their own and children's health care and make fertility decision independently (Allendorf 2007, Govindasamy and Ramesh 1997, Govindasamy and Malhotra 1996). A study revealed that women's access to financial and physical

resources, freedom of movement, ability to make household decision and visit natal kin as major components of women's autonomy in India (Matthews *et al.* 2003). Women's education and employment influenced positively in their decision-making autonomy at household level and seeking maternal health care services in most developing countries (Matthews *et al* 2003, Woldemicael 2007).

Autonomy is a multidimensional concept and difficult to quantify (Malhotra and Schuler 2005). It refers to independence or freedom of the will of one's action. It is also the ability of a person to act independently in accordance with objective morality rather than under the influence of desires (Liebeck and Pollard 2013). It is defined as technical, social, and psychological ability for making decisions about one's private concerns as well as that of one's intimates (Dyson and Moore 1983).

Women's autonomy is a broad as well as complex term which has contextual meaning. It may be influenced by personal attributes of women as well as socio-cultural norms and values (Makinwa-Adebusoye and Jensen 1995). There is a huge debate on definition and measurement of women's autonomy among the writers, researchers and social activists. Most researchers prefer proxy indicators such as educational attainment, employment, income, spousal age difference and type of family to assess women's autonomy in decision making, use of financial and physical resources and freedom of movement, and utilization of maternal health care services (Woldemicael 2007).

Prior literature focused on education, occupation and demographic characteristics i.e. age at marriage, age difference at marriage, numbers of children, sex of children and so forth for measuring the women's autonomy (Abadian 1996). In recent years, autonomy has been defined as women's enacting capacity to influence decision-making, control economic resources and move freely (Bloom *et al.* 2001, Jejeebhoy 2002, Thapa and Niehof 2013).

By pregnancy and its related causes around 2000 (6 women per day) die annually in Nepal. However, Nepal has reduced maternal mortality ratio from 530 to 229 per 100,000 live births between the years 1996 to 2011 (Bhandari and Dangal 2012). Despite the remarkable achievement on maternal mortality reduction, most indicators of maternal health care i.e. completion of four antenatal care visits, skilled care at birth, institutional delivery and postnatal care were not improved as the target of MDG five. From 2006 to 2011, more than 40% pregnant women never sought antenatal care, nearly two-thirds women delivered their baby at home without skilled care attendants and more that 50% women did not seek postnatal care (Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012). The current situation of some selected maternal health indicators of Nepal is presented in the following table (Table 1).

Table 1: Selected indicators of maternal health care of Nepal

Indicators	Nepal	SEAR	Global target
MMR	229/100000	200/100000	NA
ANC1	58.3%	76%	100%
ANC4	50.1%	NA	100%
SBA care	36%	59%	90%
Institutional delivery	35.3%	NA	NA
PNC1	46%	NA	100%
Female literacy	57.4	NA	NA

Sources: Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012, World Health Organization 2012

Despite the poor achievement of some indicators, Nepal is on track for achieving the MDG target in reducing maternal mortality. It has declined from 850 in 1990 to 415 in 2000 and further to 229 in 2011 per hundred thousand live births (Bhandari and Dangal 2012, Malla *et al* 2011). The trends of maternal mortality (Figure 1) and utilization of skilled care at birth (Figure 2) are shown in the following figures.

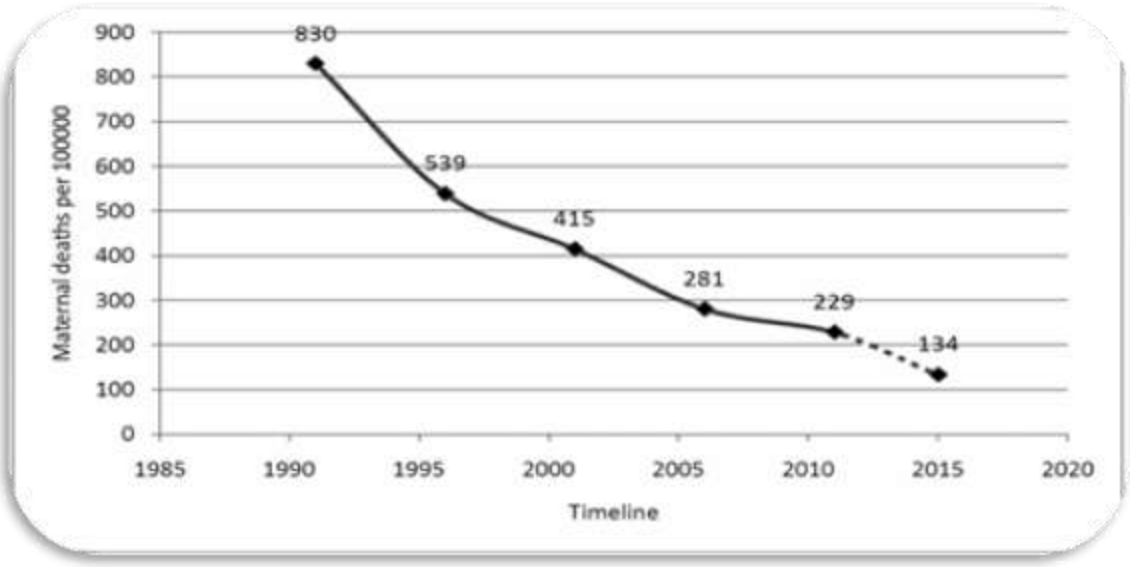

Figure 1: Trend of maternal mortality in Nepal

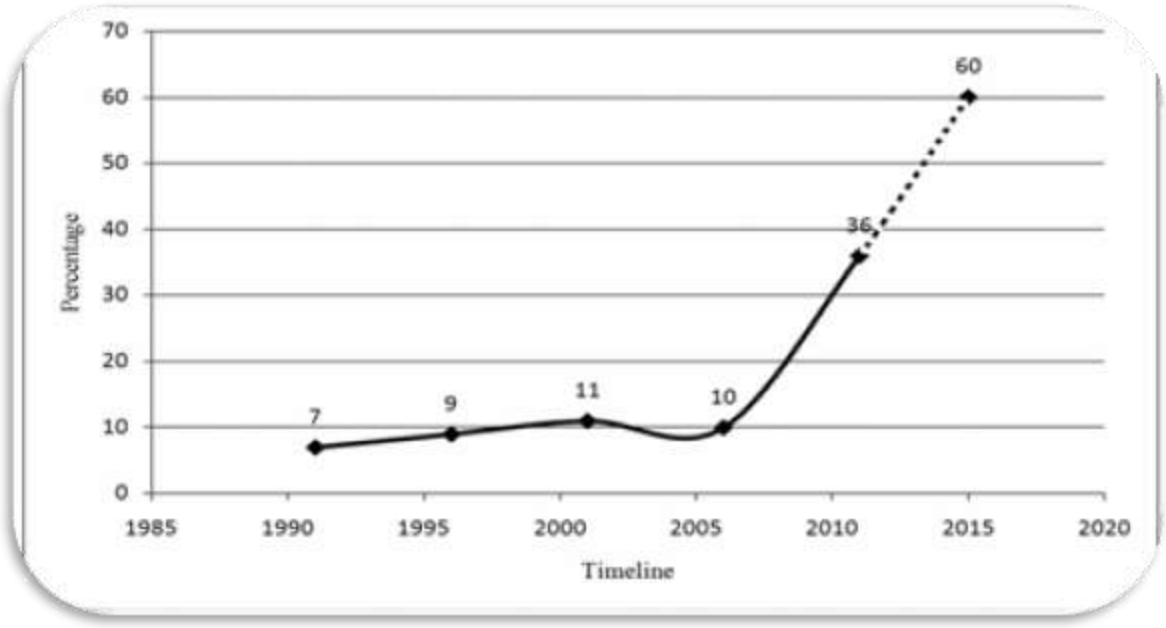

Figure 2: Trend of the utilization skilled care at birth in Nepal

Low autonomy status of women associates with poor access to their basic needs i.e. food, cloths, education, health and security (Sharma et al. 2007, Tuladhar 1997). In most

south-east Asian countries, women have an inferior position and less autonomy than man at the household level as well as in society (Dudgeon and Inhorn 2004, Thapa and Niehof 2013). As a result, women cannot access even their basic needs and claim their rights without prior permission of either their husbands or other senior members of family.

In Nepal, women's autonomy correlates with their better educational and occupational status and spousal support for seeking care. Similarly, movement autonomy, decision-making autonomy and financial autonomy and autonomy for spousal communication had positive effect on the utilization of maternal health care services (Thapa and Niehof 2013, Allendorf 2007).

Despite various efforts at enhancing the women's autonomy, many women are restricted in making decisions on household affairs as well as on social issues, utilize financial and physical resources and freedom of movement in most developing countries. Literature also shows the same situation in Nepal. For precise assessment of the utilization of maternal health care services, the factors that are associated with the utilization of maternal care services and the role of women's autonomy in the care seeking should be considered in developing countries.

1.2 Rationale of the study

Prior studies show that the high utilization of maternal health care services reduced pregnancy related complications, and maternal as well as the neonatal morbidity and

mortality in most developing countries. The utilization of health services was determined by various factors i.e. the demographic and socioeconomic characteristics of women, geographical and physical conditions, health system and health care services factors and needs of maternal health care services.

Furthermore, the most recent studies reveal that women's autonomy at household level was one of the determinants of maternal health care services utilization in most developing countries. Women's autonomy and utilization of maternal health care services may be influenced by their demographic and socio-economic characteristics. Most studies focused on assessing the association with the demographic and socio-economic characteristics and the utilization situation of maternal health care services rather than exploring the role of women's autonomy in the low utilization of maternal health care services. Some studies were found to be focused on women's autonomy and its influence on the utilization of maternal health care in Nepal. Most women's autonomy measurement tools included very limited components of women's autonomy and only a few tools were used assuring their psychometric characteristics.

This study is situated in the plains area of Nepal and has access to road transportation. There are many primary health care facilities i.e. primacy health care centers, health posts and sub-health posts up to village development committee level. However, there is still the low utilization of maternal health care services to meet the MDG five by the year 2015.

As a country which is a signatory of the Millennium Declaration, Nepal faces formidable challenges for increasing the utilization of maternal health care services. Therefore, we decided to study the role of women's autonomy and factors associated with the utilization of basic maternal health care services in Kapilvastu district, Nepal for the better understanding of its determinants. Study area was chosen considering various socio-economic factors including access to health facilities. It is fairly representative of the plain areas of Nepal. We further considered the literature and identified the gap in understanding of women's autonomy with reference to the utilization of essential maternal health care services in Nepal as well as other developing countries. Hence, we decided to construct and validate a women's autonomy measurement scale with relevance to Nepal in the first phase of study.

1.3 The study: aim and specific objectives

The overall aim of the study was to study women's autonomy and its influence on the utilization of maternal health care services in Kapilvastu district, Nepal.

The specific objectives were-

- To construct and validate a women's autonomy measurement scale based on the field evidence of western Terai, Nepal.
- To examine the relationship between women's demographic characteristics and socio-economic factors, and their utilization of maternal health care services in Kapilvastu district, Nepal.

- To correlate women's autonomy with their demographic characteristics and socio-economic factors in Kapilvastu district, Nepal.
- To examine the role of women's autonomy as a mediating factor in the utilization of maternal health care services using the new scale in Kapilvastu district, Nepal.

1.4 The study: research questions

The primary research question of this study is – does women's autonomy play a role in the extent of the utilization of maternal health care services in Kapilvastu district in Nepal?

The specific research questions are-

- What are the factors associated with the utilization of maternal health care services in Kapilvastu district, Nepal?
- What are the factors associated with levels of women's autonomy in Kapilvastu district, Nepal?
- Does women's autonomy influence the utilization of maternal health care services in Kapilvastu district, Nepal?

1.5 Research hypothesis

The main hypothesis of this study is that women in the study area who have high autonomy utilize more maternal health care services than women with restricted or low autonomy. Specifically, women who have high physical, financial and decision making autonomy utilize more maternal health care services than women with restricted or low autonomy.

1.6 The chapters: what will follow?

Chapter II review of literature focuses on theoretical as well as operational aspects of women's autonomy at the household level as well as in the society and its influence on the utilization of maternal health care services. We reviewed the global situation of maternal health and utilization of maternal health care services- antenatal care, delivery care and postnatal care and their factor associated. We further focused on correlating women's autonomy and utilization of maternal health care services. Finally, we reviewed policy, programmes and achievements of Nepal on the maternal health.

Chapter III illustrates research materials and methods, which consists of two subsections- construction and validation of women's autonomy measurement scale, and cross-sectional survey. Both subsections focus on designs, methods, population, sample, tools, ethical consideration, data collection and data analysis. Chapter IV comprises the findings of both studies i.e. scale construction and validation, and cross-sectional survey for assessing the utilization situation of maternal health care services.

In chapter V, we discuss findings, strengths, limitations and areas for further research. Chapter VI highlights major findings of the studies, conclusions and implication of the findings for policy.

CHAPTER 2
REVIEW OF LITERATURE

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REVIEW OF LITERATURE

2.1 Context of method

We reviewed the relevant published and grey literature i.e. scientific articles, books, unpublished theses, governmental and non-governmental organizations' reports on women's autonomy and utilization of maternal health care services. Online searching was a main source of literature review. We used web pages of Pub-Med, Science-Direct, the Web of Science, Google Scholar, Cochrane Review Data Bases, World Health Organization, Averting Maternal Death and Disability, Ministry of Health and Population Nepal using key terms and phrases- "women's autonomy", "maternal health care", "utilization of maternal health care services", "factors associated with women's autonomy" and "Nepal". We used "antenatal care and factors associated", "safe delivery care and factors associated", "postnatal care and factors associated", "maternal health care incentive schemes", "conditional cash transfers", "free delivery care", "safe motherhood policy/programme" "delays in delivery care" and "barriers for seeking maternal health care" for further reviewing the literature. This chapter provides an overview of the role of women's autonomy and other associated factors with the utilization of maternal health care services.

2.2 Theoretical conceptualization

This study focused on assessing women's autonomy at the household level and in the society and factors associated with the utilization of maternal health care services in Nepal. The critical feminist and social constructionist theories helped to understand the concept of women's autonomy (Kaphle *et al* 2013, Abrams 1998). We wanted to explore the social construction of women's autonomy and present utilization status of maternal health care services among the Nepalese women. Autonomy of a person is conceived by an individual to socio-cultural perspectives (Cicirelli 1992). It is a characteristic as well as a quality of the human being that is inherent in a particular act or choice (Abrams 1998). The social constructionist and critical feminist theories help to expose the social issues and voices of women. Feminist theories analyze the gender relations on the basis of the way in which discrimination of women has been practiced in the society (Barry 2012).

We reviewed various theories and models i.e. Talcott Parsons sick role theory (1951), Mechanic's general theory of help seeking (1978), Suchman's stages of illness and medical care theory (1965), Rosenstock's health belief model (1950) and Andersen's health care utilization model (1968).

Parsons proposed sick role theory in 1951. As a functional sociologist, he argued that sick individual is not a productive member of society; therefore the sickness should be treated by medical professions. The theory tries to explain rights and obligations of the sick person, as by rights the sick person is exempted from social roles. It is also

considered that the sick person is not responsible for the sick condition and as an obligation the sick person tries to get well (Watson 1951, Williams 2005).

Mechanic introduced a general theory of help seeking which is based on the person's attitude and its influences in health care utilization (Mechanic 1978). It incorporates the salience of abnormal signs and symptoms, the individual's sensitivity of the severity, the disturbance of the individual's daily life as caused by the illness, the frequency of symptoms and their persistence, and the individual's tolerance of symptoms. In the same way, it includes the individual's knowledge and cultural assumptions of the illness, denial of illness as a result of basic needs, whether response to the illness disrupts needs, alternative interpretations of symptom expression, and the treatment availability via location, economic cost and treatment resources. Mechanic's theory further allowed for disease response to be influenced by either the individual or a person who makes decisions for the individual (Mechanic 1978). Thus, as expressed in the illness behavior theory, autonomy and heteronomy influence health care utilization (Phillips *et al* 1998).

In 1965, Suchman introduced a theory on the stages of illness and medical care seeking. It is also called Suchman's stages of illness and medical care theory. It consists of five stages of the individual's decision making process in determining whether or not to seek health care. The stages are symptom experience, assumption of sick role, contact the medical care or self-care, dependent-patient role and recovery or rehabilitation respectively (Suchman 1966).

A group of social scientists developed health belief model in the early 1950s at the public health service in the United States to understand the widespread failure of people to accept disease preventives or screening tests for the early detection of asymptomatic diseases (Rosenstock 1974, Rosenstock *et al* 1988). It explains the individual's action to treat and prevent diseases with reference to the individual's perceived susceptibility to diseases, the individual's perception of illness severity, the individual's rational perception of benefits versus cost and the clues to the action. Thus, this model accepts that the individual's choice to utilize the health services as a dependent variable which varies according to context (Janz and Becker 1984).

In the late 1960s, Andersen developed a Health Care Utilization Model to assist the understanding of why families use health services, define and measure the access to health services and assist in development of policy and promote the equitable access to health care. Initially, the model focused on the family as the unit of study and later shifted to the individual as the unit of study. The model categorizes all the determinants of health care service utilization as predisposing factors, enabling factors and needs (Andersen 1995).

The health care utilization model has been modified frequently. In the late 1960s, the first model was developed which consisted of predisposing characteristics, enabling resources and needs as predictors and use of health services as an outcome. In the 1970s, the model-phase two came out. In the phase two, health care system was incorporated as a new predictor including previous predictors. The health care system

consists of policy, resources and organization; for further assessing the outcome there was also added consumer's satisfaction as outcome variable. The third phase of the model emerged between the years 1980s to 1990s with modification. The new model included population characteristics, health care system and external environment under the primary determinants of the health behaviours; personal health practices and use of health services under the health behaviours and perceived health status, evaluated health status and consumer satisfaction under the health outcomes. In the middle of the 1990s, the fourth phase of the model emerged with modification. It included health care system and external environment for health care under the environment; predisposing characteristics, enabling resources and health needs of the people under the population characteristics; personal health practices and use of health services under the health behaviours and perceived and evaluated health status and consumer satisfaction under the health outcomes (Andersen 1995).

Reviewing of various theories and models, we conclude that theories and models focus mainly on access to health care, social-network for the health care and cultural influence on the utilization of health care services. The understanding of which factors is most important to the utilization health care services and can lead to increase in the maternal health care services through creation of the effective health campaigns, policies and promotion programmes. Theories and models can facilitate better understanding of who use which services, how they access the services and when those services will be utilized.

2.3 Maternal health and utilization of maternal health care services

2.3.1 Maternal health

Maternal health is defined as the health condition of women during pregnancy, delivery and the postnatal period; while motherhood is often a positive and fulfilling experience, for too many women it is associated with suffering, ill-health and even death (WHO 2014b). It includes antenatal, delivery care and postnatal care. The quality of care is fundamental for the better health status of the mother and child at the end of a pregnancy (Dudeja and Jindal 2009). Maternal mortality is measured by ratio, rate and life time risk of maternal death. Maternal mortality ratio is the most common indicator for assessing the maternal health status which shows the risk associated with pregnancy and its related causes. Similarly, the life time risk describes the possibility of being pregnant and the risk of death due to pregnancy and its related causes of a reproductive age women (WHO 2014a, Bhandari 2013).

2.3.2 Utilization of maternal health care services: global scenario

Maternal mortality worldwide has dropped by 45% between the years 1990 and 2013. It reached an average 230 per 100,000 live births in developing countries (Sidney *et al* 2012, WHO 2014b). In 2013, despite the entire international effort approximately 289 000 women died due to pregnancy and its induced causes worldwide. Out of the total maternal deaths, almost all (99%) women died in developing countries. Nearly one-third of all maternal deaths occurred in South Asia and more than two-thirds in Sub-Saharan countries of Africa. Between the years 1990 and 2013, the global maternal

mortality rate came down 2.6% annually which is below the target (5.5%) of Millennium Development Goal Five (WHO 2014b). The following figure (Figure 3) summaries the maternal mortality status of the world and regions.

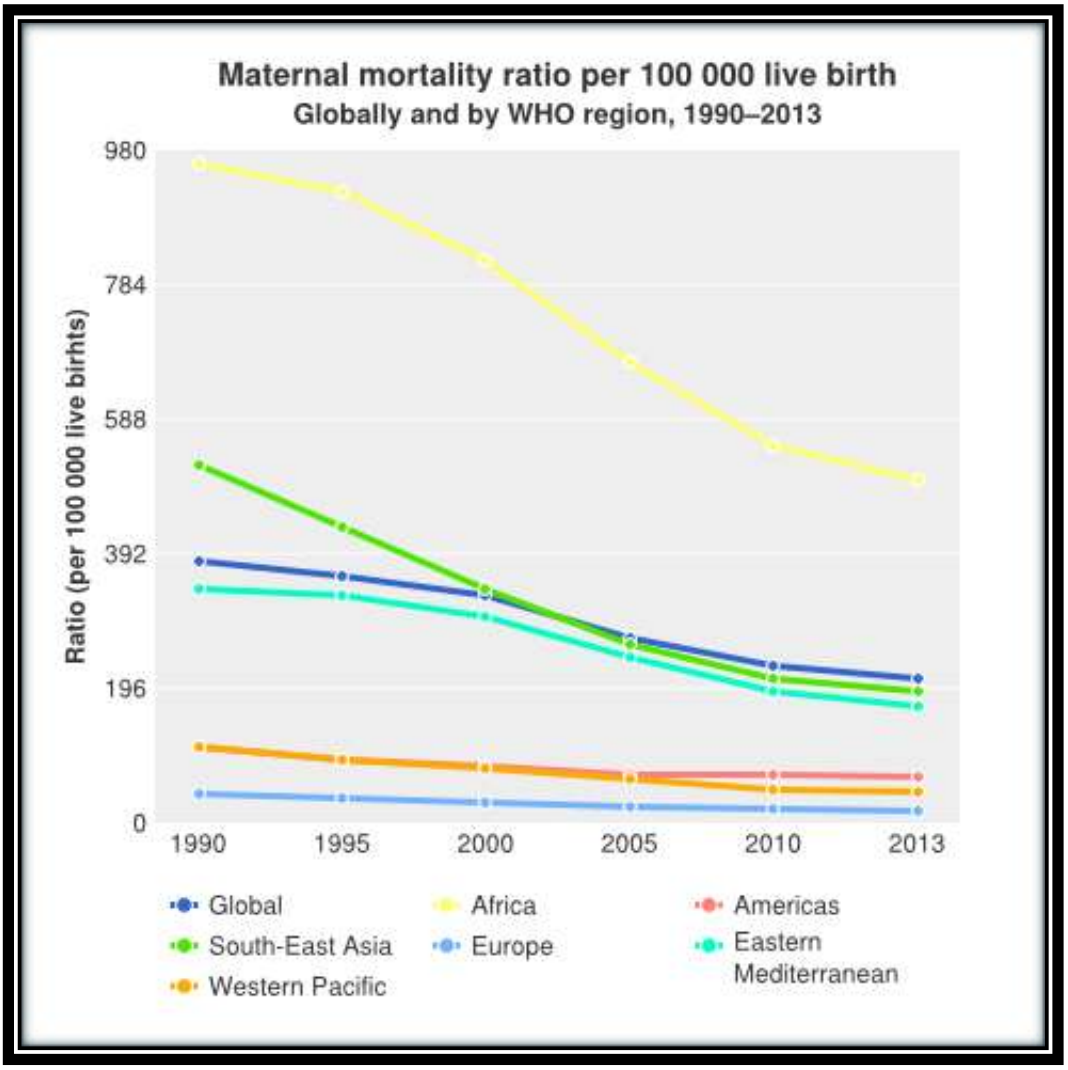

Figure 3: Maternal mortality ratio globally and by WHO regions, 1990 - 2013(WHO 2014b)

Women in developing countries have high pregnancy rate (total fertility rate 3.9 per women) and their lifetime risk of death due to high pregnancy is also high compared to

women of developed countries (World Health Organization 2012). In 2008, out of total maternal deaths, more than 50% deaths were in six countries i.e. India, Nigeria, Pakistan, Afghanistan, Ethiopia, and Democratic Republic of Congo (Hogan *et al* 2010). In the same year, the major causes of maternal deaths (80%) were severe bleeding, infections, postpartum complications, eclampsia, obstructed labor and unsafe abortion. In developing countries, most causes could be prevented by providing maternal health care services (Wanjira *et al.* 2011).

For reducing the high maternal mortality, skilled care at birth is one of the effective strategies in developing countries where institutional delivery is taken as synonymous with skilled care at birth (Bullough *et al.* 2005). Worldwide in 2013, nearly one-thirds women delivered their babies at home with help of traditional birth attendants or family members or alone, mostly in low resource countries of Sub-Sahara Africa and South East Asia. The same year more than 90% women sought skilled care at birth in developed countries (WHO 2014b).

High maternal mortality is a challenge for developing countries on the path to achieve MDG Five by 2015. South East Asia region accounts for one-third of the global maternal deaths. In this region, there is a wide divergence in socio-economic and health status among countries. Most countries of this region are unlikely to achieve the MDG Five even though maternal health is made the priority agenda of all countries (Acuin *et al* 2011, Islam 2011).

2.3.3 Utilization of maternal health care services in Nepal

High maternal mortality is one of the major public health problems of Nepal where pregnancy related causes accounted for nearly one third of deaths of reproductive age women from 2006 to 2011. It varied by the place of residence, region, ethnicity, religion and socio-economic strata (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012). Being a signatory member of the Millennium Declaration, Nepal faces a moral obligation to reduce the high maternal mortality. Despite the low proportions of skilled care at birth and institutional delivery care, the situation has changed radically over the last ten years; the maternal mortality ratio declining drastically between 1990 and 2011, from 850 to 229 deaths per hundred thousand live births (Ensor *et al* 2009, Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012). There is still a wide gap between policies and charted targets, and the real accessibility, availability and utilization of the quality maternal health care services in Nepal (Bhandari and Dangal 2012).

Antenatal care

Antenatal care services are required to impart preventive services, diagnose and manage complications during pregnancy. It provides information to promote skilled care at normal birth as well as emergency obstetric care (EmOC). Furthermore, as entry point to maternal health care services, it should provide birth preparedness and readiness for EmOC, and maximize the utilization of other components of antennal care services (Conrad *et al* 2012, Ministry of Health and Population [Nepal], New ERA, and Macro

International Inc. 2012). The relative contribution of antenatal care is difficult to assess precisely. Studying preventable factors for each major cause of maternal death, experts have estimated that maternal deaths can be reduced by at least 50% providing recommended antenatal care services in appropriate times and numbers (Brouwere and Leberghe 2001).

Antenatal care is a crucial step in the entire maternal health care services which can offer good opportunities to further care during delivery and postnatal period (Simkhada *et al.* 2010). The utilization rate of the antenatal care is assessed in many ways i.e. as proportion of women, who received antennal care from skilled health workers at least once, as well as the proportion who received four times and more during their pregnancy. The proportion of women seeking one time care was higher compared to women who received care four times. The proportion was 95% in America region, 93% in Western Pacific region, more than 90% in most of European countries, 76% in South East Asia region, 74% in Africa region and 72% in Eastern Mediterranean region in 2011 respectively (World Health Organization 2012).

In Nepal, nearly 60% pregnant women received at least one antenatal care from skilled care providers between the years 2006 and 2011. The proportion of pregnant women attending antenatal care four or more times was approximately half of the women who received at least one antenatal care. This is also low compared to the target of health sector programmes of Nepal to meet the Millennium Development Goal Five by 2015 (Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012,

Department of Health Services. 2013). Literature shows the inconsistency in the utilization of antenatal care in terms of times and basic components of services. Most providers from public health facilities focused on distributing iron and folic-acid tablets (79.5%) and intestinal anti-parasite drugs (55.1%), measuring blood pressure (86.4%), injecting tetanus toxoid (69.7%), and testing urine (55.9%) and blood (45.3%) samples from 2006 to 2011. There was huge variation among users in terms of their residency, development regions, ecological zones, education and wealth quintiles. (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012, Dhakal *et al* 2011).

Delivery care

Delivery care is considered as safe when it is attended by a skilled health care provider either in the health facility or at home. Childbirth practices differ from place to place and are determined by availability and accessibility of health services (Bhandari and Dangal 2013). All pregnant women are at risk of obstetric complications. Every year worldwide nearly 10% women die by prolonged obstructed labour. Most complications occur during labor and delivery and these cannot all be predicted. Antenatal screening does not envisage all women who will develop complications. Every pregnant woman needs access to health facilities with capabilities to provide emergency obstetric care. Neither effective antenatal care nor recognizing risk will help to lessen the maternal mortality if quality EmOC is not available, accessible or utilized in time (Khan *et al* 2006, Rooks *et al* 1990).

Childbirth attended by skilled health workers is crucial to reduce the maternal and neonatal deaths (Mpembeni *et al* 2007). In 2011, the proportion of births attended by skilled birth attendants was high (>90%) in Europe, America and Western Pacific regions. Africa, South East Asia and Eastern Mediterranean regions need to improve from their despondent situation where the proportion of the utilization of skilled care at birth was nearly 50% to 60% (World Health Organization 2012).

In 2011, the proportion of average utilization rate of skilled birth attendance was 59% in South East Asia region. There was considerable variation in the utilization among countries of this region. The proportion of skilled care at birth was more than 90% in Sri-Lanka, Thailand, Democratic Republic of Korea, and Maldives, nearly 70% in Indonesia and Bhutan, and less than 50% in India, Myanmar, Timor-Leste, Nepal and Bangladesh. The utilization rate of the skilled care at birth and institutional delivery care were going at very slow pace in India, Myanmar, Timor-Leste, Nepal and Bangladesh. Most of these countries were also less likely to meet the Millennium Development Goal Five by the year 2015 (World Health Organization 2012).

Skilled care at birth is one of the important components for preventing maternal and newborn deaths (Titaley *et al* 2010). Still, many deliveries occur at home without a skilled care providers and institutional delivery rate has only just crossed the one-third of the total deliveries in Nepal. Out of the total institutional delivery care, nearly six per cent were conducted by untrained health workers i.e. health assistants, auxiliary health workers, maternal child health workers and village health workers particularly at remote-

rural areas (Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012). The skilled care at birth also varied among the place of residence, socio-economic status, geographical regions, education, age and parity. In urban areas nearly three-fourths (72.3%) women delivered their babies in health facilities which was very high compared to semi-urban (35%) and rural (17.5%) areas between years 2006 to 2011(Shrestha *et al.* 2012).

For strengthening the safe delivery programme and reducing the high maternal mortality, The Government of Nepal promulgated a National Free Delivery Policy and initiated Rastriya Aama Surakshya Karyakram (Safe Delivery Care Programme) all over the country in 2009. For seeking delivery care, transportation facility is one of the major determinants. In developing countries, there are three common delays- delay in deciding to seek delivery care services, delay in reaching the first referral level health facility and delay in actually receiving delivery care after arriving at the facility. The second delay is directly associated with transportation facilities (Binder *et al* 2012, Hirose *et al* 2011).

The official report of the Government of Nepal claimed that out of institutional deliveries, 90% women had received safe delivery care incentives for institutional deliveries throughout the country in 2011 (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012). Regardless of the maternal health care incentives i.e. conditional cash transfers, free delivery care and cash incentive for health workers, nearly two-thirds (64%) pregnant women delivered their babies at home

without skilled health workers between 2006 to 2011 in Nepal (Malla *et al* 2011, Shrestha *et al* 2012, Bhandari and Dangal 2013, Borghi *et al* 2006).

Postnatal care

It is well documented that the utilization of postnatal care service reduces maternal and neo-natal morbidity as well as mortality. Health care providers should consider appropriate times, required numbers and quality of the services. Four postnatal care visits are suggested for all mothers and neonates. The ideal first postnatal visit should be within 24 hours, second 48–72 hours, third 7–14 days and fourth 6 weeks after delivery (World Health Organization 2014).

Despite being one of the important components of the maternal health care services, utilization of the postnatal care was low (44.5%) in Nepal between years 2006 to 2011; where it was available, quality was often poor (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012, Dhakal *et al* 2007). Postnatal care helps to establish and maintain contact with health services. Furthermore, early postnatal care is critical to promote healthy practices i.e. exclusive breast feeding, nutrition and contraception. In developing countries, status of postnatal care was mostly associated with maternal age, education, parity, economic status of the household, antenatal care visits, the place of delivery (Neupane and Doku 2013, Sines *et al* 2007), even though it varied among the residence, socio-economic status of women, religion and caste.

In Nepal, nearly one-third women (31%) utilized recommended numbers of postnatal care services from skilled health care providers at recommended times from 2006 to 2011. Out of the total antenatal care seekers, nearly one-third women had sought postnatal care within the critical first two days of childbirth (Department of Health Services 2013, Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012).

A study from 2006 shows that in most health facilities particularly in rural and remote areas of Nepal, the available postnatal care services were with very limited basic components and often substandard (Dhakal *et al* 2007). There was also a huge difference in the utilization of postnatal care services among the residences, development regions, ecological zones, education status and economic status of the family (Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012, World Health Organization 2012).

2.3.4 Factors associated with utilization of maternal health care services

The utilization of maternal health care services depends upon various factors i.e. demographic factors, socio-economic factors, and health system and health care related factors. All associated factors are classified in two groups i.e. supporting factors and hindering factors. In most developing countries- better socio-economic condition of household, closeness to health facilities, better transportation facilities, improved educational and occupational status of women, higher women's autonomy at household

level and society were seen to be positively associated with the utilization of maternal health care services (Babalola and Fatusi 2009, Simkhada *et al* 2008, Onah *et al* 2006).

The high home delivery rate as well as the low utilization of the maternal health care services is a major public health problem in most developing countries. Many countries have similar problems in the utilization of maternal health services. Socio-cultural factors, perceived benefit/need of antenatal care visits, skilled care at birth, postnatal care visits, and economic and physical accessibilities having the prominent role in the utilization of maternal health care services. A review in 2009 shows that the low utilization and limited access to maternal care services were the major causes of the high maternal morbidity and mortality in South East Asia and Sub-Sahara Africa regions (Gabrysch and Campbell 2009).

A study using the data from the third wave of National Family Health Survey (2005–06) of India shows that the utilization rate of safe delivery care and other maternal health services varied among the place of residence, socio-economic and education status, religion and caste. Muslims, scheduled castes, scheduled tribes and other backward castes were less likely to use the maternal health services. The adolescent women of southern India were more likely to utilize the maternal health services compared to others parts of the country (Singh *et al.* 2012).

Most studies from Nepal focused on the place of residence, ethnicity and religion, economic status, geographical regions as determinants of the utilization of maternal

health care services. Studies further reveal that long distance to the health facility, unfriendly provider's attitude, poor service delivery systems and physical facilities were prominent factors in the low utilization of maternal health care services in Nepal. Women's age above 35 years, high parity, low education status, low perceived attitude towards safer pregnancy, delivery and postnatal care, gender inequality, traditional socio-cultural practices, low decision-making power of women, low socio-economic status were other contributing factors of the low utilization of maternal health services in Nepal (Gabrysch and Campbell 2009, Baral *et al.* 2010, Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012).

2.4 Tools for measuring women's autonomy

Several previous studies correlated the utilization of maternal health care services with limited dimensions of the women's autonomy. Most of them included selected components of the women's autonomy i.e. decision-making for household purchases, visit to natal family or relatives, (Woldemicael 2010) freedom of movement, decision-making regarding children and household tasks (Ghuman *et al* 2006), decision making autonomy, movement autonomy, financial autonomy, (Riyami *et al* 2004, Saleem and Bobak 2005) and decision-making for large household purchases, daily household purchases, mobility, control overspending and health care (Mahapatro 2012).

We found very few studies which used comprehensive tools for measuring the women's autonomy with validation in Nepalese, (Thapa and Niehof 2013) Indian and Pakistani contexts, (Jejeebhoy and Sathar 2001, Gunasekaran 2010). Most tools were developed

considering the usage of contraceptive methods and reproductive rights and decision rather than the utilization of maternal health care services. We found a validated scale for assessing the women's autonomy which covers household decision-making, decisions regarding child care, autonomy for mobility, actual mobility, financial autonomy and domestic violence. But, it was developed with reference to monitoring feeding practices and infant growth in the rural Indian context and it focused on infant growth monitor and feeding practices (Shroff *et al* 2011).

From literature review, we felt that a gap exists for contextual scales for measuring women's autonomy with relevance to the utilization of maternal health care services in Nepal. Therefore, we decided to construct and validate a new scale of relevance to Nepal for measuring women's autonomy and its influence on the utilization of maternal health care services in Nepal. The detailed analysis of available tools is given in the following table (Table 2). Since a women's autonomy is except that is limited to the context; we felt that the exercise of developing and testing a new scale with adding to the better understanding by investigators about this phenomenon.

2.4.1 Analysis of women's autonomy measurement scales

Table 2 Available women's autonomy measurement scales

S. N.	Author & year	Purpose of scale	Parts/subparts	Type of scale	Items and score
1	Woldemicael 2010	Examines whether direct measures of women's autonomy are important predictors of maternal and child health-care utilization in Ethiopia and Eritrea.	- Making large household purchases, - Making household purchases for daily needs, - Visits to family or relatives,	Three points Likert scale, response options from " respondent alone, jointly and partner or others, score maximum two and minimum zero	Three items; total score: zero to six
2	Ghuman *et al* 2006	Assesses women's autonomy according to women and their husbands perspective from five Asian countries	- Freedom of movement - Decision making regarding children - Household tasks and decision making	Two and three points Likert-type scale, response options "yes and no", "wife and others" and "wife, jointly with husband", score zero to two.	Eleven items, total score: zero to thirteen
3	Al Riyami *et al* 2004	Correlates women's autonomy, education and employment with contraceptive use in Oman	- Decision making autonomy - Movement autonomy	Eight points decision-making index and six-points movement autonomy index	Fourteen items, total score: zero to fourteen

Table 2 Continued …

S. N.	Author & year	Purpose of scale	Parts/subparts	Type of scale	Items and score
4	Saleem and Bobak 2005	Correlates women's autonomy, education and employment with contraceptive use in Pakistan	- Decision making autonomy - Movement autonomy	Three-points Likert-type scale, response options "independent, joint and dependent", score zero to two.	Fourteen items, total score: zero to twenty eight.
5	Bloom *et al* 2001	Examines the determinants of women's autonomy in three areas: control over financial resources, decision-making power, and freedom of movement in North India.	- Financial autonomy, - Decision-making autonomy, - Movement autonomy	Nine points composite index i.e. financial autonomy, decision-making autonomy and movement autonomy are two, three and four points index respectively	Nine items, total index score: zero to nine
6	Mahapatro 2012	Examines women's autonomy and utilization of maternal and child health care.	- Decision-making on large household purchases - Decision-making on daily household purchases - Decision on mobility - Control overspending - Decision on own health care	Three points Likert-type scale, response options "self, jointly and others", score zero to two.	Five items, total score: zero to ten.

Table 2 Continued …

S. N.	Author & year	Purpose of scale	Parts/subparts	Type of scale	Items and score
7	Mistry *et al* 2009	Examines women's autonomy and its association with usage of adequate prenatal, delivery and postnatal care in rural India.	- Decision-making autonomy - Permission to go out - Financial autonomy	Three points Likert-type scale, response options "respondent, jointly and others", score zero to three.	Six items, total score: zero to twelve.
8	Jejeebhoy and Sathar 2001	Assesses women's autonomy and influence of religions and regions in India and Pakistan	- Mobility: Can go out unescorted? - Economic decision making - Access to and control over economic resources - Freedom from threat	Twenty points composite index i.e. mobility: Can go out unescorted, economic decision making, access to and control over economic resources and freedom from threat are five, six, seven and three points index respectively	Twenty items, total index score: zero to twenty one
9	Shroff *et al* 2011	Examines how women's autonomy relates to exclusive breast feeding and infant growth.	- Household decision making, - Decisions regarding child care, - Mobility autonomy, - Actual mobility, - Financial autonomy, and - Non-acceptance of domestic violence.	Two and three points Likert-type scale, response options "yes or no"; "respondent, jointly and others" and "never, some times and all the time", score zero to one and zero to three.	Forty six items, total score: zero to eighty eight

Table 2 Continued …

S. N.	Author & year	Purpose of scale	Parts/subparts	Type of scale	Items and score
10	Thapa and Niehof 2013	Assesses the relationship between women's autonomy and husbands' involvement in maternal health care.	- Economic autonomy, - Domestic decision making, - Movement autonomy, and - Spousal communication.	Four and two points Likert-type scale, response options " woman herself', husband, jointly (involving women) and other" and " yes and no" score zero to three and zero to one	Twenty items, total score: zero to thirty
11	Gunasekaran 2010	Examines women's autonomy and its influence to reproductive health behaviours.	- Sex segregated interaction (8/16)[1] - Freedom of movement (11/26) - Participation in social and political activities (7/14) - Financial management (3/6) - Household decisions (11/22) - Freedom of choice (8/16) - Violence against women (10/20) - Decision about contraceptives use (4/8) - Total autonomy items (64/128)	Three points Likert-type scale, response options "woman herself', jointly (involving women) and other" "always, sometimes and never"; score zero to two.	Total items sixty four and total score: zero to one hundred twenty eight

[1] Total numbers of items and possible maximum score

2.5 Women's autonomy and associated factors

Women's autonomy is a subjective term which has a relative meaning. It is influenced by individual characteristics of a woman and socio-cultural norms and values of the society (Makinwa-Adebusoye and Jensen 1995). Prior literature focused on couple's education, occupation and other socio-demographic characteristics i.e. age at marriage, age difference at marriage, numbers of children and sex of children for measuring the women's autonomy (Abadian 1996).

Definition and measurement of the women's autonomy is a much debated issue among writers, researchers and social activists. Most researchers use educational attainment, employment, income, spousal age difference and type of family as indirect parameters to assess women's autonomy in decision making, use of financial and physical resources, freedom of movement, and utilization of maternal health care services (Woldemicael 2007). In recent days, it is defined as enacted ability of women to influence decision-making, control financial and physical resources and freedom of movement (Bloom *et al* 2001, Jejeebhoy and Sathar 2001, Thapa and Niehof 2013).

Better educational and occupational status of women and spousal support for seeking maternal health care were found to be positively associated with women's autonomy in Nepal. In the same way, movement, decision-making and financial autonomy and freedom for spousal communication also had positive influence on the utilization of maternal health care services (Thapa and Niehof 2013, Allendorf 2007).

Low autonomy status of women associates with poor access to their basic needs i.e. food, cloths, education, health and security (Sharma *et al* 2007, Tuladhar 1997). In most south-east Asian countries, women have an inferior position and less freedom of choice than man at the household level as well as in the society (Dudgeon and Inhorn 2004, Thapa and Niehof 2013). As a result, women cannot access even their basic needs and claim their rights without prior permission of either their husbands or other senior members of family.

Women's personal autonomy contributes to creation of the conducive social environment in decision making and control over the financial and physical resources (Mistry *et al* 2009) and enhances access to information. Women's empowerment programmes aim to increase the decision-making power as well as negotiation capacity in making decisions at the household level and in the society. Empowerment is a process, requiring change over time from one state to another (Mullany *et al* 2007).

2.6 Influence of women's autonomy in utilization of maternal health care services

Prior studies disclose that increasing women's decision making power was one effective strategy to maximize the utilization of maternal health care services in low resource countries (Matthews *et al.* 2003, Woldemicael 2007). Studies further show that women who had greater autonomy over physical and financial resources were likely to seek health care and make fertility decision independently (Allendorf 2007, Govindasamy and Ramesh 1997, Govindasamy and Malhotra 1996).

Access to resources, freedom of movement and ability to make household decisions and visit natal kin were major components of women's autonomy in most developing countries (Matthews *et al.* 2003). Women's education and employment were found to be positively associated with their freedom in decision-making and seeking maternal health care services (Matthews *et al.* 2003, Woldemicael 2007).

A study in Nepal discloses that high women's autonomy contributed to the high utilization of maternal health care services in 2012. Financial autonomy, movement autonomy, decision autonomy and spousal communication autonomy (emotional autonomy) had positive association with the utilization of maternal health care services during pregnancy, delivery and postnatal period in Nepal (Thapa and Niehof 2013). In 2005-2006, women's participation in household decision making, higher women position than man in the household and spousal communication were positively associated with use of contraceptives and seeking antenatal and delivery care in Nepal with odds ratios of 1.4 and 1.3 respectively (Furuta and Salway 2006).

In recent years, researchers and policy makers agree that restriction of women's decision making is a key barrier to improve their maternal health status in developing countries (Mumtaz and Salway 2009). Some researchers incorporate husband's view also when assessing women's autonomy and utilization of maternal health care services for the validity and authenticity of the information (Allendorf 2007).

2.7 Maternal health care: policy, programmes and achievements of Nepal

In Nepal, between the years 1960 and 1990, a number of hospitals were established at the districts, zones, regions and central level. Many primary health care centres and health posts and sub-health posts were established at the local level. However, the maternal and child health status of the Nepal did not improve considerably. After restoration of the democratic system in 1990, democratic government showed commitment on maternal and child health care by formulating the first National Health Policy 1991 (Bhandari and Dangal 2012).

Since 1990 country introduced a number of policies and programmes on maternal and child health services. Despite the various efforts the proportions of antenatal care visits, birth attended by skilled health workers either in health facilities or at home, the utilization of emergency obstetric care and recommended postnatal care visits were not increasing to meet the targets of MDG and other national health programmes of Nepal (Powell-Jackson *et al.* 2009, Ensor *et al.* 2009, Borghi *et al.* 2006).

To achieve national as well as international targets and commitments by reducing the high maternal mortality particularly pregnancy related deaths, Government of Nepal introduced various aggressive programmes to increase skilled care at birth and institutional delivery care in Nepal (Witter *et al* 2011). Maternity incentive programme of Nepal, known as Safe Delivery Incentive Programme (SDIP) was introduced nationwide in 2005 to increase the utilization of skilled care at childbirth. The

programme focused on three incentives i.e. free delivery care services, fixed cash transfers to women for giving birth in the health facility and fixed financial incentive to health service provider for each delivery care attended either at home or in the health facility (Bhandari and Dangal 2012, Witter *et al* 2011).

Maternity incentive programme was reformed and extended to other non-profitable health institutions in early 2007. National Safe Delivery Care Programme which is popularly known as "Aama-Suraksha-Karyakram" was implemented since January 2009. It has been focusing on reducing maternal mortality by addressing the various delays for seeking the skilled care at birth (Bhandari and Dangal 2012, Witter *et al* 2011).

Regardless of incentives and efforts, the proportion of maternal health care utilization was low and varied among urban (72.7%) and rural (32.3%) residences, mountain (18.9%), hill (30.4%) and plain (42.8%) ecological regions; by education status of mothers i.e illiterate (19.4%), secondary level and above (76%); by wealth quintiles-lowest (10.7%) and highest (81.5%); by age (19.9% in the higher age group 35 or above) and by parity four or above (10 to 18%) from years 2006 to 2011 (Malla *et al* 2011, Shrestha *et al* 2012, Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012).

In conclusion, despite the various policies, programmes and continuous efforts the proportion of the utilization of maternal health care services is not enough to reduce the

high maternal morbidity and mortality in Nepal. It is a big challenge to achieve the Millennium Development Goal Five by tackling the diverse structure of the country.

2.8 Operational definition of terms

Associated factors: In this study, associated factors refer to those factors which are conceived as influencing the mother and child health status. The terms also include others factors which have either positive or negative contribution in the utilization of health care services and promotion of women's autonomy.

Decision-making autonomy: Decision-making autonomy includes women's independence and participation at the household level decision-making processes such as seeking health care, visiting health facilities for treatment and other health-advices, purchasing of required of goods and services and visiting relatives/friends.

Enabling factors: Enabling factors are defined as factors that make it possible for individuals or populations to modify their behavior or their environment. In health service utilization model Andersen defined enabling factors as logistical aspects of obtaining health care (Andersen 1995). In this study, women's autonomy i.e. physical autonomy, financial autonomy and decision-making autonomy are considered as enabling factors.

Financial autonomy: In this study, financial autonomy refers to women's independence in the utilization of financial resources and participation in financial decision-making process at the household level.

Need: A characteristic of as health status or illness that predicts use of health services. It is one of the factors of health care utilization model (Gochman 1997). In this study, it refers to regular need of the antenatal, delivery and postnatal care as well as emergency obstetric care.

Physical autonomy: **P**hysical autonomy refers to women's access to physical resources and movement autonomy. Movement autonomy includes women's independence for seeking health care and visiting health facilities, relatives/friends, markets and public programmes according to need and interest.

Predisposing factors: Predisposing factors refer broadly to everything including the demographic and socioeconomic characteristics that may influence a person to use a particular health service (Andersen 1995). In this study age, education, occupation, income of women, birth order and parity, household wealth, residence, family support, distance to health facilities and behavior of providers are taken as predisposing factors.

Women's autonomy: Autonomy refers to independence or freedom of will of action of individuals and it is explained as the capacity of an agent to act in accordance with objective morality rather than under the influence of desires (Liebeck and Pollard 2013). In this study, women's autonomy refers to the independence or capacity of reproductive age/pregnant women to seek required treatment during pregnancy, delivery and postnatal period. It includes financial, physical and decision-making autonomy.

CHAPTER 3
MATERIALS AND METHODS

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3.1 Study design

This was a population based cross-sectional study, conducted in two phases (Figure 4). First, we conducted a cross-sectional study in Rupandehi district of Western Development Region, Nepal for construction and validation of a women's autonomy measurement scale. This was followed by a cross-sectional survey for assessing the women's autonomy status at the household level and its influence on the utilization of maternal health care services by using structured interview schedule and the newly constructed scale in Kapilvastu District of Nepal. We validated the scale further when it was used in the survey.

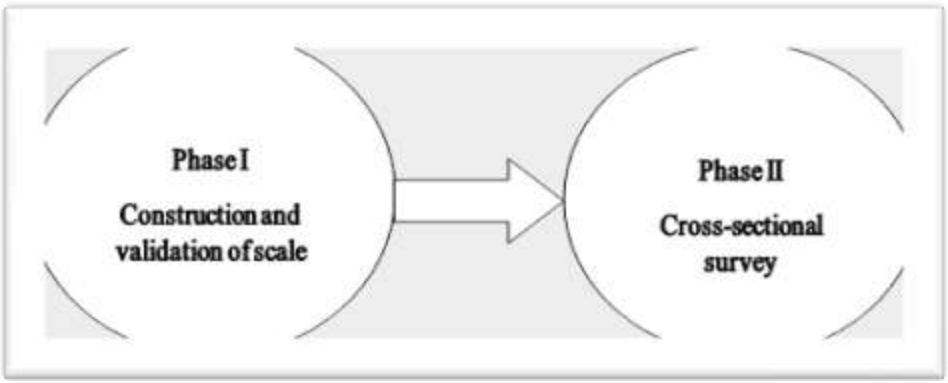

Figure 4: Phases of the study design

3.2 Organization of study

The two stages of the study were linked and organized as follows (figure 5).

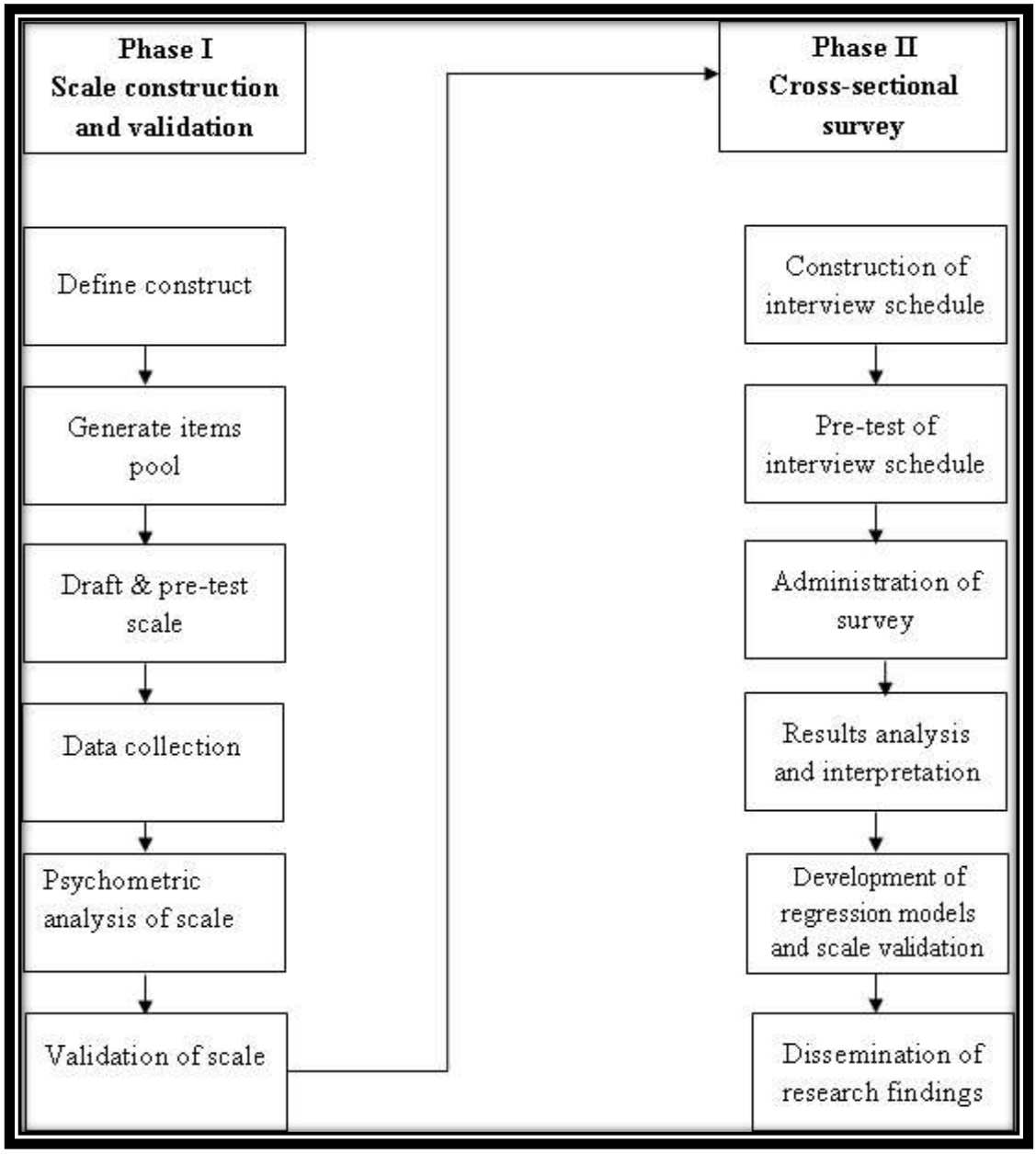

Figure 5: Organization of study

3.3 Conceptual framework

We reviewed published as well as grey literature on women's autonomy and the utilization of maternal health care services i.e. antenatal care, skilled care at birth, proportion of the home delivery, institutional delivery, emergency obstetric care and postnatal care.

In this study, utilization of maternal care services i.e. antenatal care, delivery care and postnatal care are the outcome variables and women's autonomy and factors associated with the utilization of maternal health care services are explanatory variables. Both explanatory and outcome variables were arranged in the conceptual framework for systematic research work.

We developed a conceptual framework after extensive literature review. We reviewed various published conceptual frameworks of health system research with reference to maternal health care services utilization to develop our own conceptual framework (Jennifer and Frenk 2012, Gabrysch and Campbell 2009b, Andersen 1995, Adeyi and Morrow 1996, Clapham *et al* 2004, Garg *et al* 2006). Finally, we adopted Andersen's *Health Services Utilization Model* to track the study variables (Figure 6).

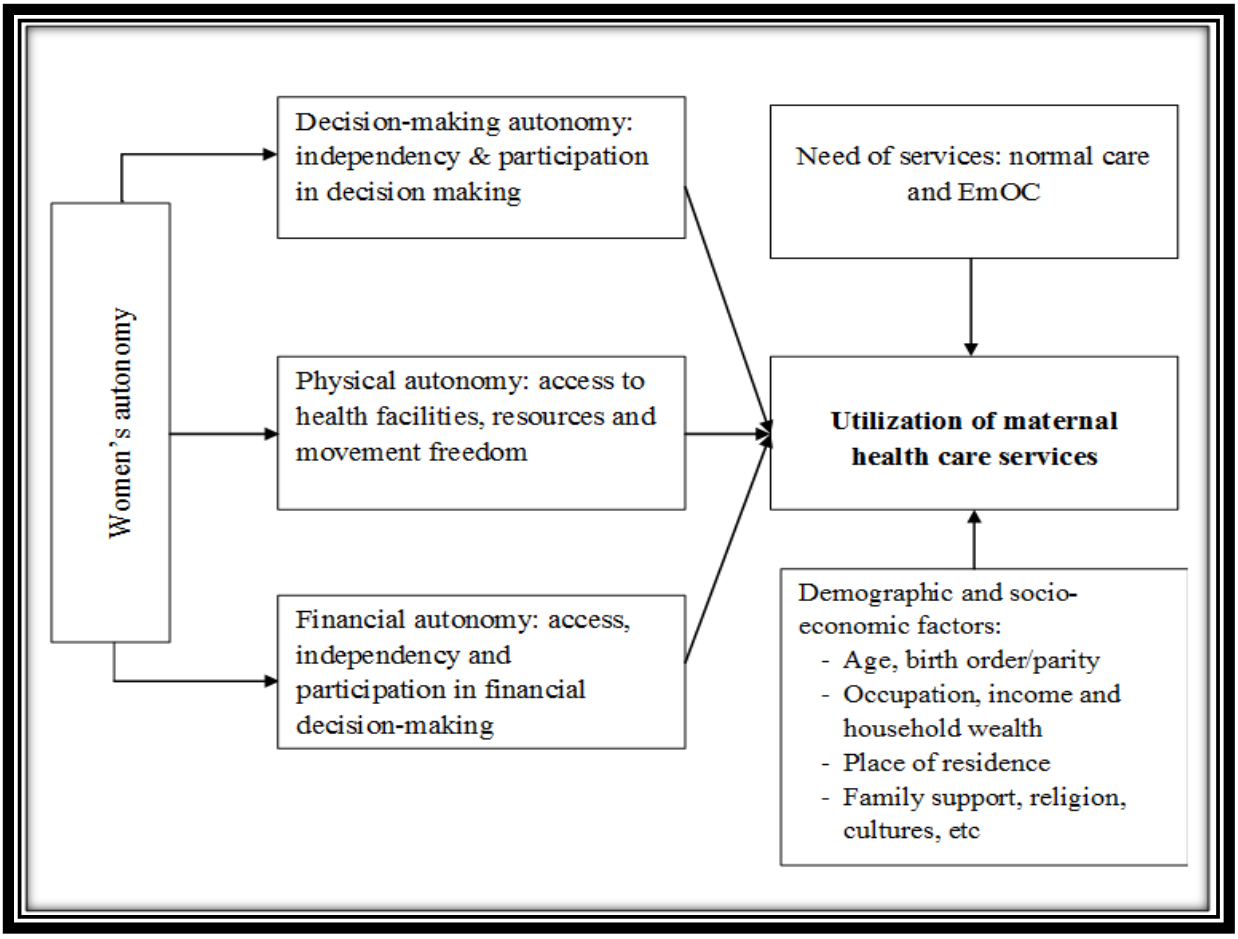

Figure 6: Conceptual framework: based on Andersen's emerging model for assessing human behaviours with reference to utilization of health services (Andersen 1995).

3.4 Study settings

We conducted this study in Kapilvastu district of Nepal. This district is known as the birthplace of Lord Buddha. It is one of districts of Lumbini Zone, Western Development Region of Nepal. It covers 1738 square kilometers area. It lies in 27.25° to 27.49° latitude North and 82.41° to 83.14° longitude east. It is situated at the height of 93 to 1491 meters from the sea level. Geographically, this district is situated in plain low land of the Terai and Chure hills. It is surrounded by Rupandehi district in the east, Dang

district in the west-north, Arghakhanchi district in the North and Uttar Pradesh, India in the south and the south-west (Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012).

Administrative area of the district is sub-divided into five Electoral Constituencies (ECs), fifteen Illakas (sub-division of the district), seventy six village development committees (VDCs) and a municipality. The other major demographic and health indicators of the district are: total population 571,936; female literacy 49.73%; the male female sex ratio 100: 997; proportion of pregnant women receiving at least one time antenatal care 60.2%; skilled care at birth 15.92% and institutional delivery 10.29%. This district has been listed in the low ranking category on the basis of Human Development Index (Ministry of Health and Population Nepal, New ERA, and Macro International Inc. 2012, Bhandari and Chhetri 2013) .

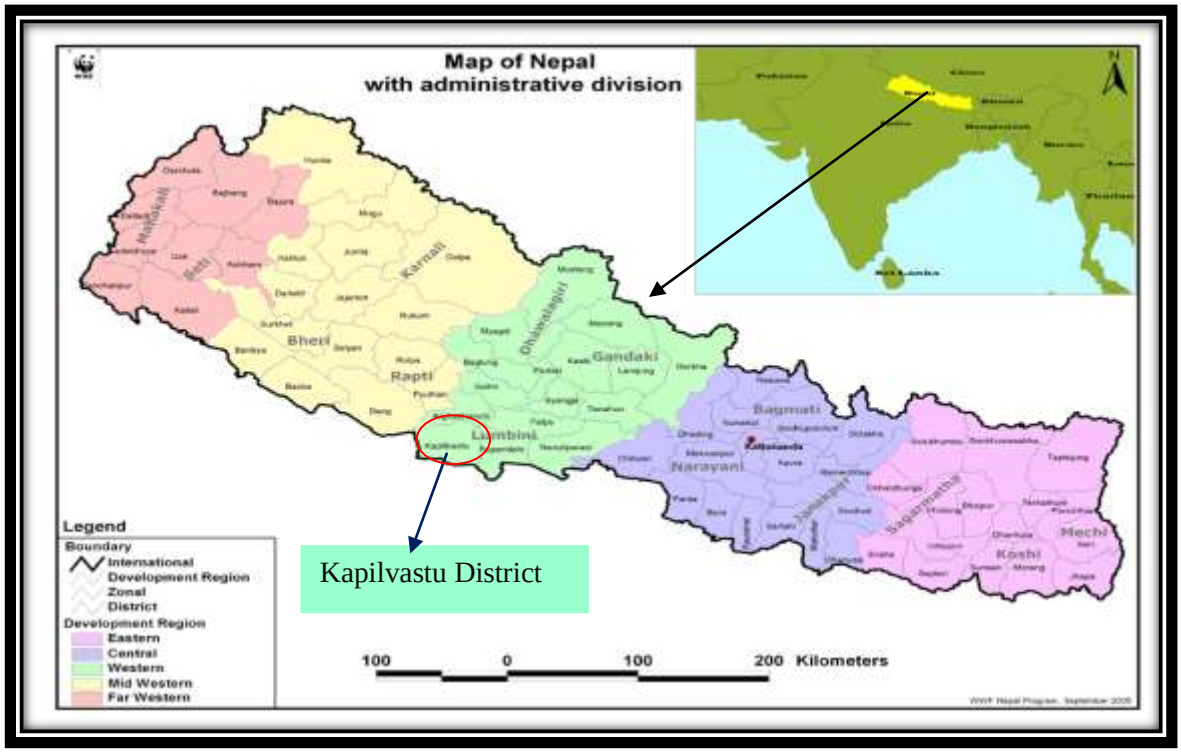

Figure 7: Map of Nepal locating the study setting: Kapilvastu District, Nepal (Map, courtesy from Google images- http://www.triphimalaya.com/nepal-general-information/index.html, (last accessed on 2014 Jun 5)

3.5 Ethical considerations

We submitted our protocol including research tools to Technical Advisory Committee (TAC) of Public Health, Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum, Kerala, India for technical comments. TAC suggested modifications on scale construction and validation methods and tools. After incorporating TAC comments, we submitted to Institutional Ethics Committee (IEC) for ethical clearance. IEC-SCTIMST granted ethical clearance for this study (copy of document is given in the appendix I). All participants were explained about the study and the written informed consent was obtained from each respondent before her

participation in the study. For assuring the participant's consent either signature or thumb impression was taken on the consent form and they were also informed of their right to withdraw from the study at any stage. We also took written approval from District Health Offices of the concerned districts- Rupandehi and Kapilvastu local authorities.

3.6 Construction and validation of scale

We conducted a study for construction and validation of a women's autonomy measurement scale in the Ilaka number eleven of Rupandehi district. This Ilaka adjoins Kapilvastu district, which has the similar demographic and socioeconomic characteristics. It consists of four VDCs. Out of four, we selected two VDCs randomly using lottery method and fixed sample and sub-samples to test the reliability and validity of the scale. The preliminary draft of the scale consisted of 24 items. Based on the ratio (1: 10) of items and respondents, we administered the scale among 250 respondents. The detailed of the sample and sub-samples is discussed under the scale construction and validation theme.

First, we prepared a preliminary women's autonomy measurement scale. The preliminary scale was drafted using the items-pool after extensive reviewing of related literature and consulting research supervisor, other members of the Doctoral Advisory Committee and experts. For further validation of the content the draft was supplied to the Doctoral Advisory Committee Members and other three experts for their comments. We

incorporated the experts' comments and finalized the preliminary draft. The preliminary draft was translated into Nepali language and conducted pretest study.

3.6.1 Steps of scale construction and validation

Definition of construct: Assessment of women's autonomy and its influence on the utilization of maternal health care is a complex task (Makinwa-Adebusoye and Jensen 1995). More recently, autonomy has been defined as the women's ability to influence decisions, control economic resources and move freely (Bloom et al. 2001, Jejeebhoy 2002, Thapa and Niehof 2013). For studying the complexity of women autonomy and its role in the utilization of maternal health care services in Nepal, we developed a conceptual framework to organize the study variables. We adopted Andersen's health care utilization model (Andersen 1995) which consists of predisposing factors, enabling factors and needs of people and their role in the utilization of health care services. We fit our study variables into this framework. We considered socio-economic factors as predisposing factors, decision-making autonomy, freedom for movement and financial autonomy of women as enabling factors and normal maternity care as well as emergency obstetric care as needs into the operational model.

Available literature shows that the high levels of women's autonomy associated positively with the greater utilization of maternal health care services in developing countries where women's autonomy is mainly determined by decision-making autonomy, movement autonomy and financial autonomy of the women. We focused on these three dimensions of women's autonomy which have the higher weightage in

women's autonomy measurement particularly in low income countries. We defined women's autonomy as "a capacity of women to control over decision-making, financial and physical resources, and freedom of mobility".

Generation of items pool: We generated a pool of items reviewing the published literature. We pooled 194 items from various studies. The details of the reviewed publication are in table 3. We removed all duplicate and unrelated items. After discussion with Doctoral Advisory Committee (DAC) members and review by three experts, we finalized 24 items which seem to be associated with decision-making autonomy, financial autonomy and movement autonomy of the women in developing countries.

All variables were categorized into three areas: decision-making autonomy, movement autonomy and financial autonomy of women. Items were scored on a three-point Likert-type scale with scoring range from two (independent), one (joint) and zero (dependent) for decision-making autonomy. Likewise, two (never), one (sometimes) and zero (always) indicate permission required for movement and financial activities. The total score of the scale consists of the sum of individual items, so, the higher scores of scale would reflect the better women's autonomy status.

Table 3 Details of literature review for generating a pool of items

Authors	Studies	No. of items
Woldemicael 2010	Three items from "do women with higher autonomy seek more maternal health care?	3
Ghuman et al 2006	Measurement of women's autonomy according to women and their husbands: Results from five Asian countries	11
Al Riyami et al 2004	Women's autonomy, education and employment in Oman and their influence on contraceptive use	14
Saleem and Bobak 2005	women's autonomy, education and contraception use in Pakistan: a national study	14
Bloom *et al* 2001c	Dimensions of women's autonomy and the influence on maternal health care utilization in a north Indian city	9
Mahapatro 2012	Utilization of maternal and child health care services in India: Does women's autonomy matter?	5
Mistry *et al* 2009	Women's autonomy and pregnancy care in rural India: A contextual analysis	6
Jejeebhoy and Sathar (2001)	women's autonomy in India and Pakistan: the influence of religion and region	12
Shroff *et al* 2011	Does maternal autonomy influence feeding practices and infant growth in rural India?	46
Thapa and Niehof 2013	Women's autonomy and husbands' involvement in maternal health care in Nepal	12
Gunasekaran 2010	Women's autonomy and reproductive behaviour	64

Pretesting of scale: Pretesting of the drafted scale was conducted in Parroha village development committee ward number six Bankatta in Rupandehi district which has similar characteristics with Kapilvastu district. We selected at least one woman of reproductive age from each five year interval of the age groups (14 to 49 years) and

interviewed 20 married women for pre-testing of the scale using convenience sampling method.

Enumerators explained to respondents about research objectives and requested for their participation in the study. They were made aware of their voluntary participation, right to terminate the interview at any point and the right to answer partially or not to answer the questions. After they agreed to participate, the enumerator carried on face to face interview. The principal investigator observed entire activities and recorded all comments. After completing all 20 interviews, the principal investigator and enumerators held a meeting to analyze the data for building up consensus and modifying the scale on the basis of the pretest feedback and finalized the scale. Major changes were not required in the questionnaire; some scale items and survey questions needed further clarity, and we modified accordingly.

Reliability and validity measurement: We conducted a study among 250 reproductive age women for scale construction and validation in Saljhandi and Rudrapur VDCs in Rupandehi district. Out of total respondents, 211 (84.4%) were from Saljhandi VDC. Enumerators visited respondents at their home using convenience sampling method. All respondents were explained about the objective of study and requested for their participation in research. We obtained the informed consent, and conducted face-to-face interview and recorded essential information. The response rate was 99.28%, seven respondents showed reluctance to take part in the study.

We administered the same draft in other two subsamples to estimate the test-retest reliability. Similarly, for calculating the validity ratio/index, the scale was supplied to the 22 subject experts for their comments on contents of the scale. The scale was supplied to the experts by email and returned in the same manner. The response rate of the emailed scale was 68.18%.

Psychometric analysis of scale: reliability and validity

Reliability and validity are two fundamental characteristics of measurement. Reliability refers to the consistency or precision in measurement and validity refers to how truly a scale measures what it is purported to measure accuracy of measurement (Lambert *et al* 1996, Filippi *et al* 1997). We analyzed the reliability and validity in various ways to assure the strength of scale to measure the women's autonomy.

Face validity: For assessing the face validity of the scale, the final draft was administered to ten people in community and primary health care facilities. Selected respondents assessed that the scale reflects what it was intended to measure. After piloting the scale among ten people, it was modified and finalized based on the feedback of piloting. Face validity is considered as a subjective assessment of scale, so we also considered the subjective ideas of the participants during data analysis.

Content validity: For assuring the content validity, we circulated a draft of preliminary scale to the Doctoral Advisory Committee Members and three other public health and reproductive health experts for insuring the content of the scale. We modified the draft

considering the written and oral feedback of the experts. The content of the final version was further assessed by thesis supervisor and one of the DAC members.

Internal consistency: The preliminary scale consisted of 24 items. We calculated correlation (r) by Cronbach's Alpha (α) and split half methods. We found Cronbach's Alpha 0.84 of total items, and 0.72 and 0.76 by splitting items in two groups respectively. Inter correlations among the items of each domain showed that most items to be positively correlated. We decided to accept all 24 items considering the Cronbach's alpha values.

Test-retest reliability: For establishing the consistency across the items, we performed test-retest method in a subsample (50 women) in one month interval and calculated Pearson's correlation (r). We found Pearson's correlation (r) 0.87 between the total score of first and second observations. Most statisticians accept correlation (r) 0.6 and above for assessing the cross items consistency (Lambert *et al* 1996). Considering test-retest results, we accepted all 24 items of the scale for further validity assessment.

The content validity was further assessed by testing the level of agreement among experts. For measuring the agreement of experts on the content of scale, we circulated the preliminary draft to the purposively selected experts. The sample of the experts consisted of university's faculty, professional researchers and public health professionals. The rating of each expert on each item was scored on a three-point Likert-type scale with scoring range from two (essential), one (useful not essential) and zero

(not necessary). The sum of scores of the individual item would reflect the overall score for a rater. In the first step, we calculated content validity ratio and content validity index. Content validity ratio shows the agreement among raters on the particular item. Content validity index is an average value of the content validity ratio of all items of the construct which indicates the overall agreement among raters on the construct. In the second step, using same subsample we merged scoring range from three groups to two groups, that is, essential and useful not essential combined in the first group and not necessary kept in the second group to calculate multirater kappa. A rule of thumb is that a kappa of 0.70 or above indicates adequate inter-rater agreement (Blankson and Kalafatis 2004). We used online multirater kappa Calculator to compute the multirater kappa (Randolph, J. J. 2008). We accepted all items of the scale considering the average content validity ratio and overall agreement of multirater kappa results of the items in scale.

Considering psychometric characteristics of the scale- Cronbach's Alpha (α) Pearson's correlation (r), content validity index (CVI) and multirater kappa value, we accepted all 24 items and finalized the scale to assess the women's autonomy. We decided to administer the scale along with the cross-sectional survey for further validation.

Further validation of scale

Factor analysis: Factor analysis is used to assess the dimensionality of scale and reduce the items. It confirms a smaller number of constructs from a large number of observed items (Worthington and Whittaker 2006). Researchers may use factor analysis for a

variety of purposes. One of the most common uses of factor analysis is to support the validity of new scale; in other words, to confirm that its measures what it is intended to measure. Factor analysis is classified in two, viz. exploratory factor analysis and confirmatory factor analysis. We used exploratory factor analysis to assess the construct validity and examine the underlying dimensionality of the items set. Thus, we can categorize a large set of items into meaningful subsets that measure different factors. Confirmatory factor analysis measures whether a specified set of factors influences the responses in the predicted way (Worthington and Whittaker 2006, Ganga and Kutty 2012).

It is a new scale; so we assumed all factors are uncorrelated and applied the principal components analysis with the extraction of eigenvalues greater than one, the orthogonal rotation by method varimax (Brown 2009).

Construct validity: convergent and discriminant validity

Convergent and discriminant validities are subtypes of construct validity. Theoretically, convergent and discriminant validity should measure similarity and dissimilarity of the constructs respectively. For ensuring the construct validity of the scale, both validities should be assessed simultaneously (Pike 2006, Watson *et al* 1995). We used rotated component matrix table of factor analysis to test convergent and discriminant validity of the scale. We assessed the correlation coefficient of items within a factor to ensure the convergent validity and loading of factors to ensure the discriminant validity of the scale.

3.7 Women's autonomy and utilization of the maternal health care services

This part of the study was a population based cross-sectional survey. Study population comprised all women of reproductive age in Kapilvastu district who had full term delivery within the last year and completed their postnatal period preceding the survey. We selected 10 VDCs from five ECs of Kapilvastu district using simple random sampling method (lottery method). The District Development Committee's record was used as a sampling frame to select required VDCs. We chose two VDCs from each EC and interviewed total 500 women. The final number of women at VDC level was fixed proportionately based on the population of village development committee (Table 4).

Table 4 Weighted distribution of sample*

ECs	VDCs	Total population	Expected live births	Required sample
1	Motipur	13235	318	88
	Rajpur	4781	113	31
2	Pakadi	7595	171	47
	Patariya	8404	190	53
3	Somdiha	6110	139	38
	Tilaurakot	9479	216	60
4	Manpur	3987	88	24
	Barakulpur	9229	221	61
5	Birpur	11489	256	71
	Ramnagar	4340	97	27
Total		74309	1712	500

* ***S****ample was fixed in each VDC based on the total number of expected live births in a year*

3.7.1 Study variables

In view of the research objectives, we listed some explanatory variables (Table 5) and outcome variables (Table 6) and defined all selected variables.

Table 5 Operational definition of selected explanatory variables

Variables	Type	Definition
Age	Continuous	Age of the respondent in years, it refers to reproductive age of women between 15-49 years.
Duration after delivery or age of the youngest child	Continuous	Completed age in the months from last delivery to date of data collection.
Age of the respondent at marriage	Continuous	Age of the respondent at her marriage/first marriage.
Age of the husband at marriage	Continuous	Age of respondent's husband at her marriage/first marriage.
Age difference at marriage	Continuous	Age difference of husband and wife at marriage.
Education of the respondent	Ordinal	Completed highest education level in years or total years of schooling.
Education of the husband	Ordinal	Completed highest education level in years or total years of schooling.
Occupation of the respondent	Nominal	Major occupation of the respondent.
Occupation of the husband	Nominal	Major occupation of the husband.

Table 5 Continued …

Variables	Type	Definition
Birth order of the last delivery	Discrete	Total number of deliveries including her last delivery.
Gap between the last and last-but-one pregnancies	Continuous	Difference between the last and last-but-one. pregnancies in months.
Desire for the last pregnancy	Nominal	Respondent's desire for a child when she carried on the last pregnancy.
Desire for more children	Nominal	Refers to desire of the respondent for more children in future.
Number of live children	Discrete	Total number of current lived children of the respondent.
Native language	Nominal	Mostly spoken language of the respondent.
Religion	Nominal	Religion of the respondent as reported by her.
Ethnicity	Nominal	Ethnicity of the respondent as reported by her and it is categorized into five groups based on the classification of Government of Nepal.
SES (wealth index)	Continuous	Total score of socioeconomic status of the household which ranging from zero to hundred. It is based on international wealth index and computed using Compute HH IWI computer software (Smits and Steendijk 2014, 2015).
Women's autonomy	Continuous	Total score of women's autonomy at the household level which ranging from zero to forty-eight. It is computed using the autonomy measurement scale developed by researchers.

Table 5 Continued …

Variables	Type	Definition
Required time to reach the health facility	Continuous	Required minimum time to reach the health facility for maternal care using available fast mode of transportation or on foot.
Mode of transportation	Nominal	Available various modes of transportation such as public, private and so forth to reach the nearest health facility for maternal health care services.

In the same way, we listed down and defined some selected outcome variables as follows -

Table 6 Operational definition of selected outcome variables

Variables	Type	Definition
Women's autonomy	Continuous	Total score of women's autonomy at household level which ranges from zero to forty eight. It is computed using the recently developed autonomy measurement scale by the authors.
At least one antenatal care visit	Nominal	Whether the respondent had at least one antenatal care visit for the last pregnancy.
Antenatal care attended by SBA	Nominal	Whether last delivery of the respondent was attended by SBA, either in health facilities or at home.
Timing of the first antenatal care visit	Continuous	Timing of the first antenatal visit during the last pregnancy.
Number of antenatal care visits	Continuous	Total number of antenatal care visit during last pregnancy of the respondent.
Place of the delivery	Nominal	Place of last delivery of the respondent either in the health facility or at home.
Reasons for the institutional delivery care	Nominal	Reasons for the institutional deliveries either for normal delivery care or EmOC.

Table 6 Continued …

Variables	Type	Definition
Delivery care attended by	Nominal	Delivery care attended by health worker in the health facility, whether the person was SBA or other health worker.
Postnatal check up before discharging	Nominal	Postnatal care of the respondent for her last delivery before discharge from the health facility.
Delivery assisted at home	Nominal	A person who assisted last delivery of the respondent whether the person was health worker or not.
Use of safe delivery kit for home delivery	Nominal	A safe delivery kit, whether it was used for the last home delivery of the respondent or not.
Postnatal care visit at least one	Nominal	At least one postnatal care visit of the respondent during the postnatal period of her last delivery.
Postnatal care provider	Nominal	Whether the last postnatal care of the respondent was attended by SBA, either in health facilities or at home.
Timing of the first postnatal care visit	Continuous	The timing of the first postnatal visit during the last postnatal period of the respondent.
Number of postnatal care visits	Continuous	The total number of postnatal care visits of the respondent, how many times it was done in the postnatal period of her last delivery.

3.7.2 Determination of sample size

In 2012, nearly sixteen per cent (15.92%) women had sought skilled care at birth in Kapilvastu district of Nepal (Department of Health Services 2013). Sample size for the cross-sectional survey was determined based on the proportion of skilled care at birth (15.96%).

We used OpenEpi statistics software to calculate the sample size (Dean *et al* 2015). At 95% confidence level the required sample size was 406 women from the whole districts. The sample was enhanced by 20% to accommodate the non-response rate and rounded to whole numbers. We decided to recruit 500 women in the cross-sectional survey. The following formula was applied to calculate the sample size.

Sample size (n) = [DEFF*Np(1-p)]/ [(d^2/$Z^2$1-α/2*(N-1)+p*(1-p)]

Here, Study Population (N) = 13594 (based on the expected numbers of live births)

Proportion of skilled care at birth (p) = 15.92%

Design effect (DEFF) = 2

Confidence limits as % of 100 (absolute +/- %) (d) = 5%

Non-response rate = 20%

3.7.3 Sampling procedures

We selected ten VDCs out of 76 VDCs of the district using simple random sampling (lottery) method. The final number of women at VDC level was fixed proportionately based on the population of the VDC. We interviewed 500 women from five electoral constituencies (ECs) and 10 VDCs of the district using a structured interview schedule and the autonomy measurement scale constructed by us. For identifying the respondents in each village, we consulted the local people to identify the center of the village. We went to the center and started data collection in a randomly chosen direction. We continued the household visit in the clock-wise direction until obtaining the required number of eligible respondents who had given birth in the last year. In a household

where two or more women were found eligible only one woman with the younger child was interviewed. In case any eligible respondent was not available for response substitution was done from the nearest house where an eligible respondent was available.

3. 7.4 Inclusion and exclusion criteria of survey

Inclusion

- No respondent was excluded on the basis of their class, ethnicity/race and religion.
- Women who had their last full term delivery within a year and completed their postnatal period, within the study area.

Exclusion

- Women who were not living in Kapilvastu district at least one year or more continuously.
- Urban areas which are stated in Taulihawa municipality of Kapilvastu district.

3.7.5 Research tools and data collection procedures

We used structured interview schedule and autonomy measurement scale for the survey. We visited selected respondents at their home. We explained the objectives of research to them and obtained their informed consent before starting the face-to-face interview. The interview schedule, measurement scale and informed consent form were used consistently during data collection.

3.7.6 Pretesting of interview schedule

We conducted a pre-test of the drafted interview schedule in Parhoha VDC, Rupandehi district. We interviewed 20 married women from 14 to 49 year old. After completing all 20 interviews, the principal investigator and enumerators held a meeting to analyze the

data for building up consensus and modified the scale in view of the pretest feedback and finalized the tools. However, major changes were not required in the questionnaire; some questions needed further clarity on content and language, and we modified and made simple accordingly.

3.7.7 Analysis of survey data

A. Utilization of maternal health care services and factors associated

Information of National Free Delivery Care (Aama) Programme

We assessed the respondent's information on National Free Delivery Care *(Aama)* Programme. First, we identified the total number of women aware about Aama programme and their sources of information; how were they informed about Aama programme? Second, we assessed their knowledge on incentives and availability of services of the Aama programme.

Antenatal care

Univariate analysis: We computed frequency, proportions (%), mean and standard deviation of the antennal care services i.e. at least one antenatal care visit, antenatal care attended by SBA, first time of antenatal care visit, at least one antenatal care visit and some others selected variables among groups contrasted by selected characteristics of the respondents.

Bivariate and multivariate analysis: We further chose the key potential explanatory variables and four outcome variables i.e. at least one antenatal care visit, antenatal care attended by SBA, first time of antenatal care visit and at least one antenatal care visit.

We used cross-tabulation and applied chi-square test for assessing the association with the demographic and socio-economic factors, and utilization of antenatal care services.

Delivery Care

Univariate analysis: We computed frequency, proportions (%), mean and standard deviation of the delivery care services i.e. proportion of institutional deliveries, institutional deliveries assisted by SBA, home delivery assisted by health workers, use of safe delivery kit at home delivery and some other selected variables among groups contrasted by selected characteristics of the respondents.

Bivariate and multivariate analysis: We selected the key potential demographic and socio-economic factors and four outcome variables i.e. proportion of institutional deliveries, institutional deliveries assisted by SBA, home delivery assisted by health workers and use of safe delivery kit for the home delivery. We used cross-tabulation and chi-square test for assessing the association with the demographic and socio-economic factors, and the utilization of skilled care at child birth and other delivery care services.

Postnatal care

Univariate analysis: We computed frequency, proportions (%), mean and standard deviation of the postnatal care services i.e. at least one postnatal care visit, postnatal care attended by SBA, timing of the first postnatal care visit, the total number of postnatal care visits and some other selected variables among groups contrasted by selected characteristics of the respondents.

Bivariate and multivariate analysis: We selected key explanatory variables and four outcome variables i.e. at least one postnatal care visit, postnatal care attended by SBA, timing of the first postnatal care visit and the total number of postnatal care visits. We used cross-tabulation and chi-square test for assessing the association with the demographic and socio-economic factors, and the utilization of postnatal care services.

B. Women's autonomy and factors associated with it

For assessing women's autonomy status at the household level, we used the autonomy measurement scale. We computed mean and standard deviation of the total score for women's autonomy. We applied one-way analysis of variance (ANOVA) to associate selected explanatory variables with women's autonomy.

We further performed multivariate modeling to examine how the socio-economic variables influenced on women's autonomy. We chose women's education, husband's education and economic status of women as key predictors of women's autonomy among several variables i.e. women's education, husband's education, women's occupation, husband's occupation and economic status of women. First, we converted women's autonomy status into two groups considering the median value of autonomy score as cutoff point. We considered autonomy score below the median as 'no autonomy' and above the median as 'autonomous'. Second, we created two categories for the respondent's education considering illiterate or less than ten years schooling as 'less educated' and ten or more years schooling as 'educated'. Then, we followed same criteria for husband's education. Similarly, we converted economic status into two

categories considering the median value of socio-economic status measurement score as cutoff point. We considered women below the median as ‘low economic status and above the median as ‘high economic status’.

We built various logistic regression models. We constructed model I between respondent’s education and their autonomy. We further adjusted women’s education for husband’s education to construct model II, and husband’s education and economic status of the household to construct model III respectively. After building models, we analyzed various pathways to establish the association with women’s autonomy, and women’s education, husband’s education and economic status of the household.

C. Influence of women’s autonomy in utilization of maternal health care services

We wanted to examine how the socio-economic variables and women’s autonomy affected their choice with regard to the utilization of maternal health care services, by constructing multivariate models. We chose women’s education, husband’s education and women’s autonomy as key predictor variables. We feel that while husband’s education will be a proxy for the general socio-economic status of the household, the subject’s score in the autonomy scale will reflect her independent decision making status. Her own educational status will represent her awareness in health matters. First, we created two groups for the respondent’s education considering illiterate or less than ten years schooling as ‘less educated’ and ten or more years schooling as ‘more educated’. Then, we did same for husband’s education. Similarly, we converted women’s autonomy into two categories considering the median value of the total score

as cutoff point. We considered women below the median as ‘low autonomous’, and median and above the median as ‘autonomous’.

The utilization of maternal health care services i.e. institutional delivery care was chosen as the outcome measure. We estimated crude odds ratios for the utilization of institutional delivery care with predictors such as respondent’s education and husband’s education. Since we found husband’s education acting as an effect modifier on the influence of women’s autonomy in the utilization of institutional delivery care services, we built two separate logistic regression models within the 2 strata of husband’s education, i.e., less than 10 years of schooling and 10 years or more of schooling of each selected outcome variable.

CHAPTER 4
RESULTS

CHAPTER 4

RESULTS

4.1 Psychometric characteristics of scale: reliability and validity

4.1.1 Reliability of scale

Internal consistency: Cronbach's Alpha value was 0.84. Correlation among individual items showed that all items of the scale correlated positively. The Cronbach's Alpha (Table 7), and item statistics and total items statistics (Table 8) showed good internal consistency of the items in scale.

Table 7 Internal consistency

Sample size	Mean	Variance	SD	No. of items	Cronbach's Alpha	Cronbach's Alpha based on standardized items
250	35.31	24.969	4.997	24	0.841	0.851

The table 7 shows the Cronbach's Alpha values and Cronbach's Alpha values based on standardized items is higher than cutoff value (r = 0.7).

Table 8 Item and total items statistics of scale

Items	Items statistics		Total items statistics			
	Mean	SD	Scale mean if item deleted	Scale variance if Item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted
What food should be cooked	1.98	0.15	33.33	24.58	0.24	0.84
Daily household expenditure/purchase	1.77	0.43	33.54	22.68	0.52	0.83
Children's clothes and food	1.87	0.35	33.44	23.51	0.40	0.84
Children's education	1.09	0.29	34.22	24.63	0.09	0.84
Children's and females' health care and medicine	1.83	0.38	33.48	23.74	0.29	0.84
Inviting and hosting guests	1.42	0.53	33.89	21.87	0.57	0.83
Use of contraceptives	1.00	0.14	34.30	24.65	0.21	0.84
Having baby/another baby	1.00	0.14	34.30	24.63	0.23	0.84
Purchase major goods in household such as land, house, computer, TV	1.08	0.35	34.23	23.41	0.43	0.83
Being a member of public institutions/organizations	1.82	0.41	33.48	23.01	0.45	0.83
Go outside the house/compound	1.62	0.49	33.69	22.14	0.56	0.83
Go marketing/shopping	1.95	0.22	33.36	24.11	0.37	0.84
Go to hospital/health care facility	1.88	0.34	33.43	23.39	0.45	0.83
Go to children's school	1.92	0.28	33.39	24.10	0.29	0.84

Table 8 Continued…

Items	Items statistics		Total items statistics			
	Mean	SD	Scale mean if item deleted	Scale variance if Item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted
Visit to natal family or relative/s' house	1.06	0.41	34.24	23.05	0.45	0.83
Visit to friend/s' house	1.12	0.42	34.19	22.90	0.47	0.83
Go to public places/programmes such as temple, church, other religious places, public programmes	1.85	0.37	33.46	23.32	0.42	0.83
Work outside the house for income	1.50	0.53	33.80	23.02	0.33	0.84
Spend money for household affairs	1.87	0.35	33.44	23.20	0.49	0.83
Lend/spend money as per personal need and interest	1.57	0.53	33.74	22.10	0.51	0.83
Saving money for your future use	0.69	0.89	34.62	19.85	0.55	0.83
Handle separate bank account	0.70	0.88	34.61	19.84	0.55	0.83
Own and control personal property	1.48	0.51	33.82	22.88	0.38	0.84
Give money or goods to natal family	1.23	0.45	34.08	23.56	0.28	0.84

Test-retest reliability*:* We calculated Pearson's correlation (r) of the total score of observation at two times and obtained r = 0.87. The correlation coefficient value 0.6 and above is considered acceptable for assessing the cross items consistency (Silverman *et al* 2001, Lambert *et al* 1996, Blankson and Kalafatis 2004). The descriptive statistics and the correlation showed good consistency across the items (Table 9).

Table 9 Descriptive statistics and correlation of two measurements

Measurements	Total mean score of items	SD	Total number of observations	Pearson's correlation (r)
Observation I	37.34	4.05	50	0.87**
Observation II	37.36	3.72	50	

** Correlation is significant at the 0.01 level (2-tailed).

4.1.2 Validity of scale

Face validity: We circulated the preliminary draft to ten primary health care workers and community volunteers. We collected written as well as verbal comments on the scale and modified some items considering their feedback. The scale was assessed considering what it is intended to measure on women's autonomy. Face validity is regarded as a subjective assessment of scale, so we also considered the subjective ideas of the participants throughout the data analysis.

Content validity: The average content validity ratio (index) and overall agreement among raters (kappa value) of the items were 0.80 and 0.83 respectively (Table 10). A rule of thumb is that kappa value 0.70 or above indicates adequate inter-raters agreement (Blankson and Kalafatis 2004).

Table 10 Content validity ratio and index

Items	Raters															No. of agreements	CVR*
	1	2	3	4	5	6	7	7	9	10	11	12	13	14	15		
1	×	×	-	×	×	×	×	×	×	×	×	×	-	×	×	13	0.7
2	×	×	×	×	×	×	×	×	×	×	×	×	-	×	×	14	0.9
3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	1.0
4	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	1.0
5	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	1.0
6	×	×	×	×	×	-	-	×	×	×	×	×	×	×	-	12	0.6
7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	1.0
8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	1.0
9	×	×	×	×	×	-	×	×	×	×	×	×	×	×	×	14	0.9
10	×	×	×	×	×	×	-	×	×	×	×	×	×	×	×	14	0.9
11	×	×	×	×	×	×	-	×	×	×	-	×	-	×	×	12	0.6
12	×	×	×	×	×	×	-	×	×	×	×	×	-	×	×	13	0.7
13	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	1.0
14	×	×	×	×	×	×	×	×	×	×	×	×	-	×	×	14	0.9
15	×	×	×	×	×	×	-	×	×	×	×	×	×	×	×	14	0.9
16	×	×	×	×	×	×	-	-	×	×	×	×	-	×	×	12	0.6
17	×	×	×	-	×	×	-	×	×	×	×	×	-	×	×	12	0.6
18	×	×	×	×	×	×	-	×	×	×	×	×	×	×	×	14	0.9
19	×	×	×	×	×	×	-	×	×	×	×	-	-	×	×	12	0.6
20	×	×	×	×	×	×	×	×	×	×	×	×	×	×	-	14	0.9
21	×	×	×	×	×	×	-	×	×	×	×	×	-	×	×	13	0.7
22	×	×	×	×	×	×	-	×	×	×	×	×	×	×	×	14	0.9
23	×	×	×	×	×	×	-	×	×	×	×	-	×	×	×	13	0.7
24	×	×	×	×	×	-	-	-	×	×	×	-	×	×	×	11	0.5
																Average content validity ratio /CVI^{Ø}	0.8

* *CVR-Content Validity Ratio,* ^{Ø} *Content Validity Index, × Agree, - Disagree*

4.1.3 Validation of scale

Considering psychometric characteristics of the scale- Cronbach's Alpha (α) = 0.84, Pearson's correlation (r) = 0.87 of test-retest, content validity index (CVI) = 0.80 and multirater kappa value = 0.83, we accepted all 24 items and finalized the scale to assess women's autonomy. The sample size of scale construct and validation study seemed not enough for factor analysis, so that, we decided to administer the scale along with the

cross-sectional survey and do further validation of the scale by performing factor analysis.

4.1.4 Further validation of scale

Factor analysis: We applied principal component analysis method with the fixed number of factors three considering the dimensions of namely decision-making autonomy, movement autonomy and financial autonomy in the preliminary scale. We found Kaiser-Meyer-Olkin (KMO) and Bertlett's test significant which meant that the set of the observations is adequate for factor analysis (Table 11). But communalities-initial and extraction value of some items was found considerably low (<0.3), cumulative variance of initial eigenvalues 51.8% and all items were not loaded on the three factors. We applied the principal component analysis method with the extraction of eigenvalues greater than one, and orthogonal rotation by method varimax. The analysis showed significant KMO and Bertlett's test ($p<0.001$), and communalities i.e. initial and extraction values (>0.3) of the total items nine. The total variance explained that the items were loaded on six factors with eigenvalues more than one (>1) and cumulative variance of initial eigenvalues 65%. Some items were loaded on more than one factor. We rotated items one by one and checked total items variance and factor loading.

After factor analysis, we decided to remove the item "what food should be cooked?" The remaining items loaded into five factors with eigenvalues more than one and cumulative variance of initial eigenvalues 63.1%. The rotated component matrix (Table 13) showed five factors and single loading with suppressed small coefficient absolute value below

0.45. Scree plot (Figure 8) also displayed five factors with eigenvalues greater than one. The factor one consisted of seven items which shows the major decision making autonomy at household, factor two included five items that explains the major financial autonomy and factor three comprised of six items which illustrates the movement autonomy. Similarly, factor four and five contained two and three items respectively which explain women's autonomy on minor decision making, financial activities and movement freedom of women. Considering the results of factor analysis, we finalized 23 items for the scale and decided 23-item scale (Appendix VII) for measuring women's autonomy.

Table 11 Results of KMO and Bartlett's test

Tests		Results
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.891
Bartlett's Test of Sphericity	Approx. Chi-Square	6399.271
	df	276
	Sig.	<0.001

Table 12 Communalities test of the items

Item number	Contents	Initial	Extraction*
1	What food should be cooked?	1.000	.612
2	Daily household expenditure/purchase	1.000	.704
3	Children's clothes and food	1.000	.690
4	Children's education	1.000	.670
5	Children's and females' health care and medicine	1.000	.617
6	Inviting and hosting guests	1.000	.590
7	Use of contraceptives	1.000	.863
8	Having baby/another baby	1.000	.881
9	Purchase major goods in household such as land, house, computer, TV	1.000	.713
10	Being a member of public institutions/organizations	1.000	.572
11	Go outside the house/compound	1.000	.659
12	Go marketing/shopping	1.000	.700
13	Go to hospital/health care facility	1.000	.652
14	Go to children's school	1.000	.518
15	Visit to natal family or relative/s' house	1.000	.509
16	Visit to friend/s' house	1.000	.587
17	Go to public places/programmes such as temple, church, other religious places, public programmes	1.000	.716
18	Work outside the house for income	1.000	.445
19	Spend money for household affairs	1.000	.658
20	Lend/spend money as per personal need and interest	1.000	.642
21	Saving money for your future use	1.000	.865
22	Handle separate bank account	1.000	.852
23	Own and control personal property	1.000	.536
24	Give money or goods to natal family	1.000	.653

* *Extraction method: principal component analysis*

Table 13 Rotated component matrix*

Items	Factors				
	1	2	3	4	5
Having baby/another baby	.852				
Use of contraceptives	.843				
Children's and females' health care and medicine	.695				
Inviting and hosting guests	.605				
Children's education	.593				
Purchase major goods in household such as land, house, computer, TV	.521				
Being a member of public institutions/organizations	.517				
Saving money for your future use		.882			
Handle separate bank account		.873			
Give money or goods to natal family		.724			
Lend/spend money as per personal need and interest		.621			
Work outside the house for income		.555			
Go marketing/shopping			.787		
Go outside the house/compound			.767		
Visit to friend/s' house			.726		
Go to hospital/health care facility			.641		
Visit to natal family or relative/s' house			.624		
Go to children's school			.473		
Daily household expenditure/purchase				.721	
Children's clothes and food				.627	
Spend money for household affairs					.746
Own and control personal property					.676
Go to public places/programmes such as temple, church, other religious places, public programmes					.532

Extraction method: principal component analysis

Rotation method: varimax with Kaiser Normalization

* *Rotation converged in 10 iterations*

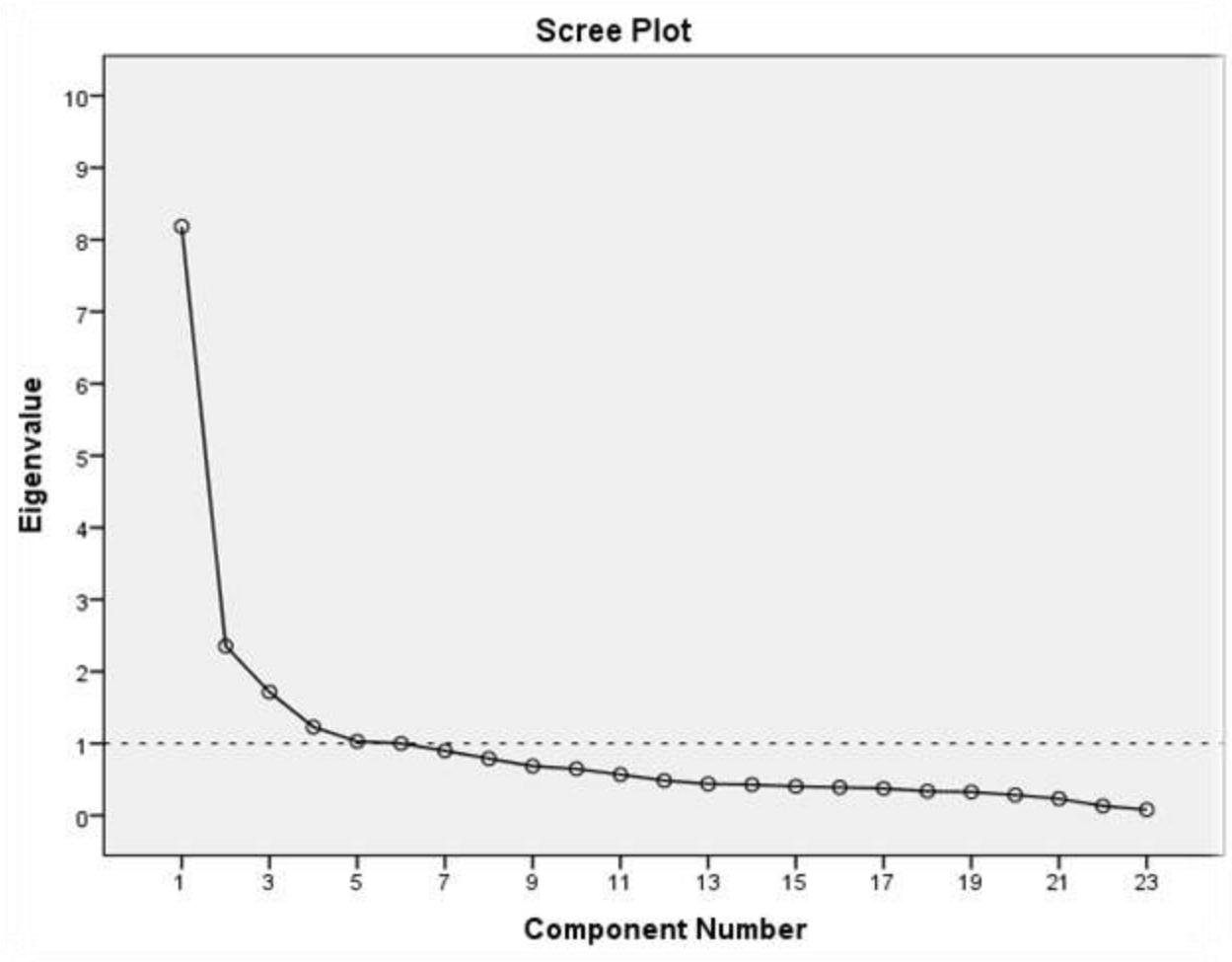

Figure 8: Scree plot

Convergent and discriminant validity

Convergent validity explains the association with items within a factor and discriminant validity explains the association with items among factors. We used rotated component matrix (Table 13) to test convergent and discriminant validity of the scale. Each factor has average correlation coefficient value of the loaded items more than 0.6 which indicates good convergent validity of the constructs. All 23 items of the scale have single loading items into five factors by suppressing absolute coefficient value less than 0.45 and average coefficient value of the loaded items of each factor is more than 0.60. It further shows good discriminant validity of items of the scale.

4.2 Women's autonomy and utilization of maternal health care services

We analyzed the demographic and socio-economic characteristics of the respondents, utilization status of maternal health care services, and women's autonomy and its influence on the utilization of maternal health care services respectively.

4.2.1 Background characteristics of respondents

Table 14 Selected demographic and socio-economic characteristics of the study sample (n = 500)

Characteristics	Categories	No.	Per cent	Mean ±SD
Native language				
	Nepali	74	14.8	
	Awadhi	401	80.2	
	Tharu	25	5.0	
Age				26.63±5.5
	<20 year	61	12.2	
	20-35 year	399	79.8	
	>35 year	40	8.0	
Age at marriage				17.61±3.1
	<20 year	427	85.4	
	20 & above year	73	14.6	
Age difference with husband at marriage				2.40±1.8
	5 or less	473	94.6	
	>5 year	27	5.4	
Age at first pregnancy				20.1±3.0
	<20 year	294	58.8	
	20 & above year	206	41.2	
Parity				3.1±2.1
	1 to 2	239	47.8	
	3 to 4	153	30.6	
	5 or more	108	21.6	
Birth spacing in month (n = 365)				35±16.0
	<24 months	139	38.1	
	24 to 36 months	116	31.8	
	>36 to 60 months	91	24.9	
	>60 months	19	5.2	
Religion				
	Hindu	437	87.4	
	Muslim	63	12.6	
Caste/ethnicity				
	Dalit*	19	3.8	
	Disadvantaged Janajatis (tribal population)	47	9.4	
	Disadvantaged Non-dalit Terai ethnic groups	380	76.0	
	Advantaged castes	54	10.8	
Education status				
	Illiterate	292	58.4	
	≤10 year schooling	150	30.0	
	>10 year schooling	58	11.6	

Table 14 Continued …

Characteristics	Categories	No.	Per cent	Mean ±SD
Education status of husband				
	Illiterate	111	22.2	
	≤10 year schooling	105	21.0	
	>10 year schooling	284	56.8	
Wealth index				
	Poor	294	58.8	
	Middle class	184	36.8	
	Rich	22	4.4	
Occupation				
	Agriculture & own business	110	22.0	
	Service	9	1.8	
	wages & migrant worker	23	4.6	
	Housewife	358	71.6	
Occupation of husband				
	Agriculture & own business	321	64.2	
	Service	45	9.0	
	Overseas employee	77	15.4	
	Wages & migrant worker	57	11.4	
Required time to reach health facility				39.7±24.8
	<30 minutes	345	69.0	
	30-60 Minutes	127	25.4	
	>60 minutes	28	5.6	

[*] *Dalit- Considered as extremely socially backward caste in Nepal.*

4.2.2 Utilization of maternal health care services

For convenience of analysis, we classified maternal health care services and its related information in four different subheadings i.e. information on National Safe Delivery Care *(Aama)* programme, antenatal care, delivery care and postnatal care which are presented here in various headings and sub-headings accordingly.

Table 15 Utilization of maternal health care services and women's autonomy score

Components	Categories	No.	Per cent	Score of women's autonomy Mean± SD	P value
Pregnancy and antenatal care					
Antenatal care visit at least one (n = 500)					<0.001***
	Yes	418	83.6	23.02±7.55	
	No	82	16.4	18.88±9.06	
Antenatal care attended by (n = 418)					0.633
	SBA	159	31.8	22.80±8.02	
	Other health workers	259	51.8	23.16±7.26	
Time of first antenatal visit (n = 418)					0.275
	<4 month	199	47.6	23.45±8.10	
	4 month or later	219	52,4	22.64±7.00	
Number of antenatal care visits (n = 418)					0.707
	4 or more visit	288	68.9	22.93±7.80	
	<4 visits	130	31.1	23.23±6.96	
Birth and delivery care					
Place of delivery (n = 500)					<0.001***
	Health facility	188	37.6	25.24±7.22	
	Home & other places	312	62.4	20.59±8.04	
Institutional delivery was sought (n = 188)					<0.05*
	Normal delivery	81	43.1	26.74±7.27	
	EmOC	107	56.9	24.15±7.01	
In health facility, delivery attended by (n = 188)					0.148
	SBA	177	94.1	25.42±7.23	
	Other health workers	11	5.9	22.18±6.50	
At home, delivery assisted by (n = 307)					0.445
	Health workers	19	6.2	21.94±8.90	
	Other persons	288	93.8	20.49±8.00	
Use of safe delivery kit for home delivery (n = 312)					<0.001***
	Yes	46	14.7	21.30±7.54	
	No	266	85.3	16.59±9.61	
Postnatal care					
Postnatal care visit at least one (n = 500)					<0.001***
	Yes	110	22.2	24.87±7.45	
	No	390	77.8	21.63±8.08	
Postnatal care provided by (n=110)					0.672
	SBA	81	73.6	24.69±7.30	
	Other health workers	29	26.4	25.37±8.00	
Time of first postnatal care visit (n = 110)					0.204
	< 48 hour	70	63.6	25.55±7.37	
	48 hour or later	40	36.4	23.67±7.55	
Number of postnatal care visits (n = 110)					0.470
	3 times or more	16	14.5	26.12±6.67	
	< 3 times	94	85.5	24.70±7.60	

** p value significant at <0.05, *** p value significant at <0.001*

A. Information on National Safe Delivery Care *(Aama)* Programme

In Kapilvastu district out of 500 women, 360 (72%) women had knowledge on the Aama programme and its incentives. Out of them, 351 (97.5%) women knew about cash reimbursement for transportation, 209 (58.1%) women were familiar with free delivery care in the public health facilities but most women did not know about financial incentive for the health workers who attend delivery care either in the health facility or at home. Female community health volunteers (FCHVs) were main sources of information on maternity care incentives and other services (Figure 9). Regarding the health facilities for delivery care, almost all women 354 (98.3%) were familiar only with government health facilities. Nearly half of women 164 (45.6%) knew that they can call SBA at their home for delivery care without paying any extra-charges/fees.

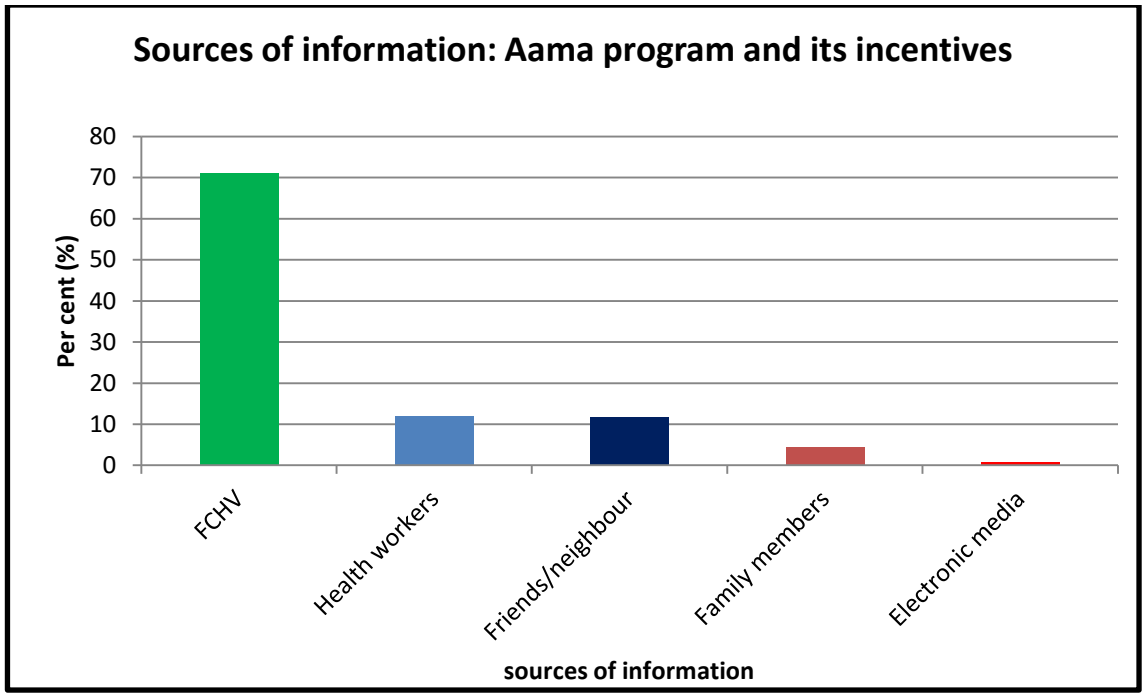

Figure 9: Sources of information about Aama programme and its incentives

B. Antenatal care

Despite the 83.6% coverage of at least one antenatal care visit, only 228 (68.90%) sought four or more antennal care visits. Out of total antenatal care seekers, 234 (46.8%) women were advised to seek the skilled care at childbirth. They were advised multiple options i.e. government hospitals 221 (94.4%), primary health care centers 46 (19.4%) and health posts/sub-health posts 33 (14.1%) for SBA care at childbirth. Nine per cent women had unwanted pregnancy in one year preceding the study period. Nearly half of the women (44.8%) replied that they did not wish any more children in future.

Out of total respondents, 150 (30%) respondents had one or more complications in their prior pregnancy/ies, like the abortion, still birth, neo-natal death. Most women were not well-prepared for delivery care; one-third women made some preparations for their last pregnancy (Figure 10). The outputs of logistic regression show the further association with the demographic (Table 16) and socio-economic (Table 17) characteristics of respondents and the utilization of antenatal care services.

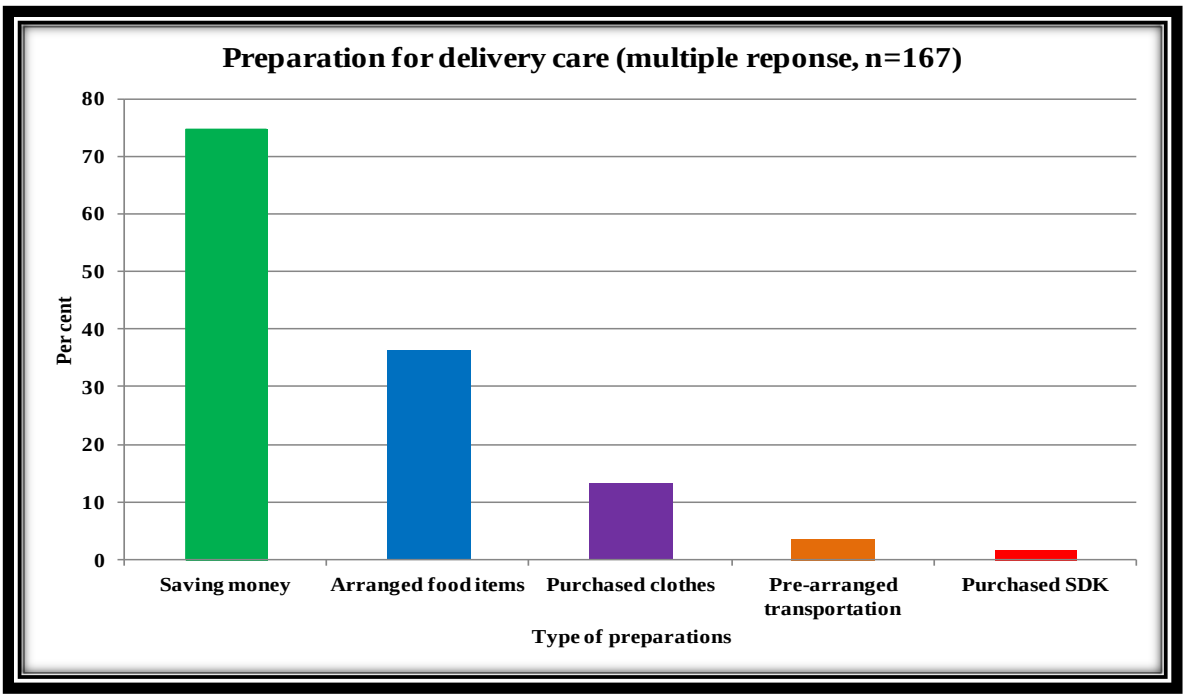

Figure 10: Preparation for delivery care: proportion of mothers

Table 16 Demographic characteristics of women and utilization of antenatal care services

Predictors	At least one antenatal care visit (n = 500)			Antenatal care attended by SBA (n = 418)			First antenatal care visit in first trimester (n = 418)			Number of antenatal care visits four or more(n= 418)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Age in Years			0.550			0.133			0.065			0.003
<20 year	51	83.6		15	29.4		31	60.8		44	86.3	
20-35 year	336	84.2		128	38.1		157	46.7		288	67.9	
>35 year	31	77.5		16	51.6		11	35.5		16	51.6	
Total	418	83.6		418	38.0		199	47.6		288	68.9	
Age at marriage			0.17			0.013			0.371			0.807
<20 year	350	82.0		124	35.4		48	48.6		242	69.1	
20 year or above	66	93.3		35	51.4		42	42.6		46	67.6	
Total	418	83.6		159	38.0		199	46.7		288	68.9	
Age difference with husband at marriage			0.169[§]			0.853			0.498			0.037
5 or less	398	84.1		151	37.9		188	47.2		270	67.8	
>5 year	20	74.1		8	40.0		11	55.0		18	90.0	
Total	418	83.6		159	38.0		199	46.7		288	68.9	
Age at first pregnancy						0.107			0.966			0.433
<20 year	239	81.3	0.096	83	34.7		114	47.7		161	67.4	
20 year or above	179	86.9		76	42.5		85	47.5		128	70.9	
Total	418	83.6		159	38.0		199	46.7		288	68.9	
Parity			0.000			0.401			0.062			0.000
1 to 2	215	90.0		83	38.5		113	52.6		170	79.1	
3 to 4	127	83.0		52	40.9		50	39.4		71	55.9	
5 or more	76	70.4		24	31.4		36	47.4		47	61.8	
Total	418	83.6		159	38.0		199	46.7		288	68.9	

Table 16 Continued …

Predictors	At least one antenatal care visit (n = 500)			Antenatal care attended by SBA (n = 418)			First antenatal care visit in first trimester (n = 418)			Number of antenatal care visit four or more (n = 418)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Birth spacing (n = 297)			0.012[§]			0.559			0.857			0.188
<24 months	106	76.3		34	32.1		43	40.6		62	58.5	
24 to 36 months	91	78.4		31	34.1		39	42.9		58	63.7	
>36 to 60 months	81	89.0		31	38.3		38	46.9		57	70.4	
>60 months	19	100.0		9	47.4		8	42.1		9	69.6	
Total	297	81.4		105	35.4		128	43.1		186	62.6	
Native language			0.129[§]			0.087			0.396			0.009
Nepali	66	89.2		31	47.0		36	54.5		56	84.8	
Awadhi	329	82.0		123	37.4		151	45.9		216	65.7	
Tharu	23	92.0		5	21.7		12	52.2		16	69.6	
Total	418	83.6		159	38.0		199	46.7		288	68.9	
Religion			0.115			0.064			0.025			0.595
Hindu	361	82.6		131	36.3		164	45.4		247	68.4	
Muslim	57	90.5		28	49.1		35	61.4		41	71.9	
Total	418	83.6		159	38.0		199	46.7		288	68.9	
Caste/ethnicity			0.361[§]			0.000[§]			0.228			0.009[§]
Dalit	14	73.7		2	14.3		8	57.1		11	78.6	
Disadvantaged Janajatis (tribal population)	37	78.7		5	13.5		20	54.1		26	70.3	
Disadvantaged non-Dalit Terai ethnic groups	319	83.9		124	38.9		143	44.8		209	65.5	
Advantaged castes	48	88.9		28	58.3		28	58.8		42	87.5	
Total	418	83.6		159	38.0		199	46.7		288	68.9	

[§] *p value for likelihood ratio*

Table 17 Socio-economic characteristics of women and utilization of antenatal care services

Predictors	At least one antenatal care visit (n = 500)			Antenatal care attended by SBA (n = 418)			First antenatal care visit in first trimester (n = 418)			Number of antenatal care visits four or more (n = 418)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Education status			0.001			0.023			0.001			0.000
Illiterate	229	78.4		76	33.2		97	42.2		140	61.1	
≤10 year schooling	136	90.7		55	40.4		65	47.8		102	75.0	
>10 year schooling	53	91.4		28	52.8		37	69.8		46	86.8	
Total	418	83.6		159	38.0		199	47.6		288	68.9	
Education status of husband			0.046			0.007			0.156[§]			0.014
Illiterate	80	76.2		22	27.5		36	45.0		50	62.5	
≤10 year schooling	240	84.5		88	36.7		108	45.0		159	66.2	
>10 year schooling	98	88.3		49	50.0		55	56.1		79	80.6	
Total	418	83.6		159	38.0		199	47.6		288	68.9	
Occupation of respondent			0.000[§]									0.260[§]
Agriculture or own business	79	71.8		37	46.8	0.008[§]	34	43.0	0.156[§]	49	62.0	
Service	7	77.8		6	85.7		3	42.9		4	57.1	
Wages & migrant worker	14	60.9		3	21.4		6	42.9		8	57.1	
Housewife	318	88.6		113	35.5		156	49.1		227	71.4	
Total	418	83.6		158	38.0		199	47.6		288	68.9	
Occupation of husband			0.003			0.038			0.87			0.015
Agriculture or own business	258	80.4		101	39.1		111	43.0		168	65.1	
Service	41	91.1		20	48.8		25	61.0		36	87.8	
Overseas employee	74	96.1		29	39.2		40	54.1		49	66.2	
Wages or migrant worker	45	78.9		9	20.0		23	51.1		35	77.8	
Total	418	83.6		159	38.0		199	47.6		288	68.9	

Table 17 Continued …

Predictors	At least one antenatal care visit (n = 500)			Antenatal care attended by SBA (n = 418)			First antenatal care visit in first trimester (n = 418)			Number of antenatal care visits four or more (n = 418)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Decision-making for health care			0.008[§]			0.006[§]			0.453[§]			0.704[§]
Independently	6	75.0		2	33.3		4	66.7		4	66.7	
Jointly	216	88.9		98	45.5		98	45.4		145	67.1	
Dependent	196	78.7		59	30.2		92	49.5		139	70.9	
Total	418	83.6		159	38.0		199	47.6		288	68.9	
Wealth index			0.402[§]			0.003			0.217			0.056
Poor	241	82.0		78	32.4		106	44.0		156	64.7	
Medium	157	85.3		68	43.3		82	52.2		115	73.2	
Rich	20	90.9		13	65.0		11	55.0		17	85.0	
Total	418	83.6		159	38.0		199	47.6		288	68.9	
Required time to reach health facility			0.000[§]			0.490[§]			0.494[§]			0.668[§]
<30 minutes	298	86.4		107	35.9		136	45.6		202	67.8	
30 to 60 Minutes	109	85.8		48	44.0		56	51.4		77	70.6	
>60 to 90 minutes	2	66.7		1	50.0		1	50.0		2	100.0	
> 90 Minutes	9	36.0		3	33.3		6	66.7		7	77.8	
Total	418	83.6		159	38.0		199	47.6		288	68.9	

[§] *p value for likelihood ratio*

C. Delivery care

In the study area, out of 500 women 188 (37.7%) women sought institutional delivery care for their last childbirth. Almost all women visited government health facilities i.e. hospitals, primary health care centers, health posts and sub-health posts (Figure 11). Antenatal care visit and institutional delivery care had very strong relation (Chi-square = 20.05, df = 1 and P <0.001), women who had antenatal care were more likely to seek institutional delivery. Despite the institutional delivery care, nearly six per cent deliveries were conducted by untrained health workers in the health facilities who did not receive any specific training on skilled delivery care. Out of the total institutional delivery care, 109 women (57.9%) visited the health facility for the self–reported emergency obstetric care. The self-reported emergency obstetric problems were prolonged labor 81 (74.3%), pre-mature labor 9 (8.6%), mal-presentation of the fetus (5.5%) and others were antepartum haemorrhage, no fetal movement, retention of urine and anemia.

We selected four outcome variables i.e. proportion of institutional deliveries, institutional deliveries assisted by SBA, home delivery assisted by health workers and use of safe delivery kit for the home delivery to associate with the demographic and socio-economic characteristics of the respondents (Table 18 and 19).

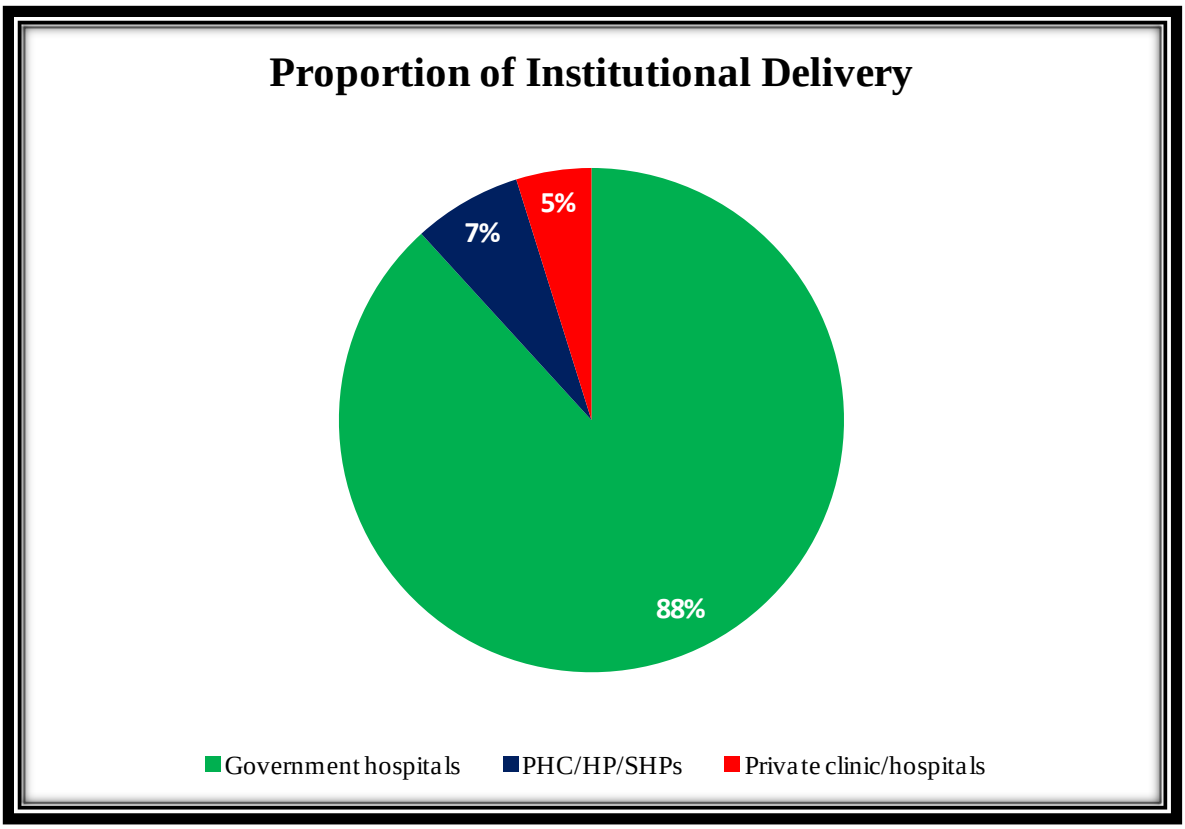

Figure 11: Proportion of institutional delivery in public and private health facilities

Out of 188 institutional deliveries, most women went to the health facilities by hired vehicles 139 (73.9%), human support or on foot 24 (12.8%), private vehicles 14 (7.4%) and public transportation five (2.7%). Out of total institutional deliveries, nine per cent women did not receive any cash reimbursements and next seven per cent women were also charged for services. More than half of women who had institutional delivery 97 (51.6%) did not receive any postnatal care services before being discharged from health facilities.

Nearly two-third 312 (62.4%) women had their child at home. Out of home deliveries, almost all women 307 (98.4%) were assisted by traditional birth attendants, other women, husband and other health workers. In the same way, we found the low utilization of safe delivery kit (SDK) 46 (14.7%) for delivery care. Out of other remaining households, most households 249 (93.6%) used new-blade and other households used any other unsterile sharp objects for cutting the umbilical cord of the new born child.

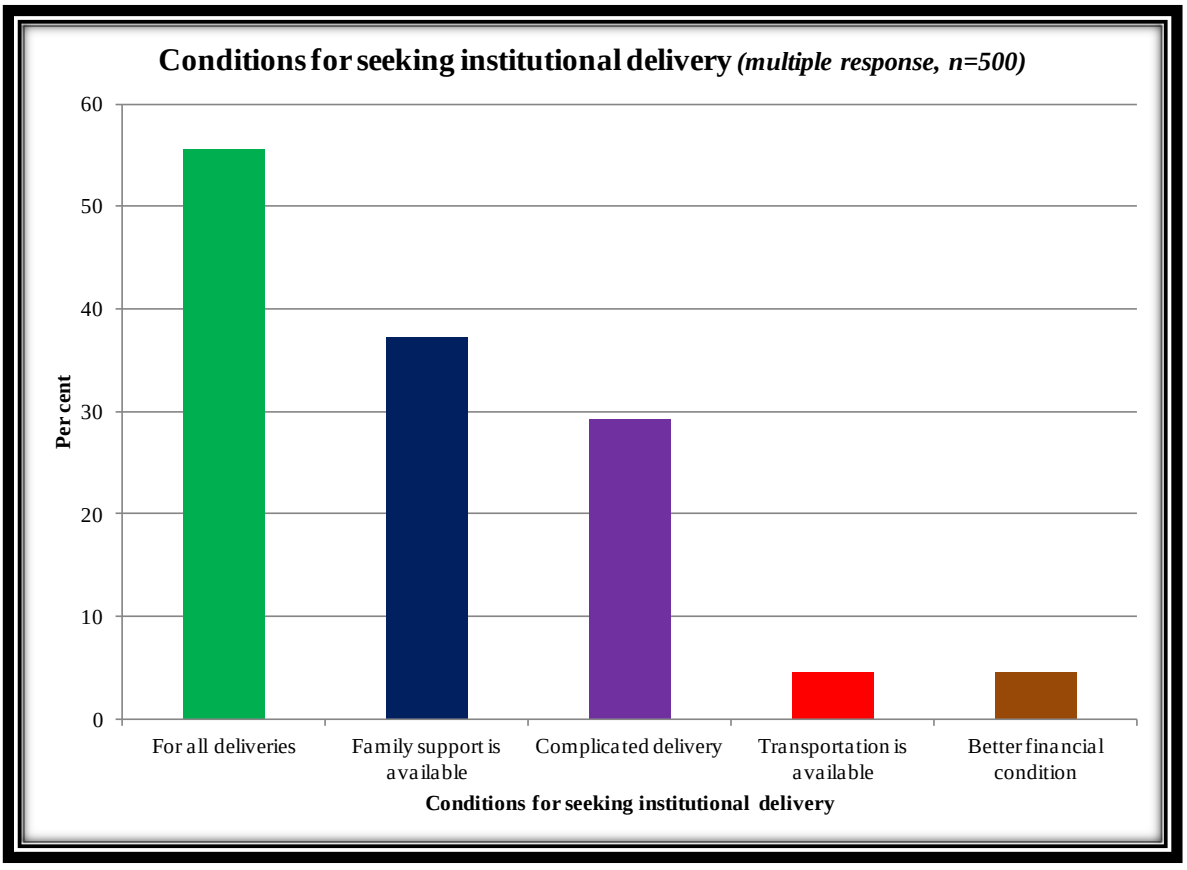

Figure 12: Conditions for seeking institutional delivery

Table 18 Demographic characteristics of women and utilization of delivery care services

Predictors	Institutional delivery (n = 500)			Institutional delivery assisted by SBA (n = 188)			Home delivery assisted by health worker (n = 307)			Use of SDK for home delivery (n = 312)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Age in Years			0.144			0.139[§]			0.284[§]			0.275
<20 year	27	44.3		26	96.3		3	9.4		8	23.5	
20-35 year	151	37.8		143	94.7		16	6.5		33	13.3	
>35 year	10	25.0		8	80.0		0	0.0		5	16.7	
Total	188	37.6		177	94.1		19	6.2		46	14.2	
Age at marriage			0.048			0.403[§]			0.331[§]			.008[§]
<20 year	153	35.8		143	93.5		18	6.7		45	16.4	
20 year or above	35	47.9		34	97.1		1	2.6		1	2.6	
Total	188	37.6		177	94.1		19	6.2		45	14.7	
Age difference with husband at marriage			0.017			0.943[§]			0.684[§]			0.274[§]
5 or less	172	36.4		162	94.2		18	6.1		43	14.3	
>5 year	16	59.3		15	93.8		1	9.1		3	27.3	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Age at first pregnancy			0.004			0.129			0.314			0.377
<20 year	95	32.3		87	91.6		14	7.3		32	16.1	
20 year or above	93	45.1		90	96.8		5	4.4		14	12.4	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Parity			0.000			0.305			0.490			0.281
1 to 2	127	53.1		121	95.3		9	8.2		21	18.8	
3 to 4	36	23.5		34	94.4		5	4.3		16	13.7	
5 or more	25	23.1		22	88.0		5	6.1		9	10.8	
Total	188	37.6		177	94.1		19	6.2		46	14.7	

Table 18 Continued …

Predictors	Institutional delivery (n = 500)			Institutional delivery assisted by SBA (n = 188)			Home delivery assisted by health worker (n = 307)			Use of SDK for home delivery (n = 312)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Birth spacing			0.025			0.894[§]			0.129[§]			.319[§]
<24 months	31	22.3		29	93.5		4	3.8		18	16.7	
24 to 36 months	29	25.0		26	89.7		4	4.6		11	12.6	
>36 to 60 months	33	36.3		31	93.9		7	12.1		7	12.1	
>60 months	9	47.4		8	88.9		0	0.0		0	0.0	
Total	102	27.9		94	92.2		15	5.8				
Native language			0.000			0.68[§]			0.175[§]			0.636[§]
Nepali	56	75.7		54	96.4		2	11.8		4	22.2	
Awadhi	119	29.7		111	93.3		15	5.4		40	14.2	
Tharu	13	52.0		12	92.3		2	16.7		2	16.7	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Religion			0.016			0314[§]			0.919[§]			0.538[§]
Hindu	173	39.6		162	93.6		16	6.1		41	15.5	
Muslim	15	23.4		15	100		3	6.5		5	10.4	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Caste/ethnicity			0.000			0.373[§]			0.770[§]			0.137[§]
Dalit	5	26.3		5	100		1	7.7		3	21.4	
Disadvantaged Janajatis (tribal population)	26	55.3		23	88.5		2	9.5		6	28.6	
Disadvantaged non-dalit Terai ethnic groups	111	29.2		104	93.7		15	5.7		35	13.0	
Advantaged castes	46	85.2		45	97.8		1	12.5		2	25.0	
Total	188	37.6		177	94.1		19	6.2		44	14.7	

[§] *p value for likelihood ratio*

Table 19 Socio-economic characteristics of women and utilization of delivery care services

Predictors	Institutional delivery (n = 500)			Institutional delivery assisted by SBA (n = 188)			Home delivery assisted by health worker (n = 307)			Use of SDK for home delivery (n = 312)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Education status			0.000			0.986[§]			0.306[§]			0.163[§]
Illiterate	71	24.3		67	94.4		11	5.1		28	12.7	
≤10 year schooling	64	42.7		60	93.8		8	9.3		16	18.0	
>10 year schooling	53	91.4		50	94.3		0	0.0		2	40.0	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Education status of husband			0.000			0.253[§]			0.946[§]			0.000
Illiterate	29	27.6		28	96.6		4	5.4		8	10.5	
≤10 year schooling	92	32.4		84	91.3		12	6.4		23	12.0	
>10 year schooling	67	60.4		65	97.0		3	6.7		15	34.1	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Occupation			0.017			0.483[§]			0.007[§]			0.000[§]
Agriculture & own business	29	26.4		28	96.6		11	13.6		21	25.9	
Service	6	66.7		6	100		0	0.0		2	66.7	
Wages or migrant worker	9	39.1		9	100		2	14.3		4	28.8	
Housewife	144	40.2		134	93.1		6	2.9		19	8.9	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Occupation of husband			0.000			0.858[§]			0.078[§]			0.431[§]
Agriculture & own business	102	31.1		96			11	5.1		34	15..5	
Service	38	84.4		36	94.1		2	28.6		0	0.0	
Overseas employee	27	35.1		26	94.7		4	8.2		6	12.0	
Wages & migrant worker	21	36.1		19	96.3		2	5.7		4	16.7	
Total	188	37.8		177	94.1		19	6.2		46	14.7	

Table 19 Continued …

Predictors	Institutional delivery (n = 500)			Institutional delivery assisted by SBA (n = 188)			Home delivery assisted by health worker (n = 307)			Use of SDK for home delivery (n = 312)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Decision-making for health care			0.000[§]			0.704[§]			0.005[§]			0.690[§]
Independently	5	62.5		5	100		0	0		1	33.3	
Jointly	140	57.6		132	94.3		13	12.7		16	15.5	
Dependent	43	17.3		40	90.0		6	3.0		29	14.1	
Total	188	37.6		177	04.1		19	6.2		46	14.7	
Wealth index			0.000			0.998[§]			0.352[§]			0.854[§]
Poor	86	29.3		81	94.2		15	7.4		29	13.9	
Medium class	86	47.7		81	94.2		4	4.1		16	16.3	
Rich	16	72.7		15	93.8		0	0.0		1	16.7	
Total	188	37.6		177	94.1		19	6.2		46	14.7	
Required time to reach health facility			0.000[§]			0.167[§]			0.099[§]			0.000[§]
<30 minutes	108	31.3		99	91.7		10	4.3		23	9.7	
30-60 Minutes	70	55.1		69	98.6		6	10.6		16	28.1	
>60 to 90 minutes	1	33.3		1	100		0	0.0		1	50.1	
> 90 Minutes	9	36.1		8	88.9		3	18.8		6	37.0	
Total	188	37.6		177	94.1		19	6.2		46	14.7	

[§] *p value for likelihood ratio*

D. Postnatal care

In the study area out of 500 women of the postnatal period, 110 (22.0%) women sought at least one postnatal care in last one year preceding the study period. Out of the total postnatal care receivers, only 81(73.6%) women were served by skilled health workers (SBAs). Early postnatal care is crucial for reducing the maternal and neo-natal mortality. However out of total postnatal care seekers, only 70 (63.6%) women received postnatal care within 48 hours of childbirth in Kapilvastu district. According to World Health Organization, three or more postnatal care visits are considered as the ideal number of postnatal care visits (Carroli *et al* 2001, World Health Organization 2006). We found mean and standard deviation of number of visits 3.10 and 1.14 respectively. Out of the postnatal care seeker women 94 (85.5%) attended less than three postnatal visits. We found strong evidence of association with antenatal care visits and the utilization postnatal care services (Chi-square = 16.77, df = 1, $P<0.001$) women who had antenatal care visits were also more likely to utilize postnatal care services.

Out of 500 women, 62 (12.4%) suffered from various post-partum problems. Most common postpartum problems were postpartum haemorrhage (31.2%), puerperal sepsis (17.1%), postpartum depression (14.3%) and other problems i.e. the hypertension, clotting, mastitis, anemia, abdominal pain, weakness and poor lactation. The main causes of the low utilization of postnatal care services were: perceived unnecessary without having health problems 298 (60.8%), not allowed by family 82 (16.7%), long distance to the health facilities 28 (5.7%), transportation problem 27 (5.5%) and other

reasons i.e. the low quality of services, poor trust with providers and security concerns. Further detailed is given in the following tables (Table 20 and 21).

Table 20 Demographic characteristics of women and utilization of postnatal care services

Predictors	Postnatal care visits (n = 500)			Postnatal care by SBA (n = 110)			Time of first postnatal care visit within 48 hours (n = 110)			Postnatal care visits three or more (n = 110)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Age in Years			0.064			0.125[§]			0.000[§]			0.986[§]
<20 year	20	32.8		11	55.0		10	50.0		3	15.0	
20-35 year	84	21.1		65	77.4		60	71.4		12	14.3	
>35 year	6	15.0		5	83.3		0	0.0		1	16.7	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Age at marriage			0.006			0.064			0.667			0.816[§]
<20 year	85	19.9		59	69.4		55	64.7		12	14.1	
20 year or above	25	34.2		22	88.0		15	60.0		4	16.0	
Total	110	22.0		82	73.6		70	63.6		16	14.5	
Age difference with husband at marriage			0.325			0.745[§]			0.755[§]			0.862[§]
5 or less	102	21.6		76	74.5		64	62.7		15	14.7	
>5 year	8	29.6		5	62.5		6	75.0		1	12.5	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Age at first pregnancy			0.213			0.054			0.539			0.821
<20 year	59	20.1		39	66.1		36	61.0		7	15.3	
20 year or above	51	24.8		42	82.2		34	66.7		9	13.7	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Parity			0.000			0.209[§]			0.210			0.860[§]
1 to 2	72	30.1		54	75.0		50	69.4		10	13.9	
3 to 4	22	14.4		18	81.8		12	54.5		4	18.9	
5 or more	16	14.8		9	56.2		8	50.0		2	12.5	
Total	110	22.0		81	73.6		70	63.6		16	14.5	

Table 20 Continued …

Predictors	Postnatal care visits (n = 500)			Postnatal care by SBA (n = 110)			Time of first postnatal care visit within 48 hours (n = 110)			Postnatal care visits three or more (n = 110)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Birth spacing			0.282[§]			0.797[§]			0.534[§]			0.959[§]
<24 months	17	12.2		12	70.6		11	64.7		2	11.8	
24 to 36 months	18	15.5		15	83.3		8	44.4		3	16.7	
>36 to 60 months	18	19.8		13	72.2		11	61.1		3	16.7	
>60 months	5	26.3		4	88.0		2	40.0		1	20.0	
Total	58	15.9		44	75.9		32	55.2		9	15.5	
Native language			0.000			0.804			0.145[§]			0.940[§]
Nepali	31	41.9		22	71.0		23	74.2		5	16.1	
Awadhi	73	182		54	74.0		42	57.5		10	13.7	
Tharu	6	24.0		5	83.0		5	83.3		1	16.7	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Religion			0.352			0.061[§]			0.322[§]			0.568[§]
Hindu	91	22.5		75	76.0		65	65.7		15	15.2	
Muslim	11	17.5		5	45.5		5	45.5		1	9.1	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Caste/ethnicity			0.003[§]			0.259[§]			0.288[§]			0.497[§]
Dalit	5	26.3		2	40.0		3	60.0		0	0.0	
Disadvantaged Janajatis (tribal population)	8	17.0		5	62.0		6	75.0		2	25.0	
Disadvantaged non-Dalit Terai ethnic groups	74	19.5		55	74.0		43	58.1		10	13.5	
Advantaged castes	23	42.6		19	82.0		18	78.1		4	17.4	
Total	110	22.0		81	73.6		70	63.6		16	14.5	

[§] *p value for likelihood ratio*

Table 21 Socio-economic characteristics of women and utilization of postnatal care services

Predictors	Postnatal care visits (n = 500)			Postnatal care by SBA (n = 110)			Time of first postnatal care visit within 48 hours (n = 110)			Postnatal care visits three or more (n = 110)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Education status			0.000			0.748			0.090			0.860[§]
Illiterate	48	16.4		36	75.0		28	58.3		6	12.5	
≤10 year schooling	32	21.3		22	68.8		18	56.2		5	15.6	
>10 year schooling	30	51.7		23	76.7		24	80.2		5	16.7	
Total	110	22.0		81	73.6		81	63.6		16	14.5	
Education status of husband			0.001			0.642[§]			0.283			0.753[§]
Illiterate	17	16.2		11	64.7		12	70.6		2	11.8	
≤10 year schooling	54	19.0		40	74.1		37	68.0		7	13.6	
>10 year schooling	39	35.0		30	76.9		21	53.8		7	17.9	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Occupation			0.393[§]			0.351[§]			0.308[§]			0.345[§]
Agriculture or own business	26	23.6		17	65.4		13	58.0		4	15.4	
Service	4	44.4		3	75.0		3	75.0		0	0.0	
Wages or migrant worker	6	26.1		3	50.0		5	83.3		0	0.0	
Housewife	74	20.7		58	78.0		49	66.2		12	16.7	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Occupation of husband			0.001			0.002[§]			0.242			0.469[§]
Agriculture or own business	54	16.8		44	81.5		32	59.3		10	18.5	
Service	17	37.8		15	88.2		11	64.7		3	17.6	
Overseas employee	24	31.2		17	70.8		14	58.3		2	8.3	
Wages or migrant worker	15	26.3		5	33.3		13	86.7		1	6.7	
Total	110	22.0		81	73.6		70	63.6		16	14.5	

Table 21 Continued …

Predictors	Postnatal care visits (n = 500)			Postnatal care by SBA (n = 110)			Time of first postnatal care visit within 48 hours (n = 110)			Postnatal care visits three or more (n = 110)		
	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value	No.	Per cent	p value
Decision-making for health care			0.000[§]			0.150[§]			0.166[§]			0.426[§]
Independently	25	25.0		1	50.0		1	50.0		1	50.0	
Jointly	73	36.0		58	79.5		51	69.9		11	15.1	
Dependent	35	14.1		22	62.9		18	51.4		6	11.4	
Total	110	22.0		81	73.6		70	63.6		16	14.5	
Wealth index			0.022[§]			0.322[§]			0.642[§]			0.327[§]
Poor	54	18.4		37	68.5		32	59.0		7	13.0	
Medium class	47	25.5		38	80.9		32	68.1		6	12.8	
Rich	7	40.9		6	66.7		6	66.7		3	33.3	
Total	110	22.0		81	73.6		70	63.3		16	14.5	
Required time to reach health facility			0.000[§]			0.551			0.434[§]			0.827[§]
<30 minutes	65	18.6		46	70.8		39	60.0		10	15.4	
30-60 Minutes	44	34.6		34	77.3		30	68.2		6	13.6	
>60 to 90 minutes	0	0.0		0	0		0	0		0	0.0	
> 90 Minutes	1	4.0		1	100.0		1	100.0		0	0.0	
Total	110	22.0		81	73.6		70	63.6		16	14.5	

[§] *p value for likelihood ratio*

4.3 Women's autonomy and factors associated with it

We measured women's autonomy using the scale developed by us. We collected the demographic and socio-economic information about respondents using structured interview schedule. The mean score of women's autonomy was found 23.34± 8.06 out of a maximum possible score of 48. The mean scores of the various dimensions of women's autonomy are shown in the following figure (Figure 13). Following tables 22 and 23 show results of cross tabulation between women's autonomy score and the selected demographic and socio-economic predictors using one-way ANOVA test.

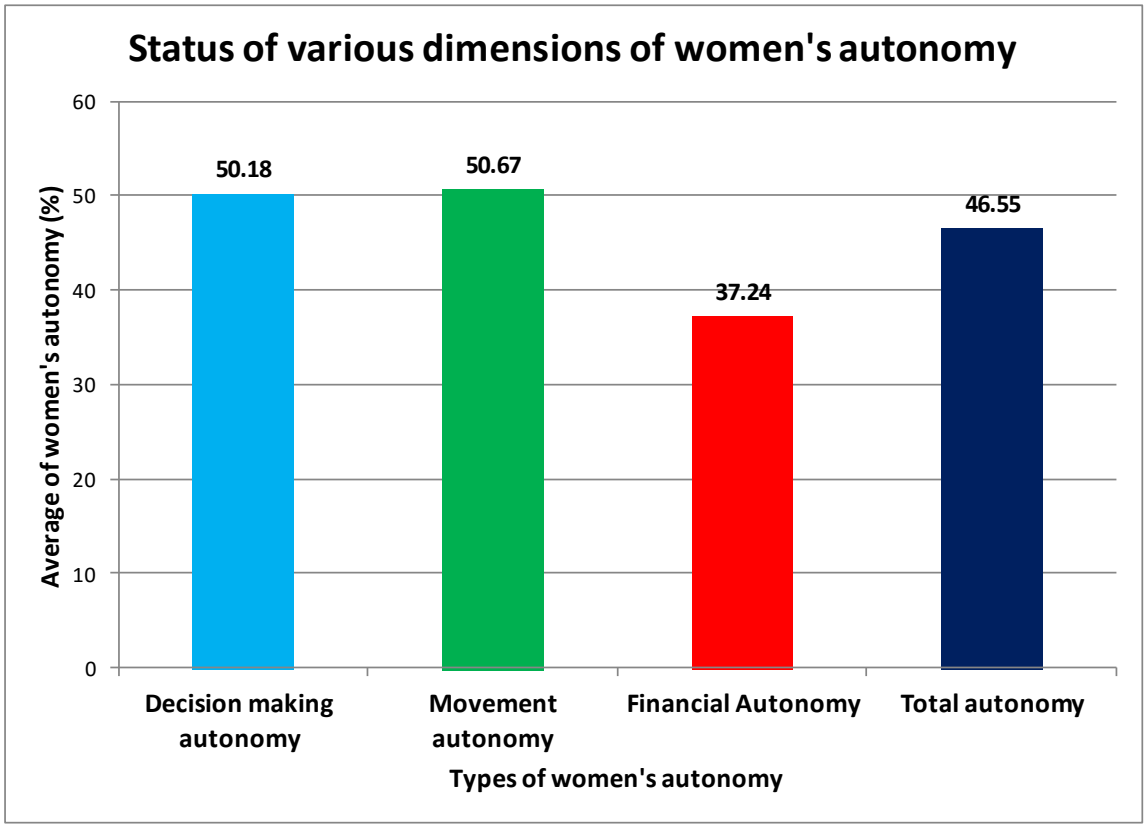

Figure 13: Average score of various dimensions of women's autonomy

Table 22 Demographic characteristic of women and their autonomy (n = 500)

Predictors	No. women	Per cent	Mean± SD of sum score of women's autonomy	P value
Age in Year				0.73
<20 year	61	12.2	21.57±7.93	
20-35 year	399	79.8	22.44±7.94	
>35 year	40	8	22.53±9.41	
Total	500	100	22.34±8.05	
Age at marriage				<0.05*
<20 year	427	85.4	22.04±7.98	
20 year & above	73	14.6	24.12±8.33	
Total	500	100	22.34±8.05	
Age difference at marriage				<0.001***
5 or less	473	94.6	22.05±7.80	
>5 year	27	5.4	27.41±10.57	
Total	500	100	22.34±8.05	
Age at first pregnancy				<0.05*
<20 year	294	58.8	21.65±8.00	
20 year & above	206	41.2	23.34±8.04	
Total	500	100	22.34±8.05	
Parity				0.135
1 to 2	239	47.8	22.93±7.90	
3 to 4	153	30.6	22.20±8.34	
5 or more	108	21.6	21.12±7.89	
Total	500	100	22.34±8.05	
Birth spacing (n = 365)				<0.05*
<24 months	139	39.04	20.68±8.71	
24 to 36 months	116	32.58	22.90±7.05	
>36 to 60 months	91	25.56	21.80±7.76	
>60 months	19	5.34	26.10±8.04	
Total	365	100	21.95±8.03	
Native language				<0.001***
Nepali	74	14.80	28.45±7.68	
Awadhi	401	80.20	21.02±7.60	
Tharu	25	5.00	25.56±7.20	
Total	500	100	22.34±8.05	
Religion				<0.05*
Hindu	437	87.40	22.67±8.11	
Muslim	63	12.60	20.03±7.32	
Total	500	100	22.34±8.05	
Caste/ethnicity				<0.001***
Dalit	19	3.80	21.74±12.80	
Disadvantaged Janajatis (tribal population)	47	9.40	23.80±7.83	
Disadvantaged non-Dalit Terai ethnic groups	380	76.00	21.15±7.52	
Advantaged castes	54	10.80	29.67±5.54	
Total	500	100	22.34±8.05	

[*] *One-way ANOVA test exact significant, [*] p value significant at <0.05, [***] p value significant at <0.001*

Table 23 Socio-economic characteristic of women and their autonomy (n = 500)

Predictors	No. women	Per cent	Mean± SD of sum score of women's autonomy	P value
Education status				<0.001***
Illiterate	192	38.40	20.64±7.42	
< 10 year schooling	150	30.00	22.83±8.36	
>10 year schooling	58	11.60	29.66±5.85	
Total	500	100	22.34±8.05	
Education status of husband				<0.001***
Illiterate	105	21.00	21.13±7.90	
< 10 year schooling	284	56.80	21.33±33	
>10 year schooling	111	22.20	26.06±8.32	
Total	500	100	22.34±8.05	
Occupation				0.147
Agriculture or own business	110	22.00	21.06±9.43	
Service	9	1.80	26.22±9.72	
wages or migrant worker	23	4.60	22.30±8.20	
Housewife	358	71.60	22.64±7.50	
Total	500	100	22.34±8.05	
Occupation of husband				<0.001***
Agriculture or own business	321	64.20	21.34±8.16	
Service	45	9.00	28.67±6.22	
Overseas employee	77	15.40	22.43±7.03	
Wages or migrant worker	57	11.40	22.89±7.90	
Total	500	100	22.34±8.05	
Wealth index				<0.01**
Poor	294	58.80	21.49±7.93	
Medium class	184	36.80	23.18±8.21	
Rich	22	4.40	26.68±6.26	
Total	500	100	22.34±8.05	

[*] *One-way ANOVA test exact significant, [**] p value significant at <0.01, [***] p value significant at <0.001*

From the cross-tabulation, it was clear that the major influences on women's autonomy were socioeconomic status including the ethnicity, women's education and husband's education. Age and parity also seemed to influence autonomy. Autonomy, in turn, is crucial in the choice of antenatal care, place of delivery care and postnatal care. Hence, we constructed a conceptual framework.

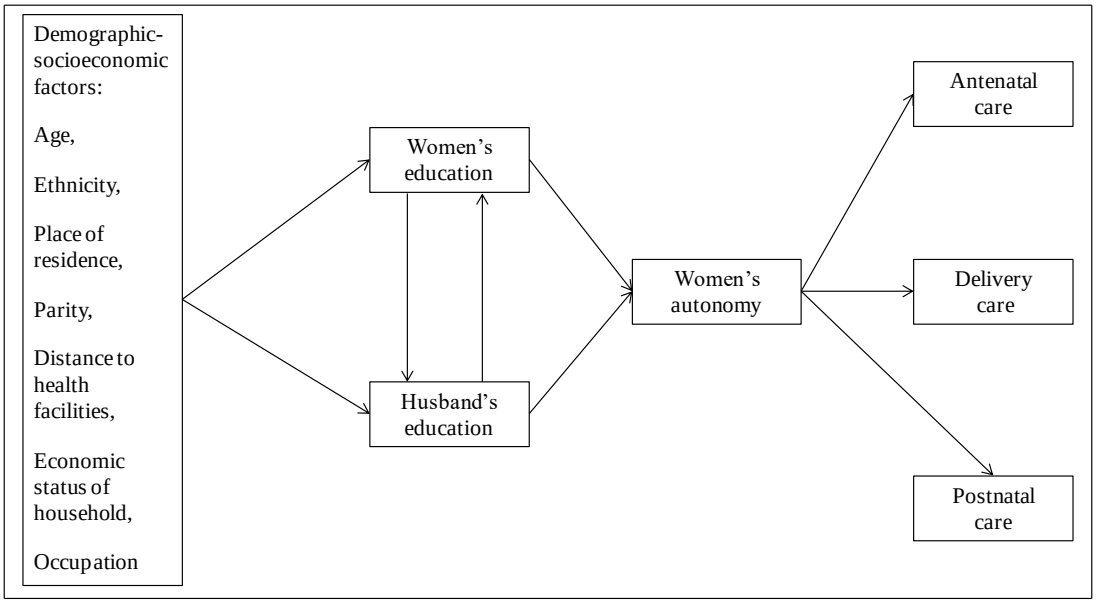

Figure 14: Conceptual pathway of the utilization of maternal health care services

We chose women's education, husband's education and socioeconomic status to build multivariate models for predicting the utilization of maternal health care. We found strong direct effect of women's education (OR = 8.14, CI = 3.77–17.57), husband's education (OR = 2.63, CI = 1.69–4.10) and socio-economic status of the household (OR = 1.42, CI = 1.01–2.03) on women's autonomy. When we adjusted women's education for husband's education, the odds ratio decreased around 22% [from (OR = 8.14, CI = 3.77–17.57) to (OR = 6.32, CI =2.77 - 14.46)] (table 24). However, women's education

and women's education were also highly associated each other (Likelihood ratio = 16.77, df = 25, P<0.001).

Table 24 Influence of women's education, husband's education and socio-economic status of household on women's autonomy

Variables	Model I*			Model II**			Model III***		
	OR	95% C.I. for OR		OR	95% C.I. for OR		OR	95% C.I. for OR	
		Lower	Upper		Lower	Upper		Lower	Upper
Women's education status									
Illiterate or less than ten years schooling	Ref.			Ref.			Ref.		
Ten years or more schooling	8.14	3.77	17.57	6.32	2.77	14.46	6.35	2.76	14.58
Husband's education status									
Illiterate or less than ten years schooling				Ref.			Ref.		
Ten years or more schooling				1.50	0.91	2.49	1.51	0.90	2.55
Economic status of household									
Low							Ref		
High							0.98	0.67	1.44

* *Model I – Respondent's education and women's autonomy*

** *Model II – Respondent's education and husband education, and women's autonomy*

*** *Model III – Respondent's education, husband' education and economic status of household, and women's autonomy*

4.4 Influence of women's autonomy in utilization of maternal health care services

From previous analysis, women's education and husband's education were found as key predictors of the utilization of maternal health care services. We further wanted to assess whether women's education and husband's education has an effect on the utilization of maternal health care services independently or through women's autonomy. To bring out the complex interaction of women's autonomy, women's education and husband's education on the utilization of maternal health care services, we constructed the series of multiple logistic regression models. We chose institutional delivery care as outcomes, because this is definitive and least likely to be misclassified.

Since there is a strong collinearity between women's education and husband's education, we decided to treat husband's education as a stratifying variable. We created two sets of multivariable logistic regression models: one in the stratum with husband's education illiterate or <10 years and another in the stratum with husband's education ≥10 years. The institutional delivery care was outcome variable; the predictors were women's education, age and autonomy (categorized into 'high' and 'low'). Our interest was to assess how far the effect of women's education was mediated through her autonomy on the utilization of institutional delivery care services (Table 25).

Table 25 Women's education, age and autonomy, and utilization of institutional delivery care services with reference to husband's education

Variables	Model I*			Model II**			Model III***		
	OR	95% C.I. for OR		OR	95% C.I. for OR		OR	95% C.I. for OR	
		Lower	Upper		Lower	Upper		Lower	Upper
Stratum 1: husband's education less than ten years schooling									
Women's education									
Illiterate or less than ten years schooling	Ref.			Ref.			Ref.		
Ten years or more schooling	11.98	2.58	55.57	9.66	2.05	45.59	9.06	1.91	42.94
Age of women				0.96	0.93	1.01	0.96	0.92	1.01
Women's autonomy									
Low							Ref		
High							1.34	0.86	2.08
Stratum 2: husband's education ten years or more schooling									
Women's education									
Illiterate or less than ten years schooling	Ref.			Ref.			Ref.		
Ten years or above schooling	24.49	6.85	87.56	22.60	6.28	81.32	13.53	3.54	51.72
Age of women				0.95	0.85	1.05	0.91	0.81	1.03
Women's autonomy									
Low							Ref		
High							6.75	2.30	19.93

* *Model I – Respondent's education*

** *Model II – Respondent's education and age*

*** *Model III – Respondent's education, age and women's autonomy*

What this table seems to suggest is that when the husband is not educated, women's education works independent of the effect of her autonomy, and is a dominant influence. Adding autonomy to the model does not make a difference. On the other hand, when the husband is educated, women's education seems to work partly through autonomy since by adding autonomy to the model, around 40% of the effect is explained by autonomy [(22.6-13.5)/22.6].

CHAPTER 5
DISCUSSION

CHAPTER 5
DISCUSSION

5.1Summary of the discussion

The findings of this study show that the overall women's autonomy as measured in the study was low at the household level. We found various demographic and socioeconomic characteristics of women to be positively associated with their autonomy and the utilization of maternal health care services. We further found women's autonomy to mediate the influence of demographic and socio-economic factors in the utilization of maternal health care services. Women's education, husband's education and economic status of the household were key predictors of women's autonomy and the utilization of maternal health care services. However, husband's education had an indirect effect on the utilization of maternal health care services through women's autonomy. Improvement of education and economic status of women and households would be among the effective strategies for increasing their autonomy at the household and the utilization of maternal health care services.

5.2 Scale to measure women's autonomy

One objective of this study was to construct and validate a scale for measuring women's autonomy with relevance to Nepal. For assessing women's autonomy, most prior studies focused on the demographic and socio-economic characteristics of women. With the shifting paradigms, most recent social researchers emphasize women's ability to

influence the decision-making, control economic and physical resources, freedom of movement, and reproductive rights (Bloom *et al* 2001, Jejeebhoy 2002, Saleem and Bobak 2005). We developed and tested a scale to measure autonomy in women. It is mainly focused on decision making autonomy, financial autonomy and movement autonomy of the women.

For assuring the internal consistency of the scale, most studies used Cronbach's Alpha (Bloom *et al* 2001) and Pearson's correlation (Silverman *et al* 2001). Both Cronbach's Alpha and Pearson's correlation support our scale. Similarly, for assuring the validity of the new scale, face validity and content validity (ratio, index and kappa value) are common psychometric characteristics (Randolph, J. J. 2008, Silverman *et al* 2001). Face validity, content validity ratio, content validity index and multirater-kappa values were acceptable which show good validity of the scale.

The exploratory factor analysis confirms a smaller number of constructs from a large number of observed items (Worthington and Whittaker 2006, Brown 2009). The total items variance, *KMO and Bartlett's test,* communalities- initial and extraction, and the coefficient of the loaded items are major determinants for appraising the convergent and discriminant validity (Silverman *et al* 2001, Simpson and Gangestad 1991). From exploratory factor analysis we found good convergent and discriminant validity of our scale where average coefficient values of each factor were acceptable. It also shows good construct validity of the scale.

Construct validity analysis is the best way for validating a new scale. It is a new concept in research where researchers compare the outputs of their scale with outputs of other similar established scales (Upadhyay *et al* 2014). We did not find any comparable standard scales, so, we tested convergent and discriminant validity for assuring the construct validity of the scale where all five factors of the scale had single loading items by suppressing absolute coefficient value less than 0.45 and average coefficient value more than 0.60 of each factor. Most researchers considered average coefficient value 0.6 or more as cutoff point to assess the convergent validity and loading status of items into factors by suppressing absolute value 0.40 or more to assess the discriminant validity of the scale (Simpson and Gangestad 1991). The psychometric characteristics of the scale assured us that it has good capacity to measure three dimensions of women's autonomy i.e. decision-making autonomy, financial autonomy and freedom of movement. It furthermore classified the dimensions of women's autonomy into five factors considering the major and minor roles of women in decision-making as well as practicing of their autonomy at the household level. We finalized the new scale by confirming its psychometric characteristics.

5.3 Utilization of maternal health care and factors associated with it

One objective of this study was to assess the utilization of maternal health care services and its associated factors in Kapilvastu district, Nepal. The findings show that having at least one antenatal care, institutional delivery care, and at least one postnatal care were positively associated with the most demographic and socioeconomic factors. The

Government of Nepal pursued various programmes of maternal health care services aggressively to reduce the high maternal and neonatal morbidity and mortality particularly pregnancy related deaths (Witter *et al* 2011). Various maternity incentives and programmes were introduced nationwide since 2005 for increasing the utilization of maternal health care services. Primarily, many programmes focused on free care of deliveries, fixed cash transfers to women giving birth in the health facility, fixed financial incentive to health service provider for each delivery attended either at home or in the health facility and for completing four antenatal care visits (Bhandari and Dangal 2012, Witter *et al* 2011). In spite of various efforts still a large number of women were unaware of many maternal health care incentives such as cash-transfer for the institutional delivery, skilled care providers and right health facilities for maternal health care services in Kapilvastu district. Most women had no easy access to information on maternal health care incentives and services. Female community health volunteers were the main source about information of the maternal health care services.

Recommended numbers and timing of antenatal care visits should facilitate to identify and prevent the adverse outcomes of pregnancy. World Health Organization recommends at least four antenatal care visits with the first visit should be held in the first trimester of pregnancy (Carroli *et al* 2001, World Health Organization 2006). In Kapilvastu district, nearly half of the women had their first antennal care visit in the first trimester of their pregnancy. Out of the total participants, just more than one-third of women knew about the incentive for four antenatal care visits from FCHVs, health

workers and mass media. The Government of Nepal provides 400 Nepalese rupees (3.78 US Dollar) as cash-incentive to women who complete four or more antenatal care visits and seek institutional delivery care. It further indicates the need of health promotion and awareness programmes for increasing the utilization of antenatal care incentives as well as services.

Antenatal care services impart preventive, diagnostic and management services for pregnancy and its complications. It is most essential to promote skilled care at childbirth as well as in the postnatal period. Moreover, it is supposed to prepare pregnant women and their family for delivery and EmOC, and maximize the utilization of more components of antennal, natal and postnatal care services (Conrad *et al* 2012, Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012). Although a study from 1999 to 2000 estimated that maternal mortality can be minimized by at least 50% in developing countries, particularly in south east Asia by providing recommended care services at appropriate times and numbers the relative contribution of antenatal care is difficult to assess (Brouwere and Leberghe 2001).

Poor access to maternal health care services, cost of the services, shortage of the skilled human resources, strong traditional socio-cultural practices were found to be associated with the low utilization of maternal health care services in Nepal (Bhandari and Dangal 2013). Despite the high utilization of antenatal care services in Kapilvastu district, women were found less adherent to timing of the first antenatal care visit and the minimum required number of antenatal care visits. Many demographic-socioeconomic

factors and level of women's autonomy associated positively with the utilization of antenatal care services. The utilization of maternal health care services was found to be positively associated with the demographic and socio-economic factors. It also correlated with availability, accessibility and affordability of the health services including individual characteristics of health care seekers and providers (Chandhiok *et al* 2006, Hossain 2010).

Every pregnant woman is at risk of obstetric complications. Out of the total maternal deaths, nearly 10% women die every year globally by the prolonged obstructed labor. Childbirth practice is considered as safe when it is attended by a skilled birth attendant either in the health facility or at home (AbouZahr 2003, Say and Raine 2007, Bhandari and Dangal 2013). Previous studies show that most complications occurred during labor and delivery. All the complications cannot be predicted by prenatal screening as well. Every pregnant woman needs access to health facilities with capabilities to provide emergency obstetric care (Khan *et al* 2006, Rooks *et al* 1990).

The major determinants of delivery practices are classified as socio-cultural factors, perceived benefit of services, economic factors, physical factors and health system factors in low resource countries. These factors associated positively with the utilization of normal delivery care services as well as care of obstetric complications (Thaddeus and Maine 1994, Gabrysch and Campbell 2009). Women's education, behaviour of health providers, economic status of the household, exposure to the mass media and other socio-cultural factors were found to be positively associated with use of maternal health

care services in Nepal (Sharma *et al* 2007). The findings of this study show the comparable situation where women's age difference with her spouse being more than five years at marriage, advantaged castes, and better education of couple, occupation of the husband, economic status of the household and women's autonomy were found to be positively associated with institutional delivery practices. However, in care of obstetric complication, it is hard to estimate the role of socio-economic and physical factors like the economic condition of the household and distance to the health facility (Thaddeus and Maine 1994, Gabrysch and Campbell 2009).

Postnatal care is one of the major components of maternal health care which facilitates establishment and continuation of contact with a number of health care services. Furthermore, early postnatal care is crucial to promote health practices such as exclusive breast feeding for the neonate and supplementary foods for the child, and family planning. Prior studies show that the utilization of postnatal care services was lower than antenatal care and delivery care services in Nepal, and where it was available quality was often substandard (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012, Dhakal *et al* 2007). This study shows a similar situation and trend in Kapilvastu district where utilization of at least one postnatal care service was low (22.2%) than the average national utilization (46%) of the same service.

In developing countries, postnatal care was mostly associated with maternal age, education, parity, economic status of the household, antenatal care visits, the place of delivery (Neupane and Doku 2013, Sines et al 2007), even though it varied with the

place of residence, socio-economic status, religion and ethnicity. These studies also supports our findings where women's age more than 20 years, parity below three, some advantaged castes, better educational status of couple, occupation of the husband, economic status of the household and women's autonomy were found to be positively associated with at least one postnatal care visit in Kapilvastu district.

Financial barrier is one of the major causes of the low utilization of institutional delivery care and other maternal health care services in low resource countries. For addressing the financial barrier and encouraging women and their family for the utilization of maternal health care services, many countries and international agencies started various maternal health care incentives including conditional cash transfers programme since 1990's and onward. Conditional cash transfer is a successful strategy to increase the utilization of institutional delivery care services in many developing countries such as Janani Suraksha Yojana in India, voucher programme in Bangladesh, conditional cash transfers programme in Mexico, conditional cash transfers programme in many Latin American countries and some of African and Asian countries (Randive *et al* 2013, Nguyen *et al* 2012, Sosa-Rubí *et al* 2011, Titaley *et al* 2010). The Government of Nepal launched a 'Safe Delivery Incentive Programme' and other maternal health care incentives since 2005 onward. Among various incentives, conditional cash transfers programme and free delivery care services are successful programmes in Nepal which have been attracting many pregnant women for institutional delivery care. Despite various efforts, institutional delivery care/skilled care at birth is not enough to address

the target of Millennium Development Goal Five in Nepal (Powell-Jackson *et al* 2009, Witter *et al* 2011, Powell-Jackson and Hanson 2012). Our findings in Kapilvastu district also match with these results where institutional delivery is still low.

The overall utilization of maternal health care services is still low in Nepal. Various factors hinder the utilization of different aspects of maternal care i.e. antenatal care, delivery care and postnatal care (Sharma *et al* 2007). The findings of this study show a similar situation in Kapilvastu district where the overall utilization of maternal health care services was below the national average of the utilization of maternal health care services.

5.4 Women's autonomy and factors associated with it

One objective of this study was to assess women's autonomy and associated factors in Kapilvastu district, Nepal. The findings show that overall women's autonomy status was low in Kapilvastu district. However decision-making autonomy and freedom of movement autonomy scored better than financial autonomy of women. It varied with the demographic characteristic and socio-economic status of women. We found significant association with women's autonomy and some selected demographic and socio-economic factors.

Autonomy is an individual's capacity and varies from person to person. It may influence socioeconomic and demographic characteristics of individuals and resulting outcomes. It may manipulate one's personal environment through control over physical and financial

resources and information to make individual as well as at the household level decision-making process. Thus, women's autonomy should be conceptualized as their capacity to negotiate and make a decision according to their needs and wishes. It may persuade women to practice their fertility rights and the utilization the maternal health care service (Bloom *et al* 2001, Jejeebhoy 1991).

Women's autonomy correlated with their age, education, occupation, income, single family, closer ties to natal kin in most developing countries (Bloom *et al* 2001, Jejeebhoy and Sathar 2001). A study in India and Pakistan shows that Hindu Indian women had higher autonomy compared to Islamic Pakistani women (Jejeebhoy and Sathar 2001b). Most prior studies focused on women's age, age at marriage, age difference at marriage, parity, birth order, birth spacing, ethnicity, religion, place of residence and family structure. Some studies included education and occupation status of the couple, economic status of the household, women's property-right, laws which discriminated against women, policies and programmes, and political factors (Abramsky *et al* 2011, Jejeebhoy and Sathar 2001, Bloom *et al* 2001).

Women's autonomy is a broad as well as complex term which has a contextual meaning. Despite various efforts for enhancing women's autonomy in developing countries, many women are deprived of their capacity in decision-making in their household affairs as well as social issues (Makinwa-Adebusoye and Jensen 1995, Malhotra and Schuler 2005). The findings show that most socio-economic factors associated positively with their autonomy at the household level.

A study in Eritrea shows that women's decision making autonomy at the household and spousal communication were positively associated with preference for fertility and use of contraceptive methods. It further shows that many explanatory variables i.e. economic status of household and employment had a strong independent influence on fertility preferences and ever-use of the contraception in spite of a woman's autonomy (Woldemicael and Tenkorang 2010). Similarly, education of women, education of husband, age at marriage, marital duration, type of marriage (love marriage), number of children and membership in self-help-group were significantly associated with women's autonomy at the household level in India (Gunasekaran 2010). Our findings show that women who had improved socio-economic characteristics were more likely to enjoy relatively higher autonomy at the household level and utilize maternal health care services. A study in Nairobi shows that the better economic and education status of women were strongly associated with overall women's autonomy, decision making and movement autonomies were rather weak (Fotso *et al* 2009).

In Kapilvastu district, woman's education, husband's education and economic status of the household were found as key predictors of the utilization of maternal health care services among the several demographic and socio-economic variables. We assess whether women's education influences their autonomy independently or interacts with other factors. Woman's education was found to be a key predictor of women's autonomy at the household level. Husband's education and economic status of the household were other important mediating factors of the pathways. It indicates that woman's education,

husband's education and economic status of the household play a vital role for improving the women's autonomy in Kapilvastu district. However, education does not necessarily increase women's autonomy if other traditional socio-cultural factors remain strong in the society (Jejeebhoy and Sathar 2001). Similarly, a study in Nepal shows that the efforts to address socio-economic issues such as low women's education, low social status, poor income and unemployment were found to be important for improving the women's autonomy as well as the utilization of maternal health care services (Furuta and Salway 2006).

5.5 Influence of women's autonomy in utilization of maternal health care services

One objective of this study was to examine the role of women's autonomy as a mediating factor in the utilization of maternal health care services using the new scale in Kapilvastu district of Nepal. There is strong positive association with women's education and the utilization of maternal care services. We wanted to explore whether women's education is acting independently or through its effect on women's autonomy. We found that this pathway differs in the two social strata identified by husband's education. When husband's education is low, the odds ratio for women's education, which was 9.66 in the model without women's autonomy, is hardly changed (9.06) when autonomy is included in the model. This indicates that in households with low social status, the most important key predictor for the improved utilization of maternal care services is the woman's educational status. Autonomy of the women hardly seems to

make a difference: this could be because the levels of women's autonomy may not vary much among these women. In the households with high social status indicated by high level of education for the husband, the odds ratio for women's education, which is 22.6 in the model without the term for women's autonomy, reduces to 13.5 when autonomy is introduced into the model. This indicates that around 40% [(22.6-13.5)/22.6], of the effects of woman's education can be attributed to her autonomy in decision-making. There is more variability in the expression of woman's autonomy in households of higher socio-economic status. Thus both the woman's and the husband's educational status has a strong positive effect on the utilization of maternal health care services, irrespective of whether the woman has decision making power; however, this may give her an additional advantage which cannot be ignored.

The concept of autonomy starts to act only when the education and other socio-economic conditions of the woman are better. A study in Nairobi shows that the influence of women's autonomy on the utilization of maternal health care services among poor women was weak. However, women's better economic status and education were associated with the place of delivery and their overall autonomy. It further showed that women's autonomy was not a major mediator between women's education and utilization of institutional delivery care services (Fotso *et al* 2009). This is somewhat contradictory to what we found.

Prior studies showed that women's autonomy is one of the major determinants for seeking skilled care at birth and other maternal health care services. Low women's

autonomy at household level is considered as a major block in increasing the utilization of maternal health care services in the developing countries. Autonomy is a relative term which is determined by various factors such as demographic factors, socio-economic factors, cultural factors and so forth (Thapa and Niehof 2013, Tuladhar 1997, Sharma *et al* 2007). In Kapilvastu district, the mean score of women's autonomy was 23.34±8.06 out of the total maximum possible score 48. There was low utilization of safe delivery care services compared to the national average utilization of the same services (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012). A study in north India shows that higher freedom of movement was to be found positively associated with the utilization of maternal health care services (Bloom *et al* 2001).

In Nepal, the proportion of skilled care at birth varied by residence, socioeconomic status, geographical regions, educational status, age and parity of the women. Nearly three-quarters of women in urban areas, one-third in semi-urban areas and one-fifth in rural areas attended health facilities for their delivery respectively (Shrestha *et al* 2012). We had a similar finding where women's education was one of the key predictors of the utilization of maternal health care services.

Unsafe delivery practice is one of the major causes of maternal mortality in Nepal (Suvedi *et al* 2009). Government started focused programmes such as safe delivery care programmes for promoting safe delivery care throughout the country. Government formulated National Skilled Birth Attendants Policy, Safe Motherhood and Neo-natal Health Long Term Plan, National Free Delivery Care Policy to assure the various safe

delivery incentives. Since, the middle of 2009, the government integrated different safe delivery care incentives as a safe delivery care package (Ensor *et al* 2009, Powell-Jackson and Hanson 2012, Bhandari and Dangal 2012). Regardless of various efforts, we found high proportion of home deliveries and low utilization of safe delivery kit for home deliveries in Kapilvastu. Both home delivery and use of SDK had inverse relation with women's autonomy and socio-economic factors.

Multivariate shows that the utilization of at least one antenatal care and postnatal care visit had significant association with women's education and these variables. We also observed mediation effect of husband's education and women's autonomy on the utilization of antenatal and postnatal care service. Prior studies show that autonomy had influence on the utilization maternal health care services in low resource countries through couple's education, occupation and economic status of the household (Thaddeus and Maine 1994, Gabrysch and Campbell 2009). It supports our findings in Kapilvastu district strongly.

Other studies on women's autonomy and utilization of antenatal care services in Nepal and other developing countries revealed the shared effects of women's autonomy and socio-economic factors on the utilization of antenatal care services (Simkhada *et al* 2008, Navaneetham and Dharmalingam 2002, Mullany *et al* 2007). A study in the rural context of India shows that the association with women's autonomy and the utilization of pregnancy care services varied across the country. South Indian women reported high autonomy. They were more likely to utilize maternal health care services compared to

North and East Indian women where women's education status was also higher than the North Indian women (Mistry *et al* 2009).

Early postnatal care visit is a crucial dimension of maternal health care services for reducing maternal and neonatal deaths (Paudel *et al* 2013). The findings of this study indicate that there were many challenges in increasing the utilization of postnatal care services in Kapilvastu district. The root cause of the low utilization of postnatal care services in Kapilvastu district was the poor perceived need of postnatal care services. Most women considered postnatal care as unnecessary unless having postpartum problems. It further indicates the need of education to increase the utilization of postnatal care services.

Women's autonomy is associated to ranging degrees with the utilization of maternal health care services in most developing countries. Autonomy has contextual meaning and its assessment may differ from one community to another. However, women's education, husband's education and economic status of the household were found as major predictors of the utilization of maternal health care services where autonomy was a mediating factor of the pathways. It was also supported by the best success stories of some countries such as Sri-Lanka, Thailand, Malaysia where they are focusing on enhancing socio-economic status of women and succeeding in improving the utilization of maternal health care services. Women's education and other socio-economic conditions of women should be considered as cross-cutting issues in long term health policies and programmes as well as other development plans of Nepal.

5.6 Strengths of the study

According to human development index, the study site falls into low performance districts of western development region of Nepal (Ministry of Health and Population [Nepal], New ERA, and Macro International Inc. 2012). All findings of the study are based on the primary information. The findings of this study aid in identifying and relating the factors associated with the utilization of maternal health care services and their relation to women's autonomy in Kapilvastu district. We have constructed and validated a new scale and developed a conceptual framework which may bridge the literature gap to some extent for assessing women's autonomy and its role in the utilization of maternal care services in developing countries, particularly in Nepal. The study also to some extent explored the existing status of the MGD Five. It may facilitate the policy makers and planners to prioritize their intervention programmes on maternal health care in future.

5.7 Limitations of the study

Despite the number of strengths, the study was based on the reported information which was obtained from women and to some extent from their husbands and other immediate family members. We involved three enumerators for data collection. So, there was chance of inter-raters bias in the measurement. Hence, it needs further empirical assessment for precise measurement of the women's autonomy and the utilization of maternal health care services. This study covered only maternal health care out of the range of reproductive health issues of women in developing countries. We used a single

measurement scale in whole Kapilvastu district for assessing the women's autonomy which may not measure precisely considering the heterogeneous nature of the district. The study was focused on only the quantitative dimensions of women's autonomy as well as the utilization of maternal health care services. Women's autonomy and health seeking behaviours of people are complex subjects. Therefore, it may also require more qualitative studies for further precise assessment.

5.8 Areas for future research

We found very few tools for assessing the women's autonomy either at the household level or in community in Nepal. Considering the literature gap, we constructed and validated a new scale for measuring women's autonomy with relevance to developing countries, particularly Nepal. We also developed a conceptual framework for assessing the association with the demographic-socioeconomic factors, women's autonomy and the utilization of maternal health care services. We recommend these tools for further use and validation in the large heterogeneous sample for assuring the performance in other settings. From literature review, furthermore, we conclude that there is a gap in the literature on cultural and political aspects of women and the utilization of maternal health care in Nepal. We further suggest quantitative as well as qualitative studies with reference to cultural and political issues of women's health and rights for exploring women's autonomy status and underlying causes of the low utilization of maternal health care services in Kapilvastu district.

CHAPTER 6
SUMMARY AND CONCLUSIONS

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6.1 Summary of the findings

The study focused on assessing women's autonomy and its influence on the utilization of maternal health care services in Kapilvastu district, Nepal. We constructed and validated a new scale to assess women's autonomy. The overall autonomy of women and the utilization of maternal health care services were found low in Kapilvastu district. Some demographic and socioeconomic factors were associated with their autonomy and the utilization of maternal health care services. Among several predictors, women's education, husband's education and economic status of the household were strong predictors of the utilization maternal health care services. Women's autonomy was found as a mediating factor of pathways of the utilization of maternal health care services. The major findings are summarized as follows-

- We developed and tested a 23 item scale with three-point Likert-type scoring. It is a suitable tool for assessing women's autonomy with reference to Nepal and other developing countries which has good psychometric characteristics.
- The overall utilization of maternal health care services was low in Kapilvastu district. However, the utilization proportion of antenatal care services was higher compared to institutional delivery care and postnatal care services.

- The utilization of antenatal care services had positive association with institutional delivery care and postnatal care services in Kapilvastu district. Just more than one-third women delivered their last child in health facilities.
- Out of the total institutional deliveries, nearly two-thirds women visited the health facility for the self-reported emergency delivery care. A few home deliveries were assisted by health workers and some households used safe delivery kit for the home delivery care.
- The utilization of maternal health care services had positive association with most demographic and socio-economic factors.
- The overall women's autonomy status was low in Kapilvastu district. It had positive association with most demographic and socio-economic factors.
- Among several factors, women's education, husband's education and economic status of the household had a strong positive effect on women's autonomy. Husband's education and socio-economic status of the household were positively associated with women's autonomy.
- Women's education had strong positive association with institutional delivery care. The study further showed that when the husband is not educated, women's education works independently of the effect of her autonomy, and is a dominant influence. On the other hand, when the husband is educated, women's education seems to work partly through her autonomy.

6.2 Implication of the findings

- We have developed a new scale for measuring the women's autonomy at the household level. This is a validated scale for measuring women's autonomy with relevance to the utilization of maternal health care services in developing countries, particularly in Nepal.

- The findings of the study communicate the situation of a particular plain district of Western Nepal. However, these results may represent most rural communities of other plain districts of Nepal. The findings should provide strong evidence for policy-makers, planners and various level implementation managers to focus on the associated factors of the high maternal morbidity and mortality, and low utilization of maternal health care services.

- We constructed a new conceptual framework considering the relationship of demographic-socioeconomic factors and women's autonomy with the utilization of maternal health care services. It is a useful tool for assessing the health policies, programmes and the utilization of maternal health care services.

- The study further showed the precise achievement of selected indicators of MDG five which aids the Government of Nepal and other national and external development partners for attempting maternal health care issues and closing gap for achieving the MDG five.

- The findings further facilitate the better understanding and planning of the skilled human resources for maternal health care services. It should be used for assessing the utilization of maternal health care services with relevance to women's autonomy in developing countries.

6.3 Conclusions

Low education and economic status of women are significantly associated with the low utilization of maternal health care services in Kapilvastu district of Nepal. Women's autonomy seems as a mediating factor of the pathways in the utilization of maternal health care services. Women's education, husband's education and economic status of the household are found to be key predictors of women's autonomy and utilization of maternal health care services. Educated women seem likely to exercise their autonomy and use maternal health care services independently. Improvement of women's education, husband's education and economic status of the household would be among the effective strategies for increasing their autonomy and utilization of maternal health care services in Kapilvastu district of Nepal.

In spite of intensive implementation of incentive programmes to increase the utilization of maternal health care services during pregnancy, childbirth and postnatal period, we do not see an encouraging response. It points to the very basic and strong relationship between women's position in the household and the society, and their health status. There are limits to how far financial incentives can overcome these obstacles.

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THE ANNEXURE

PUBLICATIONS

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- Bhandari TR, Sarma PS, Kutty VR. Utilization of maternal health care services in post-conflict Nepal. *Int J Womens Health* 2015;7: 783–790.

- Bhandari TR and Dangal G. Abortion practices in Nepal: what does evidence show? *N J Obstet Gynaecol* 2015; 19 (1):3-11

- Dangal G and Bhandari TR. Women's autonomy: new paradigm in maternal health care utilization (editorial). *GJMEDPH* 2014;3(5):1-2

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- Bhandari TR. Maternal health issues in Nepal and ways forward. *JSHAS* 2012;2 (1):64-69.

CURRICULUM VITAE

Tulsi Ram Bhandari

(Senior Research Fellow)

Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala, India, **&**

(Assistant Professor)

Department of Public Health, Faculty of Science and Technology, Pokhara University, Lekhnth Municipality-12, Dhungepatan, Kaski, Nepal

tulsib2004@gmail.com

Cell No. 009779851178182 (Nepal), 0919605657941(India)

EDUCATION

- Ph.D. Scholar (Senior Research Fellow), Sree Chitra Tirunal Institute of Medical Sciences and Technology, Trivandrum, Kerala, India, from January 2012 to date.

  Research: Women's autonomy and utilization of maternal health services in Kapilvastu district, Nepal

  Supervisor: Professor, Dr. V. Raman Kutty, M Phil, MD, MPH

- Master of Public Health (MPH), Faculty of Health and Medical Sciences, Allahabad Agricultural Institute –Deemed University, India, 2007

  Research: Safe injection practices and awareness among health care workers in tertiary level hospitals, Kathmandu, Nepal

  Supervisor: Associate professor, Dr. Varidmala Jain, MD

- Master of Health Education, Faculty of Education, Tribhuvan University, Kathmandu, Nepal, 1999

  Research: Competency need of teachers for teaching health, population and environment subject in secondary level in Katmandu district, Nepal

  Supervisor: Professor, Dr. Bhimsen Devkota, Ph.D.

- Bachelor in Population Education, Faculty of Education, Tribhuvan University, Kathmandu, Nepal – 2000

- Bachelor in English and Health Education, Faculty of Education, Tribhuvan University, Kathmandu, Nepal, 1995

PUBLICATIONS

- Bhandari TR, Kutty VR, Ravindran TKS, Sarma PS, Dangal G. Safe delivery care practices in western Nepal: Does women's autonomy influence the utilization of skilled care at birth? Under review-Journal of *PLOS Medicine.*

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- Bhandari TR. And HS Chhetri. *Textbook "Management and supervision in school health programme" for Master Degree, Health Education.* Kathmandu: Kshitiz Publication, Kritipur, 2005.

PRESENTATIONS

- Bhandari TR, Gangal G, Sarma PS, Kutty VR. Construction and validation of a women's autonomy measurement scale with reference to the utilization of maternal health care services in Nepal. Scientific Fete 2015, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandru, India, March 18, 2015.

- Bhandari TR. Women's autonomy and utilization of maternal health services in Kapilvastu district, Nepal. Academic seminar on public health issues. Bielefeld University, Universitätsstraße 25, 33615 Bielefeld, Germany. December 20, 2013.

- Bhandari TR and Kutty VR. Global maternal mortality reduction strategies and influence in Nepal. XI South East Asia Regional Scientific Meeting of the International Epidemiological Association, Pokhara, Nepal, September 27-29, 2013.

- Bhandari TR, Kutty VR and Dangal G. First National Midwifery Conference on 'Midwifery education: policy into action, saving lives of the women and newborns' Kathmandu, Nepal. September 14-15, 2013.

AWARDS AND GRANTS

- German Academic Exchange Service (DAAD) Scholarship, Bielefeld University, Germany, Oct to Dec 2013,
- Ph.D. Fellowship 2011, University Grants Commission, Nepal.
- Faculty Research Grants 2010, Faculty of Science and Technology, Pokhara University, Nepal

APPENDICES

APPENDIX I: IEC CLEARANCE

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौघोगिकी संस्थान
तिरुवनन्तपुरम - 695 011, केरल, इंडिया
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
THIRUVANANTHAPURAM - 695 011, INDIA
(An Institute of National importance under Govt. of India)

Institutional Ethics Committee
(IEC Regn No. ECR/189/Inst/KL/2013)

SCT/IEC/617/JUNE -2014 11-06-2014

Dr. Tulsi Ram Bhandari
PhD Student
AMCHSS, SCTIMST.

Dear Dr. Tulsi Ram Bhandari,

The Institutional Ethics Committee reviewed and discussed your application to conduct the study entitled "WOMEN'S AUTONOMY AND UTILIZATION OF MATERNAL HEALTH SERVICES IN KAPILVASTU DISTRICT, NEPAL"(IEC/617) on 7th June, 2014.

The following documents were reviewed:

1. *Covering letter.*
2. *Research Proposal.*
3. *Consent form – English & Nepali versions.*
4. *In-depth interview guidelines - English & Nepali versions.*
5. *Structured interview schedule & scale - English & Nepali versions.*
6. *CV – Tulsi Ram Bhandari.*

Page 1 of 2

तार : चित्रमेट फोन फाक्स ई-मेइल
Grams : Chitramet Phone : 2443152 Fax : (91)471-2446433 E-mail : sct. @sctimst.ker.nic.in
2550728

The following members of the Ethics Committee were present at the meeting held on 7th June, 2014 at G. Parthasarathi Board Room, AMCHSS, SCTIMST.

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Justice Gopinathan. P.S	BSc. LLB	Male	Legal Expert (Chairperson)	*No*
2.	Dr. Meenu Hariharan	DM	Female	Clinician (Gastro Enterologist)	*No*
3.	Dr. M.D. Gupte	MD, DPH	Male	Public Health	No
4.	Dr. R.V.G. Menon	PhD	Male	Lay Person	No
5.	Dr. Mala Ramanathan	MSc, PhD, MA	Female	Ethicist/Social Scientist (Member Secretary)	Yes

IEC Decision

The IEC approved the conduct of the study in the present form.

Remarks:

The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team /guide who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,

Mala Ramanathan
Member Secretary, IEC

APPENDIX II
INFORMED CONSENT FORM

Namaskar, I am Tulsi Ram Bhandari, Ph.D. Scholar at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala India. This study "**Women's Autonomy and Utilization of Maternal Health Services in Kapilvastu District, Nepal**" is being carried out as part of the course requirements for my Ph.D. research and is being conducted under the supervision of Dr. Raman Kutty, Professor, Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala, India.

Purpose of the study

The overall aim of the study is to study women's autonomy and its influence on the utilization of maternal health care services in Kapilvastu district, Nepal.

The specific objectives are-

- To construct and validate a women's autonomy measurement scale based on the field evidence of western Terai, Nepal.
- To examine the relationship between women's demographic characteristics and socioeconomic factors, and their utilization of maternal health care services in Kapilvastu district, Nepal.
- To correlate women's autonomy with their demographic characteristics and socioeconomic factors in Kapilvastu district, Nepal.

- To examine the role of women's autonomy as mediating factor in the utilization of maternal health care services using the new scale in Kapilvastu district, Nepal.

Procedure

The study would take approximately 30-45 minutes of your valuable time. You would be asked some questions related to "Women's Autonomy and Utilization of Maternal Health Services in Kapilvastu District, Nepal". All your given information will be kept confidentially and will not be shared with anyone other than members of study team. You do not have to be in the study, but we hope you will agree to participate since your views are important. If I ask you any question you do not want to answer, just let me know and I will go on to the next question or you can stop the interview at any time. Pease you feel free to ask any questions or reservations related to this study.

Risks and discomfort

Participating in this study imposes no risk to your health. However, you would be asked some questions which could be individual in nature.

Benefits

There may not be direct benefits for you from this study but from a public health prospective, your information may prove to be of great importance with respect to understanding the burden of the problems related to delivery practices and as an issue of public health relevance which may contribute to frame some appropriate strategies to reduce maternal mortality and to save the lives of neo-born and infant. In additional to this, there will be answered your queries on research subject.

Confidentiality

Utmost priority will be given to protect the privacy and confidentiality of your personal information. Your personal information will not be shared with anyone not involved in the study and reporting will be done in aggregate form. At any stage your identify will not be revealed and for this; a participant identification number will be kept under the protection of the principal investigator and will be destroyed properly when they are deemed no longer needed or after one year of dissertation report submission, whichever comes first.

Contact Information

If you have additional questions about this research or you would like to verify research credentials, you may contact me or Institute's Ethical Committee member in the following given details:

Tulsi Ram Bhandari
AMCSS, SCTIMST, Trivandrum, Kerala
Cell N. 0919605657941
E-mail- tulsib2004@gmail.com

Dr. Malaramanathan
Member Secretary, IEC, SCTIMST,
Trivandrum, Kerala, Contact No. 091-0471-2520234
Email- mala@sctimst.ac.in

Voluntary Participation

Your participation in this study is voluntary and you have the right to withdraw your participation at any time during the interview without any explanation. Refusal to participate will not involve any penalty or loss of benefits to which you are otherwise entitled.

CONSENT STATEMENT

(Participant's copy)

Participant's Unique Identification (UID) Number[2] | | | | | | | | | | |

I have read/been read the details of the information sheet. The nature of the study and my involvement has been explained and all my questions regarding study have been answered satisfactory. By singing/ providing thumb impression on this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I have also been informed who should be contacted for further clarifications. I know that I can withdraw my participation at any time during the interview without any explanation.

Name of the participant: _____

Signature/left thumb print:

Consent taken date: | | | | | | | | |

If the participant is illiterate:

Name of witness: _____

Signature of witness:

Signature of investigator:

Date | | | | | | | | |

[1] First two digits Village Development Committee's code and last three digits UID

CONSENT STATEMENT

(Investigator's copy)

Participant's Unique Identification (UID) Number[3] | | | | | |

I have read/been read the details of the information sheet. The nature of the study and my involvement has been explained and all my questions regarding study have been answered satisfactory. By singing/ providing thumb impression on this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I have also been informed who should be contacted for further clarifications. I know that I can withdraw my participation at any time during the interview without any explanation.

Name of the participant: _____

Signature/left thumb print:

Consent taken date: | | | | | | |

If the participant is illiterate:

Name of witness: _____

Signature of witness:

Signature of investigator:

Date | | | | | | |

[3] First two digits Village Development Committee's code and last three digits UID

APPENDIX III

RESEARCH TOOLS

WOMEN'S AUTONOMY MEASUREMENT SCALE

(Likert-type Scale)

Select only one option out of the three options given below and write respective number (2 or 1 or 0 as applicable) in the given box

SN	Autonomy domains	Scale		
A	**Decision-making autonomy (How do you make the following decisions?)**	**Independent (2)**	**Jointly (1)**	**Dependent (0)**
1.	What food should be cooked?			
2.	Daily household expenditure/purchase			
3.	Children's clothes and food			
4.	Children's education			
5.	Children's and female's health care and medicine			
6.	Inviting and hosting guests			
7.	Use of contraceptives			
8.	Having baby/another baby			
9.	Purchase major goods in household such as land, house, computer, TV			
10.	Being a member of public institutions/organizations			
Total score = 0 to 20				
B.	**Movement autonomy (Do you need permission for following activity?)**	**Never (2)**	**Sometimes (1)**	**Always (0)**
1.	Go outside the house/compound			
2.	Go marketing/shopping			
3.	Go to hospital/health care facility			
4.	Go to children's school			

5.	Visit to natal family or relative/s' house			
6.	Visit to friend/s' house			
7.	Go to public places/programmes such as temple, church, other religious places, public programmes			
Total score = 0 to 14				
C.	**Financial autonomy** **(Do you need permission for following activity?)**	**Never** **(2)**	**Sometimes** **(1)**	**Always** **(0)**
1.	Work outside the house for income			
2.	Spend money for household affairs			
3.	Lend/spend money as per personal need and interest			
4.	Saving money for your future use			
5.	Handle separate bank account			
6	Own and control personal property			
7.	Give money or goods to natal family			
Total score = 0 to 14				
Grand total score = 0 to 48				

~ End ~

KEY INFORMANT'S RATING ON THE CONTENTS OF WOMEN'S AUTONOMY MEASUREMENT SCALE[4]

Name of Informant (optional):---------- Date: ---/----/------

(MM/DD/YY)

SN	Autonomy domains	Rating		
A	**Decision-making autonomy (Make decision on the following activities)**	**Essential (2)**	**Useful not essential (1)**	**Not necessary (0)**
1.	What food should be cooked?			
2.	Daily household expenditure/purchase			
3.	Children's clothes and food			
4.	Children's education			
5.	Children's and females' health care and medicine			
6.	Inviting and hosting guests			
7.	Use of contraceptives			
8.	Having baby/another baby			
9.	Purchase major goods such as land, house, computer, TV			
10.	Being a member of public institutions/organizations			
Total score = 0 to 20				
B.	**Movement autonomy (Need permission for the followings activities)**	**Essential (2)**	**Useful not essential (1)**	**Not necessary (0)**
1.	Go outside the house/compound			
2.	Go marketing/shopping			
3.	Go to hospital/health care facilities			
4.	Go to children's school			
5.	Visit to natal family or relative/s' house			
6.	Visit to friend/s' house			
7.	Go to public places/programmes such as temple,			

[4] It is a rating scale; please write respective number (2 or 1 or 0) in the given box.

	church, other religious places, public programmes			
Total score = 0 to 14				
C.	**Financial autonomy (Need permission for the followings activities)**	**Essential (2)**	**Useful not essential (1)**	**Not necessary (0)**
1.	Work outside the house for income			
2.	Spend money for household affair /expenses			
3.	Lend/spend money as per personal need and interest			
4.	Saving money for your future use			
5.	Handle separate bank account			
6	Own and control personal property			
7.	Give money or goods to natal family			
Total score = 0 to 14				
Grand total score = 0 to 48				

~ End ~

STRUCTURED INTERVIEW SCHEDULE

Unique Identification Number (UIN):

Identification								
Name of district:……..	Code of district:							
Name of VDC:……	Code of VDC:							
Ward No.:								
Household No.:								
Name of respondent (optional): ……								
Name of household head (optional): …….	1 = M, 2 = Female							

Enumerator's visits								
Visits	1	2	3	Final visit				
Dates	----------	----------	----------	Day				
Enumerator	----------	----------	----------	Month				
Results[5]	----------	----------	----------	Year	2	0		

Result codes:
1 completed 2 not at home 3 postponed 4 refused 5 partly completed 6 incapacitated 7 other (specify)……..

Language of Interview schedule :	Nepali/English	
Language of Interview:	……	
Native language of respondent:	……	
Translator used (Yes = 1; No = 2)		
Language Codes:		

1 Nepali, 2 Bhojpuri, 3 Maithili, 4 Newari, 5 English, 6 Awadhi, 9 Other (specify)……

Verify by principal investigator:-
Signature:…… Date:……

[5] Read the given codes first.

INFORMED CONSENT STATEMENT

Good morning/afternoon/evening /Namaskar

I am Tulsi Ram Bhandari, Doctor of Philosophy (Ph.D.) scholar at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala India. This study is being carried out as part of the course requirements for my Ph.D. research under the supervision of Dr. Raman Kutty, Professor, Achutha Menon Centre for Health Science Studies. All information given by you will be kept confidential and will only be shared within the study team after masking the personal details. Your participation in this study is purely by your choice and you have the right to withdraw from this interview at any point in time. If I ask you any question you do not want to answer, just let me know and I will go to the next question or you can stop the interview at any time. There may not any direct benefit for you by participating in this study. However, the information you provided may help to make the maternal health care services better for the future in Nepal. There is no harm to you in being a part of the study.

If you agree to participate in this study, I would also request your permission for recording your response. At the end of the study, after completion of report writings, all the recorded raw data will be kept only with the principal investigator.

Do you have any questions? May I begin the interview now?

Signature/finger print of respondent:----------

Signature of interviewer: ----------Date: ----------

Respondent agrees to be interviewed . . . 1 [Start]

Respondent does not agree to be interviewed . . . . 2 [End]

INTERVIEW SCHEDULE

(Write in the given boxes or tick on selected options clearly)

S.N.	Questions	Filter and Coding Categories	Skip
Background Information			
01	What is your date of birth? (Record as per the Nepalese Calendar)	Month…. Year….. 2 0 Do not know(write 00)	
02	How old were you at your last birthday? (Compare and correct 101 and 102)	Completed age in years	
03	What is your current marital status?	Living with husband……...1 Widowed…….2 Divorced …….3 Separated ……...4 Others……..9 If other (specify)……	
04	How old were you at your first marriage?	Completed age in years	
05	How old was your husband at your first marriage?	Completed age in years	
06	How old were you at your first pregnancy?	Completed age in years	
07	What was the order of your last parity?	Write in order	
08	How many children do you have now? (record only live children)	Record in total number Male Female	
09	When did you have your last deliver?	Date (YY/MM/DD)	
10	Where did you have your last delivery?	Home ……...1 Health facility……..2 Other ……9 If other specify…….	If home, got to 12
11	For what did you go to the health facility?	Normal delivery……..…1 EMOC……..…2 Others. ..……..….9 If other, specify……	

12	Who takes the decision in the family to seek healthcare services, when you need it?	Husband ……..……..1 Respondent herself……..2 Both husband and wife……3 Other……9 If other, specify……	
13	What is your religion?	Hindu . . . . 1 Buddhist . . . . . 2 Muslim . . . . . 3 Kirat . . . . . 4 Christian . . . . . 5 Other . . . . . 9 (Specify)……..	
14	What is your caste/ethnicity? (write in blank give code in given row)	…….. (Code as per national classification[6] of caste)	
Information on Socio Economic Status			
15	What is the highest grade of your education?	Illiterate ……..….1 Just literate …….2 Primary ……..3 Lower secondary……..……..4 Secondary……..….5 Higher secondary and above……..….6	If illiterate, go to 18
16	What is the highest grade of your husband's education?	Illiterate ……..….1 Just literate …….2 Primary ……..3 Lower secondary……..……..4 Secondary……...5 Higher secondary and above……..6	
17	Do you read a newspaper or magazine at least once a week, less than once a week or not at all?	At least once a week . . . . . 1 Less than once a week . . . . . 2 Not at all 3	

[6] 1. Dalit, 2. Disadvantaged Janajatis, 3. Disavantaged non-dalit Terai caste groups, 4. Religious Minorities, 5. Relatively advantaged Janajatis and 6.Upper caste groups (for details see in Appendix VI)

Socio-economic status continue (Scale was adopted from International Wealth Index)			
18. a. Does the household own or have following items- [Give tick mark(✔) into correct option][7]			
Television?	Yes ☐	No ☐	Unknown ☐
Refrigerator?	Yes ☐	No ☐	Unknown ☐
Phone (landline /cell)?	Yes ☐	No ☐	Unknown ☐
Two wheelers (bike/scooter)?	Yes ☐	No ☐	Unknown ☐
Three/four wheelers (car, jeep etc)?	Yes ☐	No ☐	Unknown ☐
Cheap utensils (= or < $50)?	Yes ☐	No ☐	Unknown ☐
Expensive utensils (>$300)?	Yes ☐	No ☐	Unknown ☐
Electricity?	Yes ☐	No ☐	Unknown ☐

18.b. What is the quality of the -[8](Give tick mark(✔) into correct option)				
Main source of drinking water?	Low ☐	Middle ☐	High ☐	unknown ☐
Toilet facility usually used?	Low ☐	Middle ☐	High ☐	unknown ☐
Main floor material?	Low ☐	Middle ☐	High ☐	unknown ☐
No. of rooms used for sleeping	One ☐	Two ☐	Three+ ☐	unknown ☐

[7] Before filling the scale, read attached sheet in Appendix VI for any confusion.

[8] See attached guideline before rating following options.

19	How often do you listen to the radio?	At least once a week . . . . . 1 Less than once a week . . . . . 2 Not at all 3	
20	How often do you watch the television?	At least once a week . . . . . 1 Less than once a week . . . . . 2 Not at all 3	
21	What is the main occupation of your husband? (Tick on only one major occupation)	Farmer ……...…1 Service (government/private)..….2 Daily wage/laborer…….....3 Own business…….....4 Migrant worker……..…5 Overseas employee……..….6 Other……..…9 If other, specify……	
22	What is your main occupation/work? (Tick on only one major occupation)	Farmer ……..1 Service(government/private)...2 Daily wage/laborer……....3 Own business…….…...4 Migrant worker…….……5 Housewife …….……6 Other…….….9 If other, specify……	
Information on maternal health care programmes			
23	Did you hear about Aama Suraksha Karyakrama (National Free Delivery Care Programme)?	Yes……1 No…….2	If no, go to 27
24	How did you know about AAMA at the first time? (Tick only one from the alternatives as first source)	Electronic media (Radio, TV)…….....1 Print media (newspapers, magazines)..2 Family members……..……..3 Health workers……..……4 Friend/neighbor……..……..5 FCHVs…….....…..….6 Other……..……...9 If other, specify……	
25	What are the incentives of *Aama Suraksha Karyakrama*? (Multiple answers, tick on all the correct responses)	Cash transfers as transportation expense to institutional delivery……...A Free delivery care in health facility ...B Incentives to the health workers…….C	
26	Do you know where are available free delivery care services and maternal incentives under the *Aama Suraksha Karyakrama*? (Multiple answers, tick on all the correct responses)	Public hospital……A PHCC…….…..B HP/SHP…….…....C Non profitable hospital ...D Private care provider. …..E Others……...X If other, specify…….....	

27	Are you aware that you can call SBA at home for conducting delivery without paying any extra charges/fees?	Yes……1 No……..2	
Information on pregnancy and antenatal care			
28	Were you ready for pregnancy when you conceived?	Yes ……1 No……..2	
29	Do you wish to have any more children in future?	yes ……1 No ……..……2	
30	What was the gap between last and next-to-last pregnancies?	Write in months ☐☐☐	
31	Did you go for antenatal care during your last pregnancy?	Yes……1 No……2	If no, go to 41
32	When did you go for antenatal care after getting conception?	Write in months ☐☐	
33	How many times did you seek antenatal care during last pregnancy?	Write in numbers ☐☐	
34	Who examined you at the health facility?	SBAs(Doctor/Nurse/midwife……1 Other health workers……..2 Other……...9 If other, specify…….	
35	Were you advised to seek SBA care for delivery?	Yes……1 No……..2	If no, go to 41
36	Where were you advised to meet for SBA care?	Public hospital……..…A PHCC……..B HP/SHP……..…...C Non profitable hospital……D Private care provider……. …..E Others……...X If other, specify…….…….....	
37	Were you told to go to the SBA if you had any health problems with the pregnancy?	Yes……1 No……..2	If no, go to 41
38	Do you remember what the conditions/problems are supposed to seek the SBA care? (Probe whatever she says and record as multiple responses)	Pre-mature labor…….....A Prolonged labor……..……B Mal-presentation of fetus..…….C Bleeding before delivery……..D Excessive bleeding after delivery (>500 milliliter)……..E Placenta previa/abruption……F Retain placenta/ uterine rupture/ inversion……..G Puerperal sepsis……..….H	

38 Cont.		Severe headache……..…I Fit/convulsion ……..…...J High fever……..…..K Do not know……N Foul smelling discharged ……L No fetal movement……..M Other……X If other/s, specify……	
39	Were you told where to go if you had any problems during pregnancy?	Yes……1 No……..2	
40	Where were you advised to meet SBA, whenever you had any problem during pregnancy?	Public hospital……A PHCC……...B HP/SHP……C Non profitable hospital……D Private care provider. ……..E Others……...X If other, specify…….....	
41	Are you aware of the incentives given for four (4) ANC visits? (Rs 400 cash transfers for 4 ANC visits)	Yes……....1 No……2	If no, go to 43
42	How did you come to know about the incentives related to four (4) ANC visits?	Electronic media (Radio, TV)……....1 Print media (newspapers, magazines).2 Family members……..…….3 Health workers……..……...4 Friend/neighbor……..…….5 FCHVs…….....……..6 Other……..……..….9 If other, specify…….	
43	Did you have any other pregnancy and delivery related complications (probe about abortion, still birth, child loss)?	No Abortion Still births Child loss	
44	Did you make any preparation for delivery care on the beforehand?	Yes……1 No……..2	If no, go to 46
45	What did you prepare in advance for delivery care?(multiple response)	Saved money……A prearranged transportation……B Found blood donor……C Requested health worker……...D Purchased safe delivery kit……E Arranged food items…..……F Arranged clothes……G Other……..……X If other/s, specify……	

Information on delivery care			
46	Where did you have your last baby?(Place of delivery)	Home ……1 Health facilities…….2 Other……..9 If other, specify……	If not health facility go to 51
47	Where did you go for the delivery?	Public hospital……1 PHCC…….….2 HP/SHP…….…...3 Non profitable hospital..4 Private care provider. …5 Others……9 If other, specify……....	
48	In health care facility, who assisted you during delivery?	SBAs(Doctor/Nurse/midwife…1 Other health workers……..2 Other……...9 If other, specify……	
49	Did you go to health care facility as per your plan or went due to any sudden complication?	Planned……..1 Complications……2	If as planned, go to 51
50	If there was a complication, please specify?	Pre-mature labor…….....1 Prolonged labor……..2 Mal-presentation of fetus ……..3 Bleeding before delivery…….4 Excessive bleeding after delivery (>500 ml) ……..5 Placenta previa/abruption……..…6 Retain placenta/ uterine rupture/inversion……7 Other……..…….....9 If other/s, specify	
51	How long it takes to reach the health care facility? (Recorded based on the available common mode of transportation)	Write in minutes ☐☐☐	
52	How did you go to the healthcare facility?	By foot……1 By own vehicle……2 By public transportation……..3 By hired vehicle……...4 Transported by person/s……..5 Others……...9 If other, specify…….....	If not, public transport go to 54

53	How many steps you changed to reach healthcare facility by public transportation? (If there were used various modes of transportation specify in the other)	One……1 Two……2 Three……3 More than three……4 Other……..9 If other specify……	If home delivery go to 62
54	Were you referred from one healthcare facility to next?	Yes……...1 No……2	If no, go to 62
55	Did you get any help from referring facility to reach referred facility?	Yes……1 No……2	If no, go to 57
56	How did they help you?	Arranged vehicle……A Contacted to referring facility……B Provide cash support/incentives….C Other……....X If other, specify……	
57	Did you go to the referred healthcare facility?	Yes……..1 No……2	If yes, go to 59
58	Why did you not visit the referred facility? (multiple response)	Very far……..A No transportation facility……..B Financial problems……C Child born before that ……..…...D Family not willing to bring there....E Other……....X If other, specify	
59	Did you receive the cash reimbursement for transportation expenses before discharging from the health facility?	Yes……1 No ……2 Do not know……..8	
60	Did healthcare facility charge you any amount for delivery?	Yes……1 No ……..2 Do not know……...8	
61	Did you have health check up after delivery while you were in the facility?	Yes……1 No ……2	Yes, go to 67
62	Did anybody assist you during delivery at home?	Yes……1 No ……2	
63	Who assisted you for delivery at home?	Health worker(SBA)……...1 Other health workers……..….2 TBA…….……..…3 Mother-in-law/other women……...4 Husband ……..5 Other…….……..…….9 If other, specify……	

64	Why did you not go to the health facility for delivery? ((multiple response))	Too much cost……A Facility not opened……..B Too far……C No transportation……D No trust/poor quality……...E No female provider……F Family not allowed……..G Security concerned……..H Not necessary……...I Not customary……..J Child born before reaching……..K Other ……..……..X If other, specify……	
65	Was the delivery kit used at home?	Yes……..1 No ……...2 Do not know……8	*If yes, go to 67*
66	Which instrument was used to cut the umbilical cord at home?	Boiled/new blade……1 Used blade……...2 Knife/others weapons……3 General scissors ……4 Do not know……..…...8 Other……..…...9 If other, specify……	
67	What are the conditions for visiting the health facility? (multiple response)	For all delivery……A For complicated delivery……B If transportation available……....C If available family support……...D If have better financial condition…E Other……X If other, specify…….	
Information on postnatal care			
68	Did you seek postnatal check up after your delivery or discharged from hospital? (ask both hospital and home deliveries)	Yes……1 No ……2	If no, go to 70
69	When did you have the first postnatal check up?	<4 hours……1 4-23 hours……2 1-2 days……3 3-6 days……4 7-14 days……...5 15-42 days……6 Do not know…….……8	
70	How many times you visited for the postnatal check up?	Write in numbers ☐☐	

71	Who examined you during the first postnatal visit? (Tick anyone who had attended first postnatal care)	SBAs(Doctor/Nurse/midwife……1 Other health workers……..2 Other……...9 If other, specify……	
72	Did you get any complications during postnatal period? (within 6 weeks) (Both home and health facility deliveries)	Yes ……..1 No ……2	If no, go to 74
73	What was/were the problem/s? (multiple response)	Retained/fragmented placenta…….A Primary PPH (within 24 hrs)..……..B Secondary PPH (after 24 hrs)……...C Clot/hematoma……D Perineal tear…..……E Mastitis ……..……..F Puerperal sepsis……G Hypertension……....H Anemia……I Death of baby……...J Postpartum depression ……K Other……X If other, specify……..	
74	Why did you not seek postnatal care? (Ask only to those women who did not visit the healthcare facility for postnatal care.)	Too much cost……A Facility not opened……..B Too far……C No transportation……D No trust/poor quality……...E No female provider……..F Family not allowed……..G Security concerned……..H Not necessary……...I Other ……..……X If other, specify……	
75	How much time does it take to reach the nearest health facility for the postnatal care? (Travelling time taken by commonly available mode of transportation)	Write time in minutes	

~~~ The end~~~
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APPENDIX IV

GUIDELINE TO ASSESS THE SOCIO-ECONOMIC STATUS OF THE HOUSEHOLD

For coding the wide range of categories use the following guideline:

Water supply

- High quality: Bottled water or water piped into dwelling or premises;
- Middle quality: Public tap or protected well;
- Low quality is unprotected well, spring or surface water.

Toilet facility

- High quality: Flush toilet;
- Middle quality: Public toilet, improved pit latrine etc.;
- Low quality: Traditional pit latrine or no toilet facility.

Floor quality

- High quality: Finished floor with parquet, carpet, tiles, linoleum, ceramic etc.;
- Middle quality: Cement, concrete, wood, etc.;
- Low quality: None, soil, dung etc.

Cheap utensils

Household owning one or more cheaper assets, like having at least one or more chair, table, clock, watch, water cooker, radio, fan or mixer (roughly less than 50 US Dollar).

Expensive utensils

Household owning at least one or more items, like having a washer, dryer, computer, motorbike, motorboat, air conditioner, or generator(over 300 US Dollar)

APPENDIX V

CASTE/ETHNIC CLASSIFICATION OF NEPAL

1. Dalit

- Hill: Kami, Damai, Sarkii, Gaine, Badi
- Terai: Chamar, Mushar, Dhusah/Paswan, Tatma, Khatway, Bantar, Dom, Chidimar, Dhobi, Halkhor

2. Disadvantaged Janajatis

- Hill: Magar, Tamang, Rai, Limbu, Sherpa, Bhote, Walung, Byansi, Hyolomo, Garrti/Bhujel, Kuumal, Sunsar, Baramu, Pahari, Yakkah, Chhantal, Jirel, Darai, Dura Majhi, Danuwar, Thami, Lepcha Chepang, Bote, Raji, Hayu, Raute, Kusunda,
- Terai: Tharu, Dhanuk, Rajbansi, Tajpuriya, Gangai, Dhimarl, Meche, Kisan, Munda Santhal/Satar, Dhangad/Jhangad, Koche, Pattarkatta/Kusbadiay

3. Disavantaged non-dalit Terai caste groups:
Yadav, Teli, Kalwar, Sudhi, Sonar, Lohar, Koiri, Kurmi, Kanu,Haluwai, Hajam/Thakur, Badhe, Bahae, Rajba Kewat, Mallah, Nuniya, Kumhar, Kahar, Lodhar, Bing/Banda, Bhediyar, Mali, Kumar, Dhunia

4. Religious Minorities
Muslims, Churoute

5. Relatiively advantaged Janajatis- Newar, Thakali, Gurung

6. Upper caste groups
Brahman (hill), Chhetri, Thakuri, Sanyasi, Brahman (Terai), Rajput, Kayastha, Baniya, Marwadi, Jaine, Nuraang, Bengali

APPENDIX VII

FINAL VERSION OF WOMEN'S AUTONOMY MEASUREMENT SCALE
(Likert-type Scale)

Select only one option out of three options given below and write respective number (2 or 1 or 0 as applicable) in the given row.

SN	Autonomy domains	Scale		
A.	**How do you make decision on-**	**Independent (2)**	**Jointly (1)**	**Dependent (0)**
1	daily household expenditure/purchase?			
2	children's clothes and food ?			
3	children's education?			
4	children's and females' health care and medicine?			
5	inviting and hosting guests?			
6	use of contraceptives?			
7	having baby/another baby?			
8	purchase major goods in household such as land, house, computer, TV?			
9	being a member of public institutions/organizations?			
Total score = 0 to 18				
B.	**Do you need permission to -**	**Never (2)**	**Sometimes (1)**	**Always (0)**
10	go outside the house/compound?			
11	go marketing/shopping?			
12	go to hospital/health care facility?			
13	go to children's school?			
14	visit to natal family or relative/s' house?			
15	visit to friend/s' house?			
16	go to public places/programmes such as temple, church, other religious places, public programmes?			
Total score = 0 to 14				
C.	**Do you need permission to-**	**Never (2)**	**Sometimes (1)**	**Always (0)**
17	work outside the house for income			
18	spend money for household affairs			
19	lend/spend money as per personal need and interest			
20	saving money for your future use			
21	handle separate bank account			
22	own and control personal property			
23	give money or goods to natal family			
Total score = 0 to 14				
Grand total score = 0 to 46				