WOMEN'S AUTONOMY AND MATERNAL HEALTH CARE UTILIZATION IN NEPAL

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Master's thesis

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(Public Health)

September, 2013

Abstract

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SITU K.C: WOMEN'S AUTONOMY AND MATERNAL HEALTH CARE UTILIZATION IN NEPAL
Master's Thesis, 72 pages, 1 appendix
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Public Health
September 2013

Background: Maternal mortality is a major public health problem in low- and middle-income countries. Most of the maternal deaths could be prevented if there is adequate and timely use of maternal health care services by women. Decision making power of women is one of the essential factors which have influence on maternal health care service utilization.

This study aims to assess the association between women's autonomy and maternal health care utilization among Nepalese women.

Methods: This study was based on Nepal Demographic Health Survey (NDHS), 2011 which is a nationally representative, population based household survey. The total of 4,148 women was analyzed in this study. Utilization of maternal health care services was measured in terms of number of ANC visits, timing of start of ANC visit, skilled attendants during ANC visits, place of delivery and skilled attendants during delivery. Similarly, women's autonomy was assessed in terms of decision making regarding health care, large household purchases, visiting friends or relatives and spending money earned by husbands. The association of various socio-demographic variables, women's autonomy and maternal health care utilization was analyzed using Pearson's chi-square test and binary and multiple logistic regressions.

Results: About half of the studied women attended more than three times ANC visits. Almost 61% women had home delivery and only 36 % birth deliveries were attended by skilled health professionals. One fourth of women had higher level of women's autonomy and majority had medium level of autonomy. Women who had autonomy in their health care were significantly more likely to have ≥3 ANC visits (OR=1.69, 95%

CI= 1.41-2.03) and were also more likely to give birth at health facility (OR=1.44, 95% CI=1.26-1.64). Various socio-demographic factors such as age, education, employment and wealth quintile were also significantly associated with the utilization of maternal health care services.

Conclusion: Utilization of maternal health care services was found to be low among Nepalese women. Higher autonomy of women was associated with higher utilization of maternal health care services. Participation of women in decision making process regarding health care and household matters should be increased for the better use of maternal health care services in Nepal.

Key words: Antenatal care, Delivery care, Women's autonomy, Nepal

Abbreviations

AHW	Auxiliary Health Worker
ANC	Antenatal Care
DHS	Demographic Health Survey
EA	Enumeration Area
FCHV	Female Community Health Volunteer
HA	Health Assistant
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
ICPD	International Conference on Population and Development
MCHW	Maternal and Child Health Worker
MDG	Millennium Development Goal
NDHS	Nepal Demographic Health Survey
PHCC	Primary Health Care Center
SHP	Sub Health Post
TBA	Traditional Birth Attendant
WHO	World Health Organization

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1. INTRODUCTION

Everyday about 800 women die due to pregnancy related complications worldwide and 99% of them occur in low and middle income countries (WHO, 2012). More than half of these occur in sub-Saharan Africa and one third in South Asia. Due to various interventions in maternal health care services, maternal death has been halved worldwide between 1990 and 2010 but it is still unacceptably high in many low- and middle-income countries (WHO, 2012).

Nepal is one of the countries where maternal mortality ratio is still high (229 per 1, 00,000 live births) compared to other low and middle income countries (NDHS, 2011). In spite of low maternal health care utilization in Nepal, there is significant reduction in maternal mortality over ten years of time from 850 in 1990 to 229 in 2011 (NDHS, 2006; NDHS, 2011). Even though the mortality is still high, this figure shows that Nepal is on track to achieve Millennium Development Goal (MDG) and was also awarded for this achievement (Nyaya Health, 2010). One of the reasons of this high maternal mortality in Nepal is probably uneven and inequitable utilization of health care services (Gill et al, 2007).

It has been shown that 80% of worldwide maternal death could be prevented if women had access to fundamental health care services (Kilpatrick et al, 2002; Wessel et al, 1999). Therefore to reduce maternal mortality and morbidity increase in use of reproductive and maternal health services are essential. Earlier studies have found that various socio-demographic factors such as early marriage, young age at pregnancy, lack of formal education, low income, distance to health facility, transportation problems etc are associated to low utilization of maternal health care services (Suwal, 2008; Ye et al., 2010). Besides these factors, the most important causes for the high mortality rate in Nepal are the three delays: delays in taking decision for seeking health care, delays in accessing care and delays in receiving health care in health institution (Shrestha, 2012). Some of the earlier studies reported that delay in seeking health care is due to cultural beliefs, financial problems, transportation problems and decision making power in household (Suwal, 2008). However, women autonomy (self decision making power of women) plays even vital role for the utilization of health care services.

In most part of South Asia, women have inferior status in society and also within the household. Similarly, in the context of Nepal, women had less opportunity in many areas such as educational attainment, participation in decision making and health care service utilization as compared to men (Adhikari & Sawangdee, 2011). This lowers the autonomy and decision making power of women resulting the adverse effects on health. Women's autonomy in decision making is also associated with ethnicity, deprivation level, urban/rural classification, education and number of living children (Kabeer, 2002).

Numbers of researches have been conducted regarding the factors contributing to low utilization of health care services and most of them are found to be focused on provision and geographic accessibility of services. But very few studies concentrate on women's autonomy and the use of maternal health care services (Salway & Furuta, 2006). Thus, this study aims at determining the association between women's autonomy and the utilization of maternal health care utilization in Nepal. An attempt is made to discover the various dimensions of women's autonomy and its relationship with the maternal health care utilization. Furthermore, the study aims to find the relationship of socio-demographic factors with the utilization of maternal health care services and level of autonomy.

2. LITERATURE REVIEW

2.1 Maternal health care and utilization

Maternal health care refers to the health care that a woman receives during pregnancy, childbirth and immediately after the birth which is crucial for the well being of a mother and new born baby. It includes antenatal care, delivery care and postnatal care. The use of antenatal, delivery and postnatal care services can be assessed through the number and timing of ANC visits, proportion of births delivered in health centers, attendants during delivery and antenatal care and number of postnatal visits.

2.1.1 Maternal Health care services in Nepal

Maternal health care services are provided through both government and private institutions. In government level, Primary Health Care services in Nepal are provided through Sub-Health Posts (SHP), Health Post (HP) and Primary Health Care Centers (PHCC). At the secondary level, there are districts hospitals in every district and tertiary care is provided by zonal, regional and central hospitals. There is one specialized maternity hospital in central level. Similarly, there are number of private hospitals and clinics which provide services on maternal and reproductive health issues.

2.1.2 Antenatal care services

Antenatal care (ANC) is an important component of maternal health which helps to identify the complications and potential risks during pregnancy and also helps to plan a safe delivery. Antenatal care provides the opportunities to encourage women to deliver with the skilled birth attendants (Mrisho et al., 2009). World Health Organization (WHO) has recommended women to attend at least four ANC visits during their pregnancy (WHO, 2002). However, the utilization of ANC visit is still low in Nepal e.g. only 50% of pregnant women had ANC visits during their pregnancy (NDHS, 2011).

A study carried out in Nepal showed that many of the Nepalese women lacked sufficient number of ANC visits and early ANC care from skilled health personnel during pregnancy (Neupane & Doku, 2012). Another study carried out in Bangladesh also found low utilization of antenatal care services. Only 52% of women in Bangladesh received antenatal care from medically trained personnel and the median number of ANC visit was 3.1 (Hossain, 2010). Similarly, in the context of Nepal utilization of antenatal care was not found satisfactory as the average ANC utilization was below the

government target and also below the average of low- and middle-income countries as the ANC take up was 8% in Western Mountains and 33% in Central Hills (Baral et al., 2012).

A study conducted in Ethiopia provides an evidence for low utilization of antenatal care services. It showed that only 54% of the women received antenatal care at least one time during their pregnancy (Tsegay et al., 2013). Nevertheless, another study from Kenya showed that 90% women received antenatal care at least once during their pregnancy period. Among those who visited antenatal clinics, 14% women started their antenatal visit in early stage of pregnancy, 68% started in second trimester and 23% in the third (Eijk et al., 2006). Neupane & Doku, 2012 also found that most of the women (45%) in Nepal started ANC visit after three months of pregnancy while 28% had no care at all.

Another study conducted in Xieng Khouang province of China, found low use of ANC services with 53.9% not receiving any services because of several reasons like lack of time, feeling not necessary, feeling embarrassed and living far away from the health facility (Ye et al., 2010).

Various studies explored the relationship between socio-demographic variables and the utilization of ANC services. The use of ANC services were found higher among the women of younger age group than the older age group (Tsegay et al., 2013; Haque et al., 2012; Furuta & salway, 2006). Similarly, education and socioeconomic condition were the strong predictors of utilization of antenatal care (Eijk et al., 2006; Neupane & Doku, 2012). Women who had less education (Adjusted OR=3.0, 95% CI=1.5-6.0) and low socioeconomic condition (Adjusted OR=2.8, 95% CI=1.5-5.3) were less likely to use antenatal care (Eijk et al., 2006). Earlier study from China (Ye et al., 2010) also showed that the significant predictors of ANC utilization were the level of education (OR = 6.8, 95% CI = 2.7-16.8), income (OR = 2.6, 95% CI = 1.2-5.7), knowledge (OR = 6.5, 95% CI = 2.4-17.6), attitude (OR = 3.0, 95% CI = 1.3-7.1), distance (OR = 2.9, 95% CI = 1.1-7.6), availability of public transportation (OR = 4.5, 95% CI = 2.0-10.4), cost of transportation (OR = 2.5, 95% CI = 1.1-5.7), and cost of service (OR = 4.6, 95% CI = 2.2-9.6). A study from India also suggested that economic status was the strong predictor of utilization of antenatal care which showed that women from the richer and richest quintile were 2 times (95 % CI=1.326-2.518) and 2.5 times (95% CI=1.628-

4.094) times more likely to use antenatal care than the women from poorest quintile (Singh et al., 2012). The major reasons for low utilization of antenatal care was no sickness during the pregnancy (32.7%), lack of awareness of the benefits (28.2%), feeling shamed (16.7%), workload (13.4%) and distance of health facility (12.5%) (Tsegay et.al., 2013).

Similarly another study from Nepal also demonstrated that working women had 36% less probability of receiving antenatal services than the women who were not working (OR=0.64) and also working women were 50% less likely to receive delivery services than non working women (OR=0.50) (Paudel & Pitakmanaket, 2010).

2.1.2 Delivery care services

Institutional delivery is one of the important factors of maternal health care services to reduce number of maternal deaths due to complications arising during delivery. In low- and middle-income countries like Nepal, most of the deliveries take place at home without assistance of skilled health attendants. A study conducted in two rural villages of Nepal found that 31% women delivered in health facility and 69% delivered their baby at home. It also found that more than half of deliveries (53%) occurred at home without assistance of any health workers and no deliveries were found to be assisted by skilled health worker (Dhakal et al., 2011). The authors also showed that only 11 % women who delivered in home used safe delivery kit and one third of the women used unclean instruments like sickle or scissor. It is vital to increase the proportion of safe deliveries in a clean environment and under the supervision of skilled attendants to reduce the health risks to mothers and the babies.

Another study from Nepal found that four out of five births (81%) occurred at home (Baral et al., 2012). Only 18% deliveries were occurred at health facility with 48% in urban and 14% in rural areas. It also found that younger mothers and mothers attending four antenatal visits were likely to deliver in health facility (Baral et al., 2012).

In one of the recent study from Ethiopia, prevalence of institutional delivery was reported very low. Only 4.1% of women gave birth at health facility which is very low compared to other low- and middle-income countries (Tsegay et al., 2013). Another study from Kenya also found low prevalence of institutional delivery which reported that 83% of the deliveries occur outside of health facility, among which 80% occurred

at home with assistance of their family members or relatives (Eijk et al., 2006). The mentioned study also found that 17% deliveries were attended by trained personnel like doctor, nurse or midwives and 36% deliveries occurred in presence of Traditional Birth Attendants which revealed that high proportion of deliveries occurred without presence of health personnel (Eijk et al., 2006).

Furthermore, a study conducted in Nigeria revealed that women were aware of importance of delivery at health facility which results in high utilization of delivery care services. Only 1.5% women reported that they gave birth to a baby at home. While, 54.8% went to government health facility for delivery, 24.5% in private hospitals and 13.5% in traditional or herbal homes (Iyaniwura & Yussuf, 2009). Different reasons for not using health center were reported among the women who did not deliver in health facility, 31.6% reported no reason, 29.4% had complain about long waiting time, 11.3% told about bad attitude of health attendants, 10.2 % reported unavailability of government facility in their community and 8% reported transportation problems (Iyaniwura & Yussuf, 2009). Another study conducted in Ethiopia also reported that different factors such as age of the women, education, husband's occupation and attendance of antenatal care were the major determinants for institutional delivery (Tsegay et al., 2013). However, one of the studies from Nepal found negative association between employment status and utilization of maternal health care services. Women who were employed are 0.43 times less likely to deliver at a health institution (Matsumura & Gubhaju, 2001). Another study found that, women with complete primary education were almost five times more likely to have a skilled birth attendants during delivery (OR=4.89, 95% CI=4.34-5.52) (Ahmed et al., 2012).

2.1.3 Postnatal care services

Postnatal period is the period following birth of a child. The main purposes of postnatal care are to maintain and promote the health of the woman and her child as women may get serious and life threatening complications during this period. Thus, it is highly recommended for a woman to have at least three postnatal check-ups within 24 hours of delivery.

In high-income countries virtually all women and their infants receive postpartum and postnatal care, albeit the nature and frequency of this care varies considerably. However

in low- and middle-income countries the need for care and support after birth is less well recognized. A study done in rural Nepal demonstrated that the prevalence of postnatal care was 34% within 42 days following the delivery and 19% women received care within 48 hours. Also, it had been reported that 65% women received postnatal care from doctor, 20% from a nurse and 16% from other health workers (Dhakal et al., 2007). Another study from Nepal also reported that there was low utilization of postnatal care services (Neupane & Doku, 2013). Only 5% of women whose deliveries were assisted by skilled personnel had postnatal check-ups while 10% of women whose deliveries were assisted by other personnel and who had no attendants had postnatal check-ups.

Women's socioeconomic condition, education and occupation were significantly associated with the utilization of postnatal care services in Nepal (Dhakal et al., 2007). One of the study from Indonesia also support the evidence that there were many maternal factors like lack of education, low socioeconomic condition, low wealth index, distance from health services which were related with low utilization of postnatal care (Titaley et al., 2009). Another recent study from Nepal by Neupane & Doku (2013) also explored the factors like education (OR = 1.46, 95 % CI = 1.11-1.92) and wealth index (OR = 2.57, 95 % CI = 1.59-4.15) were associated with the use of postnatal care.

A study conducted in India found that 44% women in India received postnatal care within 48 hours after delivery and 45% newborns received care within 24 hours after birth (Singh et al., 2012). This indicates that postnatal care was low in India which increases risks for maternity deaths and infant deaths. The above mentioned study also suggests that increasing the effective use of care during pregnancy and delivery care will led to increased use of postnatal care (Singh et al., 2012).

Another study conducted among African American women also found that prenatal care was the major indicator for the utilization of postnatal care (Ruth et al., 2000). Ruth et al, also found that women with low level care or no care during pregnancy had greater infant morbidity and mortality in the postnatal period and also they had significantly lower levels of seeking postnatal care.

Table 1: Review of studies on maternal health care services

Author, Year	Country	Study design	Sample size	Outcomes	Results
Dhakal et al., 2011	Nepal	Cross-sectional	150 women who had live births in 24 months prior to survey	Delivery care: skilled attendants at delivery	Women with higher education, whose husbands had higher education and skilled jobs, had first or second childbirth and having adverse previous obstetric history were associated with institutional delivery.
Neupane & Doku., 2012	Nepal	Cross-sectional	4,136 women who had delivery within three years prior to survey	Prenatal care: Number of prenatal visits and start and timing of prenatal care	Socio demographic variables like age, residence, education, occupation etc were statistically associated with start and timing of pregnancy
Singh et al., 2012	India	Cross-sectional	3,599 women of rural areas who had experience of childbirth in their adolescence (15-19 years)	Postnatal care	Postnatal care was low in India. Effective use of care during pregnancy and delivery care will led to increased use of postnatal care.
Ahmed et al., 2010	33 developing countries	cross-sectional	Women of reproductive age group aged 15-49 years	Antenatal and delivery care	Women with highest empowerment score had 82% higher odds of using modern contraception than women with a zero empowerment score (OR=1.82, 95% CI=1.52-2.17).
Nishar & White., 2003	Pakistan	Community based cross-sectional	323 women who had pregnancy experience	Antenatal care	Higher income women were twice likely to use antenatal care services (Adjusted OR= 1.82, 95% CI=1.14-3.89) than those of lower income.
Baral et al., 2012	Nepal	Review study (NDHS 2001-2006)	Women of reproductive age group aged 15-49 years	Antenatal care, delivery care and family planning service	Educated women from urban areas were more likely to use maternal health services than others. Women having more than three living children were less likely to use maternal health services.

Titaley et al., 2010	Indonesia	Cross-sectional	Community members which include mothers and fathers of children aged 1 to 4 months, community health workers, Traditional birth attendants, Community and religious leaders	Postnatal care	Financial problem, limited availability of health facility, lack of transportation facilities, lack of community awareness were the major reasons for not using maternal health services.
Neupane & Doku., 2013	Nepal	Cross-sectional	4,136 women of age group 15-49 years and who had delivery within three years prior the survey	Postnatal care	Majority of Nepalese women were lacking postnatal check up. Education, wealth and sufficiency of advice during pregnancy are independently associated with the utilization of postnatal care.

2.2 Women's autonomy

2.2.1 Concept of women's autonomy

There is no single accepted definition of autonomy which represents its multiple dimensions (Mason, 1995). In some studies, autonomy has been defined as the capacity to manipulate one's personal environment through control over resources and information in order to make decisions about one's own concerns or about close family members (Basu, 1992; Dyson & Moore, 1983). Autonomy helps to increases access to material resources like food, land, income and social resources such as knowledge, power, prestige within the family and community (Acharya et al., 2010). This involves the capacity and freedom of a woman to act independently on her own and on the authority of others such as, the ability to move alone, making decisions regarding health care, household purchases etc (Basu, 1992). Also, autonomy can be conceptualized as the ability of women to make and execute independent decisions pertaining to personal matters of their lives and their families (Mason, 1995). Jejeebhoy &Sathar (2001) defined autonomy as the control women have over their own lives and the extent to which a woman has equal voice with her husband in all matters affecting themselves and their families, control over resources, access to information, authority to take independent decisions and freedom in mobility.

There are inequalities in power between gender which can limit the open communication between husband and wife as well as access to reproductive health services (Acharya et al., 2010). Most of the countries in South Asia are culturally gender based which is characterized by patriarchal system where patriarch and his relatives have authority over whole family members (Jejeebhoy & Sathar, 2001). Thus, there should be increase in involvement of women in household decision making process to increase women empowerment and to reduce discrimination between men and women in the society. A study from South Asia also found that increase in women's decision making power was associated with reducing gender discrimination in society as well as improvement in their children's health (Smith & Byron, 2005).

2.2.2 Factors associated with women's autonomy

2.2.2.1 Age and family structure

The strong determinants of women's autonomy are women's age and family structure such as, older women and women in nuclear family had more autonomy as compared to other women (Jejeebhoy & Sathar, 2001). Similarly, a study by Sathar & Kazi (2000) also found that women living in nuclear family were more likely to be autonomous in mobility and decision making as compared to extended family.

One of study from India and Pakistan showed that women delaying age at marriage were observed to be more independent and have more autonomy than the women who got marriage at early age (Jejeebhoy & Sathar, 2001). Another study from Nepal also found that increase in age was directly associated with the likelihood of women's participation in household decision making (Acharya et al., 2010). This study also showed that participation of women in decision making regarding visiting friends or relatives was increased with the increasing age ($p<0.001$).

2.2.2.2 Literacy/Education

Education is a major determinant of women's status. It provides the skills needed to make important decisions regarding health for example, where is the health facility, what kind of services are provided from there, how to consult health personnel etc (Woldemicael & Tenkorang, 2010). Education and employment are regarded as the indirect measures of autonomy but they act as enabling factors in empowerment (Kishor, 2000).

The result from a study done in a North Indian city showed that education was positively associated with all factors related with women's autonomy but it gains strong significance with the autonomy of freedom in mobility. Highly educated women were more likely to have freedom of movement than the less educated (Bloom et.al, 2001). Similarly, another study from Ethiopia also showed that maternal education was positively associated with all dimensions of women's autonomy, where highly educated women were more likely to take part in decision making in large household purchases and visiting friends or relatives (Woldemicael & Tenkorang, 2010). It was found that women who have received primary or higher education were four times more likely to

seek health care than uneducated (OR = 4.45, 95% CI= 3.86- 5.14) (Woldemicael & Tenkorang, 2010).

2.2.2.3 Employment and occupation

Employment is considered as the important factor for improving women's overall status in society (Woldemicael, G, 2009). The nature of employment such as formal/informal, paid/unpaid, agricultural/non-agricultural makes a great difference in determining autonomy of women. For example, a study conducted in Guatemala explored that women who were employed in paid jobs are significantly more likely to participate in decision making than those who were not paid for their employment (Becker et al., 2006).

Employment was also found to be associated with some dimensions of women's autonomy like control over finances (OR=3.04, 95% CI=1.63-5.68), decision making power ((OR = 4.06, 95% CI = 2.24-7.37), and freedom of movement (OR = 1.95, 95% CI = 0.88-4.34) (Bloom et. al, 2001). Similarly another study from Nepal found significant association between employment and women's autonomy in household purchases, health care and freedom of mobility such as visiting friends or relatives (Acharya et al. 2010). It was also explored that women who were paid for their work were more likely to participate in health care decision making, household purchases and visiting friends or relatives than those who did not have paid work (Acharya et al. 2010; Senarath & Gunawardena, 2009). Similarly, women from rural areas in Pakistan who were employed in paid jobs were associated with all indices of female autonomy such as decision making, financial matters, mobility, access to resources etc (Sathar & Kazi, 2000). The authors also found that women who work outside home and paid for their job were more likely to make decisions on their mobility.

2.2.2.4 Income

Income is considered as the most important predictor for women's status within household and in the society. Furuta & Salway, (2006) found that women from high status family were more likely to involve in household decision making (43-46 % vs. 25-31%) and influence over earnings (26% vs. 7%) than the women of low and middle status family. One of the previous study from Nepal found that women from the richest

quintile of wealth index were significantly more likely to participate in decision making regarding health care (OR=1.33, 95% CI=1.16-1.53) and visiting friends and relatives (OR=1.47, 95% CI=1.28-1.70) (Acharya et al., 2010).

A study from rural Pakistan found association between women's autonomy and economic class which was measured by income and size of land holding (Sathar & Kazi, 2000). Economic class was found inversely associated with the autonomy indices. There was negative association between household economic status and decision making but economic autonomy was greater among the poorer women (Sathar & Kazi, 2000).

2.2.2.5 Culture and religion

Cultural and religious matters determine the social and health status of a woman. Socio cultural practices like discrimination against female children in health and general care, women's workload, lack of decision making power etc reflects the low social status of women (Okoije, 1994). A study conducted in Nicaragua found that traditional practices were associated with the use of maternal health care services. They were not able to use prenatal care services and were likely to deliver at home like other women within the families (Lubbock & Stephenson, 2008).

Another study conducted in India and Pakistan found the association between religion and women's autonomy which showed that Hindu women were less likely to experience constraints on their autonomy than Muslims (Jeejebhoy & Sathar, 2001). A study among married adolescent from Rural India found that Muslim women were likely to receive less antenatal and postnatal care as compared to other religions. About half of the women from other religion utilize safe delivery services but in case of Muslim women it was little lower i.e. 37% (Singh, P.K. et.al, 2012). There is inequality in use of maternal health services among the women of different religions. Christian and Sikh were more likely to give birth in health institutions than Muslim and Hindu women (Salam & Siddiqui, 2005). Furthermore, a study from Ethiopia also explored that maternal health care utilization varies with religion. This study found the lowest health seeking behavior among Muslims (OR=0.50, 95% CI=0.45-0.56) and the highest among the Christians (Woldemicael & Tenkorang, 2010).

2.2.3 Women's autonomy and maternal health care utilization

Since the Cairo International Conference in Population and Development (ICPD) in 1994, women's role has been recognized as a priority area for sustainable development as well as in reproductive health (United Nations, 1994). There have been number of studies conducted after the Cairo conference to find out the association between women's autonomy and reproductive health and most of the studies are cross-sectional in design. Bloom et al. (2000) found that freedom of movement was significantly associated with the likelihood of using a health professional at birth (OR=1.36, 95% CI=1.05-1.76) which provides evidence for the association that freedom of movement had strong effect on maternal health care utilization (Bloom et al., 2001).

One of the studies from Nepal showed significant association between decision making and utilization of delivery care. Women with strong decision making power in the household were 2.24 times more likely to deliver at health facility compared to women with little autonomy (Matsumura & Gubhaju, 2001. Another study carried out in Pakistan found significant positive correlation between women's decision making power and maternal health uptake but opposite result had been found with male's decision making after controlling other socio demographic factors (Hou & Ma, 2013).

Haque et al. (2010) studied the association between women's autonomy and maternal health care utilization in Bangladesh. They explored that women having higher level of overall autonomy were more likely to receive sufficient antenatal care (Adjusted OR=1.64, 95% CI=1.17-2.23) and receiving antenatal care from skilled personnel (AOR=1.91, 95% CI=1.42-2.45). Women who had medium level of overall autonomy were 1.40 times more likely to deliver with the assistance of skilled health personnel (OR=1.40, 95% CI=1.03-1.98) (Haque et al., 2010).

A study carried out in Pakistan to explore the association between women's autonomy and contraception use found that the women's autonomy was significantly associated with the use of contraceptives (Saleem & Bobak, 2005). The relationship between movement autonomy and contraception use was relatively weaker than that of decision making autonomy as the odds ratio for the highest autonomy was 5.04 (95% CI=3.67-6.92) and for the highest movement autonomy was 1.66 (95% CI=1.39-1.98) (Saleem & Bobak, 2005).

Previous studies showed that increase in women's autonomy power was associated with the improvement in child's caring practices and nutritional status of children (Kishor, 2000; Smith et al., 2003). Similarly, a study from Northern Kenya also explored the effects of women's autonomy on child's health. Results showed that there was no effect of women's autonomy on younger age (0-35 months) child's nutrition but higher level of autonomy were significantly associated with children of older aged (3-10 years) (Brunson et al., 2009). Another study from India also explored that low autonomy of women was an independent predictor of low birth weight (Adjusted OR=1.28, 95% CI=1.07-1.53) (Chakraborty & Anderson, 2011). A similar study carried out in Nepal found the significant association between women's autonomy and infant mortality rate (Adhikari & Sawangdee, 2011). Women who were involved in decision making in their health care were 26% less likely to experience infant mortality than those who were not involved in decision making rate (OR=0.74, 95% CI=0.57-0.95) (Adhikari & Sawangdee, 2011).

A study from Ethiopia demonstrated that women's autonomy was associated with maternal and child health care utilization. It found that women's autonomy was significantly associated with health seeking behavior of women (OR=1.61, 95% CI=1.52-1.69) (Woldemicael & Tenkorang, 2010). It also found that working women were 47 % more likely to seek maternal health care than non working mothers (OR=1.47, 95% CI=1.31-1.65). Paudel & Pitakmanaket (2010), found that women who made sole decision on their health care were 1.61 times more likely to use antenatal care than the women making joint decision with husbands or others after controlling socio demographic factors or other confounders (OR=1.61). Their study also showed that spousal communication on family planning was also associated with the use of antenatal care services.

One of the studies from Egypt found that improved status of women regarding increased educational level, support from husbands and older age at marriage were likely to increase the use of maternal health care use (Chiang et al., 2012). The above study also explained the participation in decision making in household issues such as what to cook, children's schooling and family planning were found insignificant to the regular

antenatal check up (OR=0.57, 95% CI=0.32-1.03) and skilled attendants at birth (OR=0.93, 95% CI=0.46-1.90).

A study carried out in Tajikistan found the association between women's autonomy and reproductive health care utilization which came up to a finding that women's autonomy was likely to increase the use of reproductive health care even though there was some negative effects of autonomy with attending four ANC checkups (Kamiya, 2011). The same study found that women's decision making on buying major items was significant with the four antenatal visits ($p<0.01$) but there was no significant result among women's decision on children's wellbeing and antenatal check-ups, institutional delivery and skilled attendants at birth.

A research carried out by Fotso et al. (2009) in the slums of Nairobi, Kenya showed a little different result which found household wealth, education and demographic and health covariates had strong relationships with place of delivery but the effects of women's overall autonomy, decision making and freedom of movement were rather weak. The result showed that women with at least secondary education were more likely to deliver in health facility ($p<0.01$) and also the pregnancies which were more likely to deliver in health institutions as compared to mistimed and unwanted pregnancies ($p<0.01$) (Fotso, et al., 2009).

Table 2: Review of studies on women's autonomy and maternal health care services

Author, Year	Country	Study design	Sample size	Outcomes	Results
Woldemicael & Tenkorang, 2010	Ethiopia	Cross sectional	5,560 married women who had live births in 5 years preceding the survey	Women's health seeking behavior	Women's autonomy was significantly associated with the health seeking behavior of women
Fotso et al., 2009	Kenya	Cross sectional	1,927 women who had pregnancy outcome in 2004-2005	Obstetrics health care services	Socio-demographic factors had strong relationship with place of delivery but women's autonomy was weakly associated.
Bloom et al., 2001	India	Cross sectional	300 women who had delivered child within 3 years of date of interview	Antenatal and delivery care services	Freedom of movement had strong effect on maternal health care utilization (OR=1.36, 95% CI=1.05-1.76)
Acharya et al., 2010	Nepal	Cross-sectional	8,257 married women aged 15-49 years	Decision making power	Women's increased education was positively associated with decision making on their own health care ($p<0.01$) Richest women were less likely to participate in decision making about their health care ($p<0.01$)
Haque et al., 2011	Bangladesh	Cross-sectional	1,778 currently married women aged 15-24 years living with at least 0-35 months old child	Antenatal and delivery care services	Women with higher level of overall autonomy were more likely to receive sufficient ANC visits (Adjusted OR=1.64, 95% CI=1.17-2.23). Women having medium level overall autonomy were 1.40 times more likely to (OR=1.40, 95% CI=1.03-1.98) to have skilled attendants at delivery than women with low autonomy.

Chiang et al., 2012	Egypt	Cross-sectional survey	201 married women of less than 50 years of age	Antenatal care check up, delivery in health facility and delivery attended by skilled professionals	Significant association was found between older age at marriage and higher education with the maternal health care utilization. Women with more than primary education were about 5.5 times more likely to use regular antenatal care services (OR=5.59, 95% CI= 2.98-10.47).
Adhikari &Sawangdee, 2011	Nepal	Cross-sectional	5,545 children who were born five years preceding the survey	Infant mortality rate	Infants of women who were involved in decision making regarding their own health care had a 25% lower chance of (OR=0.75) of dying than of those not involved in decision making.
Saleem & Bobak, 2005	Pakistan	Cross-sectional	6,579 married women of age 15-49 years	Use of contraceptive services	Significant association with decision autonomy and both lifetime and current contraceptive use, odds ratio for highest vs. lowest quintile were OR=1.8, 95% CI=1.4-2.4 and OR=2.0, 95% CI=1.4-2.8.
Furuta & Salway, 2006	Nepal	Cross-sectional	4,695 currently married women and had given birth within three years of preceding the survey	Antenatal and delivery care	Women's secondary education was strongly associated with greater use of health care Women who were involved in decision making regarding household purchases were more likely to receive health care (OR=1.3).

3. AIMS OF THE STUDY

The main aim of the study was to assess the association between women's autonomy and maternal health care utilization in Nepal.

The specific aims of the study were:

1. To analyze the maternal health care services utilization during pregnancy and delivery.
2. To determine the level of women's autonomy.
3. To analyze the association between various socio-demographic factors and maternal health care utilization.
4. To assess the association between women's autonomy and maternal health care utilization among Nepalese women.

4. MATERIALS AND METHODS

4.1 Study area

Nepal is a land locked country situated in Southern Asia, i.e. bordered to the east, south and west by India and to the north by China. It occupies total surface area of 147,181 square kilometers (NDHS, 2011). Topographically, Nepal is divided into three ecological regions; Mountain, Hill and Terai. The Mountain region accounts for 35% of the total land area, Hilly region accounts for 42% and Terai constitutes 23% of the total land area in Nepal. In the similar way, Nepal is divided into five development regions for administrative purposes which are namely Eastern, Central, Western, Mid-Western and Far-Western Development regions. The country is divided into 14 zones and 75 administrative districts. Districts are further divided into smaller units which are called as Village Development Committees (VDCs) and municipalities. Each VDC is composed of 9 wards and the number of wards in each municipality varies from 9 to 35.

The total population of Nepal is 26,494,505 with an annual population growth rate 1.35% (CBS, 2011). The male population is recorded as 12,849,041 and the female population is 13,645,463 with sex ratio of 94.2 males per 100 females (CBS, 2011). The literacy rate for males and females are 75.1% and 57.4% respectively. There are ten types of religions as reported by the census report, 2011, among which Hinduism is followed by 81.3%. The estimated domestic gross product of Nepal for 2011 is $19.921 billion (World Bank, 2012). Nepal's economy is largely based on agriculture and services which account for 36.1% and 48.5% of Nepal's GDP.

Source: http://www.mapsorama.com/political-map-of-nepal/

Fig 1: Map of Nepal

4.2 Data source

This study was based on Nepal Demographic Health Survey (NDHS), 2011 which is a part of worldwide DHS project and was carried out in every five years. NDHS is a nationally representative, population based household survey which was carried out under the aegis of the Population Division of the Ministry of Health and Population and implemented by New Era, a private research organization. The primary purpose of the 2011 NDHS is to furnish policymakers and planners with detailed information on fertility and family planning, child mortality, children's nutritional status, utilization of maternal and child health services, domestic violence, and knowledge of HIV/AIDS.

4.3 Data Sampling and sample size

The 2011 NDHS used the sampling frame provided by the list of census enumeration areas with population and household information from the 2001 Population Census. The country is broadly divided into three horizontal ecological zones, namely Mountain, Hill, and Terai and vertically, into five development regions. The cross section of these zones and regions results in 15 eco-development regions, which are referred to as sub

regions or domains in the 2011 NDHS. Due to the small population size in the mountain regions, the Western, Mid-western, and Far-western mountain regions are combined into one domain, yielding a total of 13 domains. In order to provide an adequate sample to calculate most of the key indicators at an acceptable level of precision, each domain had a minimum of about 600 households.

NDHS sample was a two-stage stratified cluster sample. In the first stage, EAs (Enumeration area) were selected using a probability-proportional-to-size strategy. In order to achieve the target sample size in each domain, the ratio of urban EAs to rural EAs in each domain was roughly 1 to 2, resulting in 95 urban and 194 rural EAs (a total of 289 EAs). In the second stage, 35 households in each urban EA and 40 households in each rural EA were randomly selected.

The 2011 NDHS collected demographic and health information from a nationally representative sample of 10,826 households, which yielded completed interviews with 12,674 women aged 15-49 years in all selected households and with 4,121 men aged 15-49 years in every second household. The total data of 4,148 women were analyzed in this study and 8,526 women were excluded from the study. Women who had given birth to a baby within five years preceding the survey were included in the present study.

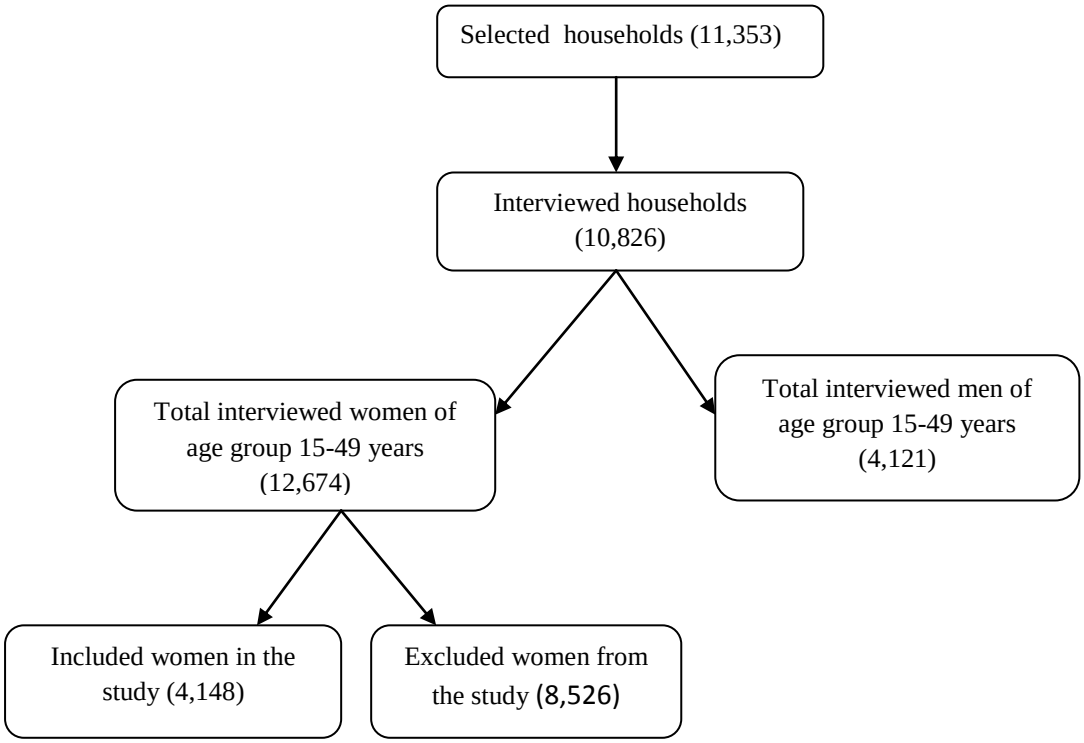

Fig 2: Sampling procedure

4.4 Study questionnaires

Three types of questionnaires were administered in the demographic health survey 2011: The household questionnaire, women's questionnaire and men's questionnaire. However this study was based on women's questionnaire and some background information from the household questionnaire.

4.5 Measurements of variables

4.5.1 Outcome variable

Two main variables were used to describe the utilization of maternal health care; antenatal care (ANC) and delivery care. Utilization of antenatal care was measured in terms of number of antenatal visits, timing of start of antenatal care and attendants during antenatal care. Similarly delivery care utilization was measured in terms of place of delivery and attendants during delivery.

4.5.1.1 Number of ANC visit

This variable describes the number of antenatal care that a woman received during the pregnancy. This variable was measured by using question, "How many times did you

receive antenatal care during the pregnancy?". The responses were collected in number and were varied from 0 to 19 times. However, in this analysis the variables were categorized into three; No visits, ≤3 visits and >3 visits.

4.5.1.2 Timing of start of ANC

Timing of initiation of ANC refers to the month of pregnancy from when a woman started to receive prenatal services. It was assessed by using the question "How many months were you when you first received antenatal care for this pregnancy?''. This variable was also categorized into three; ≤3 months, >3 months and no care. Here, ≤3 months refers to visit which took place during first trimester, >3 months means visit took place at second or third trimester.

4.5.1.3 Attendants during ANC

Attendants during ANC were assessed by using a question ''Whom did you see for antenatal care?'' with the following options for the responses; Health personnel- Doctor, Nurse/Midwife, Health Assistance (HA), Auxiliary Health Assistant (AHW), Maternal and Child Health Worker (MCHW), Village Health Worker (VHW); Other persons- Traditional Birth Attendants (TBA), Female Community Health Volunteers (FCHV), Relative/friend, others; No one. New variable was then created by re categorizing the responses into four; Skilled attendants (Doctor, Nurse, HA), Traditional trained attendants (MCHW, VHW), Traditional untrained attendants (FCHVs and relatives) and No attendants.

4.5.1.4 Place of delivery

The variable was measured by using a question "Where did you give birth to?'' with the following options: Home (your home, other's home), Government sector (Government hospital, Primary Health Care Center, Health Post, Sub Health Post, other government facilities), Non government sectors (Family Planning Association of Nepal, Adventist Development and Relief Agency, United Mission to Nepal, other nongovernmental organization), Private medical sector/ private hospitals/ clinic/ nursing home/ other private nursing home and others. In this analysis the variable was re categorized into two groups: Home and Health facility where health facility includes all public, private and non government sectors

4.5.1.5 Assistance during delivery

Assistance during delivery was measured by using a question, ‘‘Who assisted the delivery?’’ with the following options: Health personnel (Doctor, Nurse/Midwife, HA, AHW, MCHW, VHW), Other persons (TBA, FCHV, Relative/friend, others) and No one .For this analysis, it was re categorized in the same way as the attendants during ANC visits like above into four categories: Skilled attendants (Doctor, Nurse, HA), Traditional trained attendants (MCHW, VHW), Traditional untrained attendants (FCHVs and relatives) and No attendants.

4.5.2 Variables related with women’s autonomy

4.5.2.1 Women’s autonomy

There were four main questions regarding decision making capacity which explain the autonomy of women:

1. Who usually makes decisions about health care?

2. Who usually make decisions about making major household purchases?

3. Who usually makes decisions about visits to your family or relatives?

4. Who usually makes decisions how your (husband’s/ partner’s) earnings will be used?

Responses for each of the questions were measured using six options: respondent alone, respondent and husband/partner, respondent and other person, husband/partner alone, someone else and others. Two categories were made for the analysis in this study by combining first three options in which women has involvement in decision making into one group as ‘autonomy’ and the rest in other group with no autonomy.

4.5.2.2 Level of autonomy

All four dichotomized variables were combined into a single variable to explain the ‘autonomy level’ and it was further categorized into three as: ‘low’, ‘medium’ and ‘high’ level of autonomy.

4.5.3 Socio-demographic variables

In this study, the socio-demographic variables include mother’s education, age, wealth index, religion, type of residence, occupation and type of earning. Some of the variables such as religion, age, type of earning and occupation were re categorized for this

analysis. Religion was categorized into two groups: Hindu and others as majority were Hindus. Type of earning was also categorized into paid and not paid because most of the women in Nepal are involved in household and agricultural activities which are mostly unpaid. Also, for the age variable distribution was not even so, the age group above 35 was combined into one category as 35-49 and other categories of age were remained unchanged as age group: 15-19, 20-24, 25-29 and 30-34. Likewise mother's occupation was again categorized into three groups: not working, farmer and non farmer. Each categories of occupation other than not working and agriculture (professional/ technical/ managerial, clerical, sales and services, skilled manual, unskilled manual, others and don't know) were combined into one category i.e. non farming. Similarly, education was categorized into four groups; no education, primary, secondary and higher. The wealth index was calculated on the basis of household assets such as televisions and bicycles, materials used for housing construction and types of water access and sanitation facilities. The wealth index was constructed through a principal component analysis which places individual household in a continuous scale of relative wealth. It was then categorized into five groups; richest, richer, middle, poorer and poorest quintile.

4.6 Statistical analysis

The data was weighted to remove the possible bias due to unequal selection probabilities. When the weight was set the N in the weighted data equals the N in the unweighted data. Use of sample weights is inappropriate for estimating relationships, such as logistic regression and correlation coefficient. Therefore the weight was off for the regression analysis.

4.6.1 Descriptive statistics

Descriptive statistics of socio demographic variables, utilization of maternal health care services and women's autonomy and were calculated as frequency and percentage. The association between socio demographic and maternal health care utilization; socio demographic and women's autonomy; and between maternal health care utilization and women's autonomy was measured using Pearson Chi-Square test. Similarly, variables with p-value <0.05 was interpreted as statistically significant.

4.6.2 Logistic regression analysis

Logistic regression analysis was used to study the association between each outcome variables and determinants variables. The associations were presented as odds ratios and their 95% confidence intervals (95% CI). Multinomial regression was applied when the outcome variables had more than two categories. Multinomial regression analysis was used to calculate the Odds Ratios and their 95% confidence interval for number of ANC visits, timing of ANC initiation, attendants during ANC check up and delivery with respect to women's autonomy. Similarly, binary logistic model was used to calculate Odds Ratios and 95% confidence interval for place of delivery. In each table of logistic regression two models were fitted: Model I as Crude odds ratio and Model II was adjusted for all socio-demographic variables (age, place of residence, educational level, wealth index, religion, occupation and type of earning).

Statistical software SPSS version 20 was used for the analysis of data.

5. RESULTS

5.1 Socio-demographic characteristics of women

One third of the women were in the age group 20-24 years and another one third was in the age group of 24-29 years. Only 8% of the women were in the youngest age group (15-19 years) and 12% were in the older age group. Majority of women were living in rural areas (90%). Around 44% of women had no education whereas very less women had higher education (6%). There were almost one fourth women in the poorest quintile of the wealth index whereas about 16% were in the richest quintile. Majority of women were Hindu and 17% were other than Hindus. More than half of the women (58.2%) were involved in farming occupation, 14 % were non-farmer and 27.7% were not working. More than two third of the women who worked were in non-paid job while only 35% of women were in paid job (Table 1).

Table 1: Distribution of socio-demographic characteristics of women

Variables	**Number (N= 4148)**	**Percentage**
Age		
15-19	333	8.0
20-24	1329	32.0
25-29	1310	31.6
30-34	670	16.1
35-49	507	12.2
Type of residence		
Urban	418	10.1
Rural	3730	89.9
Highest educational level		
No education	1822	43.9
Primary	835	20.1
Secondary	1229	29.6
Higher	263	6.3
Wealth index		
Poorest	979	23.6
Poorer	899	21.7
Middle	873	21.0
Richer	748	18.0
Richest	649	15.7

Religion		
Hindu	3444	83.0
Others	704	17.0
Occupation		
Farmer	2416	58.2
Non farmer	583	14.1
Not working	1150	27.7
Type of earning		
Not paid	1957	65.3
Paid	1041	34.7

5.2 Distribution of outcome and autonomy variables

Table 2 describes the distribution of maternal health care utilization and women's autonomy variables. Only half of the studied population had ANC visits more than 3 times, whereas 15% had no antenatal care visits at all. Similarly, almost half of the women had started to receive ANC care in early stage of pregnancy (≤3 months) while 35.2% began after 3 months of their pregnancies. About half of the women (51%) received antenatal care from skilled professionals. Similarly about one fifth of the women received antenatal care from trained traditional, 14.2 % received from untrained traditional workers and 15.2% pregnant women had no care. In the same vein about 61% women had home delivery and only 36 % birth deliveries were attended by skilled health professionals while majority (59%) births occurred without any attendants.

Almost 60% of the women had autonomy in deciding health care, about 53% of women had autonomy in deciding on visiting friends or relatives, less than 50% had autonomy in large household purchases and 60.5% had autonomy in deciding money earned by their husbands. Majority of the women had medium level autonomy (40%) and only one fourth had higher level autonomy (Table 2).

Table 2: Distribution of maternal health care service utilization and women's autonomy

Variables	Frequency	Percentage
Number of ANC visits		
No visits	629	15.2
≤ 3 visits	1442	34.8
>3 visits	2078	50.1
Timing of start of ANC		
No care	629	15.2
≤3 months	2060	49.7
>3 months	1460	35.2
Attendants during ANC check up		
Skilled attendants	2124	51.2
Traditional trained attendants	804	19.4
Traditional untrained attendants	588	14.2
No attendants	632	15.2
Place of delivery		
Home	2480	60.8
Health facility	1598	39.2
Assistance during delivery		
Skilled attendants	1490	35.9
Traditional trained attendants	47	1.1
Traditional untrained attendants	175	4.2
No attendants	2436	58.7
Women's autonomy on health care		
Yes	2464	60.1
No	1639	39.9
Visiting friends or relatives		
Yes	2160	52.6
No	1944	47.4
Large household purchases		
Yes	1998	48.7
No	2106	51.3
Spending money earned by husband		
Yes	2416	60.5
No	1576	39.5

Women's overall autonomy		
Low	1403	35.1
Medium	1604	40.2
High	986	24.7

5.3 Socio-demographic variables and maternal health care utilization

5.3.1 Socio-demographic variables and number of ANC visits

Table 3 shows the association between socio-demographic variables and number of ANC visits. The largest group of women who had more than 3 ANC visits was of age group 20-24 and 25-29 years. Older age of women (35-49 years) was significantly associated with less or no ANC visits. The ANC visits were higher among middle age group of women than youngest and oldest age group of women. Women living in urban area were more likely to have ANC visits more than 3 times. Similarly, the number of ANC check-ups was different in rural and urban areas. There were almost 96% of women who had no care whereas 86% of the rural resident had more than 3 ANC visits. Women with no or primary education were more likely to have no care than the women with higher education. Similarly women with secondary education were significantly higher (42%) who had ANC visits more than 3 times. ANC visits more than 3 times was increasing with increasing the level of wealth index. Majority of Hindu women (86%) were associated with more than three ANC visits. Similarly, women with non-farmer occupation were associated with ANC visits more than 3 times. Women with paid job were associated with ANC visits more than 3 times (Table 3).

Table 3: Socio-demographic variables and number of ANC visits

N= 4148	**Number of ANC visits, n (%)**			**P- value**
	No visits	**≤3 times**	**>3 times**	
Age group				
15-19	27 (4.3)	125 (8.7)	181 (8.7)	<0.001
20-24	150 (23.9)	442 (30.7)	736 (35.4)	
25-29	141 (22.5)	457 (31.7)	712 (34.3)	
30-34	130 (20.7)	228 (15.8)	311 (15.0)	
35-49	180 (28.7)	189 (13.1)	138 (6.6)	
Type of residence				
Urban	27 (4.3)	92 (6.4)	300 (14.4)	<0.001

Rural	602 (95.7)	1350 (93.6)	1778 (85.6)	
Highest educational level				
No education	450 (71.5)	849 (58.8)	523 (25.2)	<0.001
Primary	120 (19.1)	284 (19.7)	431 (20.7)	
Secondary	58 (9.2)	291 (20.2)	881 (42.4)	
Higher	1 (0.2)	19 (1.3)	243 (11.7)	
Wealth index				
Poorest	322 (51.3)	380 (26.4)	277 (13.3)	<0.001
Poorer	166 (26.4)	382 (26.5)	352 (16.9)	
Middle	80 (12.7)	373 (25.9)	419 (20.2)	
Richer	47 (7.5)	214 (14.8)	487 (23.4)	
Richest	13 (2.1)	93 (6.4)	543 (26.1)	
Religion				
Hindu	495 (78.7)	1163 (80.7)	1787 (86.0)	<0.001
Others	134 (21.3)	279 (19.3)	291 (14.0)	
Occupation				
Farmer	483 (76.8)	917 (63.6)	1016 (48.9)	<0.001
Non farmer	45 (7.2)	128 (8.9)	410 (19.7)	
Not working	101 (16.1)	397 (27.5)	652 (31.4)	
Type of earning				
Not paid	391 (74.1)	694 (66.4)	872 (61.2)	<0.001
Paid	137 (25.9)	351 (33.6)	554 (38.8)	

5.3.2 Socio-demographic variables and timing of start of ANC

About one third of the women of age group 20-24 years and one third of age group 25-29 years had started antenatal check up in early pregnancy. There was significantly higher number of women (about 29%) who had no antenatal care. Large proportion of women living in rural areas had no care and late antenatal care. Similarly women having no or primary education had started their ANC care in more than three months of pregnancy and the women with secondary (39%) and higher education (11%) started ANC care ≤3 months. In case of wealth index, women of the poorest group were associated with no care while the richest group of women was associated with early ANC care. Significantly higher number of Hindu women started ANC visits ≤3 months of pregnancy. In the same way, non farmer women were associated with early ANC care than farmer and not working women. Women who had paid earning started ANC care in early pregnancy period (Table 4).

Table 4: Socio-demographic variables and timing of start of ANC

N= 4148	Timing of start of ANC, n (%)			P- value
	No care	≤3 months	>3 months	
Age group				
15-19	27 (4.3)	161 (7.8)	145 (9.9)	<0.001
20-24	150 (23.9)	707 (34.3)	471 (32.3)	
25-29	141 (22.5)	692 (33.6)	477 (32.7)	
30-34	130 (20.7)	333 (16.2)	207 (14.2)	
35-49	180 (28.7)	167 (8.1)	159 (10.9)	
Type of residence				
Urban	27 (4.3)	282 (13.7)	110 (7.5)	<0.001
Rural	602 (95.7)	1778 (86.3)	1350 (92.5)	
Highest educational level				
No education	450 (71.5)	637 (30.9)	735 (50.3)	<0.001
Primary	120 (19.1)	393 (19.1)	322 (22.1)	
Secondary	58 (9.2)	800 (38.8)	371 (25.4)	
Higher	1 (0.2)	231 (11.2)	32 (2.2)	
Wealth index				
Poorest	322 (51.3)	318 (15.4)	338 (23.2)	<0.001
Poorer	166 (26.4)	363 (17.6)	370 (25.4)	
Middle	80 (12.7)	415 (20.1)	377 (25.9)	
Richer	47 (7.5)	446 (21.7)	255 (17.5)	
Richest	13 (2.1)	518 (25.1)	118 (8.1)	
Religion				
Hindu	485 (78.7)	1768 (85.8)	1182 (81.0)	<0.001
Others	134 (21.3)	292 (14.2)	278 (19.0)	
Occupation				
Farmer	483 (76.8)	1057 (51.3)	876 (60.0)	<0.001
Non farmer	45 (7.2)	378 (18.3)	160 (11.0)	
Not working	101 (16.1)	625 (30.3)	424 (29.0)	
Type of earning				
Not paid	391 (74.1)	878 (61.2)	688 (66.4)	<0.001
Paid	137 (25.9)	557 (38.8)	348 (33.6)	

5.3.3 Socio-demographic variables and place of delivery

About one third of the studied population of age group 20-24 years and 25-29 years had given birth to their babies at health facility. Lowest proportion of women of the age group 35-49 years (7%) was associated with institutional delivery. Women living in

urban areas were associated with delivery in health facility but majority of women (96%) residing in rural areas had given birth at home. Similarly women with low education were less likely to give birth at health facility while most of the women having secondary (45%) and higher education (13.5%) were associated with delivery in health facility. According to wealth index, poorest group of women were associated with home delivery. As the level of wealth increased, the percentage of women with health facility delivery also increased. Majority of the Hindu (86%) women had given birth in health facility. Likewise, most of the women (72%) who were engaged in farming were associated with home delivery. Women who were paid for their work (45%) gave birth at health facility (Table 5).

Table 5: Association between socio-demographic variables and place of delivery

N= 4148	**Place of delivery, n (%)**		**P- value**
	Home	**Health facility**	
Age group			
15-19	148 (6.0)	181 (11.3)	<0.001
20-24	744 (30.0)	559 (35.0)	
25-29	767 (30.9)	526 (32.9)	
30-34	433 (17.5)	226 (14.1)	
35-49	388 (15.6)	105 (6.6)	
Type of residence			
Urban	103 (4.2)	311 (19.5)	<0.001
Rural	2377 (95.8)	1286 (80.5)	
Highest educational level			
No education	1418 (57.2)	377 (23.6)	<0.001
Primary	531 (21.4)	285 (17.8)	
Secondary	490 (19.8)	719 (45.0)	
Higher	41 (1.7)	216 (13.5)	
Wealth index			
Poorest	831 (33.5)	127 (8.0)	<0.001
Poorer	652 (26.3)	229 (14.3)	
Middle	540 (21.8)	318 (19.9)	
Richer	335 (13.5)	402 (25.2)	
Richest	122 (4.9)	521 (32.6)	

Religion			
Hindu	2009 (81.0)	1370 (85.8)	<0.001
Others	471 (19.0)	227 (14.2)	
Occupation			
Farmer	1775 (71.6)	599 (37.5)	<0.001
Non farmer	225 (9.1)	351 (22.0)	
Not working	480 (19.4)	647 (40.5)	
Type of earning			
Not paid	1393 (69.6)	526 (55.3)	<0.001
Paid	608 (30.4)	425 (44.7)	

5.4 Women's autonomy and maternal health care utilization

5.4.1 Women's autonomy and number of ANC visits

More than two thirds of women (67%) who had autonomy in deciding health care had more than three ANC visits. About equal proportion of women who had autonomy and who had not were associated with no ANC visits. Almost half of the women (51%) had visited for more than three ANC check-ups while about 56% women with no autonomy had no ANC visits. Similar result was found in case of visiting friends or relatives however the association was not statistically significant. In case of autonomy in spending money earned by husbands, there was positive association between women with more than 3 ANC visits and deciding spending money earned. Furthermore, about one fourth of women (42%) who had medium level of autonomy were more likely to have more ANC visits than women with high and low level of autonomy (Table 6).

Table 6: Association between autonomy variables and number of ANC visits

N=4148	Number of ANC visits, n (%)			P-value
	No visits	≤ 3 times	>3 times	
Women's autonomy on Health care				
Yes	317 (51.3)	776 (54.3)	1371 (66.7)	<0.001
No	301 (48.7)	653 (45.7)	686 (33.3)	
Large household purchases				
Yes	270 (43.8)	672 (47.0)	1055 (51.3)	0.001
No	347 (56.2)	757 (53.0)	1002 (48.7)	
Visiting friends or relatives				
Yes	319 (51.6)	716 (50.1)	1125 (54.7)	0.025
No	299 (48.4)	713 (49.9)	932(45.3)	
Spending money earned by husband				
Yes	321 (53.9)	792 (57.0)	1303 (65.0)	<0.001
No	275 (46.1)	598 (43.0)	703 (35.0)	
Overall autonomy				
Low	174 (29.2)	472 (34.0)	756 (37.7)	<0.001
Medium	247 (41.4)	519 (37.3)	838 (41.8)	
High	175 (29.4)	399 (28.7)	412 (20.5)	

5.4.2 Women's autonomy and timing of start of ANC

Table 7 shows the association between women's autonomy and timing of start of ANC visits. About two third of the women who have autonomy in health care had started ANC care in early stage of pregnancy while women with no autonomy were mostly associated with no care and late care. Likewise, women with autonomy in large household purchases were associated with ANC care before three months of pregnancy. More than two third (64%) of women who had autonomy in spending money earned by husbands had started antenatal care in first trimester of pregnancy. Majority of the women (42%) who had medium level of autonomy had started early ANC care than low and high level autonomy (Table 7).

Table 7: Association between autonomy variables and timing of start of ANC

N=4148	Timing of start of ANC, n (%)			P-value
	No care	≤3 months	>3 months	
Women's autonomy on Health care				
Yes	317 (51.3)	1343 (65.8)	804 (55.7)	<0.001
No	301 (48.7)	699 (34.2)	639 (44.3)	
Large household purchases				
Yes	270 (43.8)	1042 (51.0)	686 (47.5)	0.004
No	347 (56.2)	1001 (49.0)	758 (52.5)	
Visiting friends or relatives				
Yes	319 (51.6)	1105 (54.1)	737 (51.0)	0.172
No	299 (48.4)	937 (45.9)	707 (49.0)	
Spending money earned by husband				
Yes	321 (53.9)	1276 (64.2)	819 (58.1)	<0.001
No	275 (46.1)	711 (35.8)	590 (41.9)	
Overall autonomy				
Low	174 (29.1)	744 (37.4)	485 (34.4)	<0.001
Medium	248 (41.5)	834 (42.0)	523 (37.1)	
High	175 (29.3)	409 (20.6)	402 (28.5)	

5.4.3 Women's autonomy and place of delivery

Women having autonomy on health care were associated with delivery in health facility (Table 8). More than two third of women having autonomy in health care decision making had delivery in health facility. Percentage was little higher in giving birth at health facility (52%) than in home (47%) among the women having autonomy in large household purchases. Similarly, there was little but statistically significant difference in home and health facility delivery among the women who had autonomy in visiting friends or relatives. Likewise, women's autonomy in spending money earned by husbands was associated with delivery in health facility. In case of women's overall autonomy, deliveries in health facility was higher in women with low and medium level autonomy comparing with high autonomy.

Table 8: Association between autonomy variables and place of delivery

N=4148	Place of delivery, n (%)		P-value
	Home	**Health facility**	
Women's autonomy on Health care			
Yes	1385 (56.5)	1038 (65.7)	<0.001
No	1068 (43.5)	543 (34.3)	
Large household purchases			
Yes	1148 (46.8)	818 (51.7)	0.001
No	1304 (53.2)	763 (48.3)	
Visiting friends or relatives			
Yes	1264 (51.5)	858 (54.3)	0.087
No	1189 (48.5)	722 (45.7)	
Spending money earned by husband			
Yes	1363 (57.4)	1012 (65.2)	<0.001
No	1010 (42.6)	539 (34.8)	
Overall autonomy			
Low	798 (33.6)	581 (37.5)	<0.001
Medium	924 (38.9)	648 (41.8)	
High	652 (27.5)	321 (20.7)	

5.5 Regression analysis for maternal health care utilization

5.5.1 Women's autonomy and number of ANC visits

Table 9 shows the odds ratio (OR) and 95% Confidence interval (CI) for number of ANC visits with respect to women's autonomy. Women who have autonomy in their health care were significantly more likely to have more than 3 ANC visits (OR=1.69, 95% CI= 1.41-2.03). The association became weaker but still remained significant even when adjusted for all socio-demographic variables included in Model II (OR= 1.51, 95% CI= 1.20-1.91). Women with autonomy in making large household purchases, were also more likely to have ANC visits more than 3 times (from adjusted model OR=1.35, 95% CI= 1.07-1.70). In the similar trend woman with an autonomy on spending money earned by husband had 30% higher probability of having more than 3 ANC visits (adjusted OR=1.30, 95% CI=1.02-1.64). Women who had low level

autonomy were more likely to receive more than 3 ANC visits (OR=1.84, 95% CI=1.44-2.34) than women with medium level of autonomy were (OR=1.43, 95% CI=1.14-1.80). However the significant association was lost when adjusted for all socio-demographic variables in Model II.

Table 9: Odds ratios and 95% confidence interval (CI) for number of ANC visit with respect to women's autonomy

Women's autonomy	**OR 95% CI**			
	Model I		**Model II**	
	≤3 visits	**>3 visit**	**≤3 visits**	**>3 visit**
Health care				
No	1	1	1	1
Yes	1.10 (0.91-1.34)	1.69 (1.41-2.03)	1.24 (0.99-1.55)	1.51 (1.20-1.91)
Large household purchases				
No	1	1	1	1
Yes	1.15 (0.94-1.39)	1.27 (1.06-1.53)	1.34 (1.07-1.69)	1.35 (1.07-1.70)
Visiting friends and relatives				
No	1	1	1	1
Yes	0.93 (0.77-1.13)	1.05 (0.88-1.27)	1.10 (0.88-1.38)	1.07 (0.85-1.35)
Spending money earned by husband				
No	1	1	1	1
Yes	1.22 (1.00-1.49)	1.53 (1.27-1.84)	1.35 (1.08-1.71)	1.30 (1.02-1.64)
Overall autonomy				
High	1	1	1	1
Medium	0.91 (0.72-1.16)	1.43 (1.14-1.80)	0.87 (0.64-1.18)	0.81 (0.64-1.02)
Low	1.18 (0.92-1.52)	1.84 (1.44-2.34)	0.56 (0.40-0.79)	0.86 (0.67-1.11)

Model I: Crude Odds Ratio
Model II: Adjusted for socio-demographic variables

5.5.2 Women's autonomy and timing of start of ANC

Women having autonomy in health care were significantly more likely to receive early ANC care (OR=1.65, 95% CI=1.37-1.99). The association remained significant even

after adjusting for all socio-demographic variables in Model II (OR=1.46, 95% CI=1.16-1.84). Similarly, women having autonomy in deciding large household purchases were more likely to receive early ANC care (from adjusted model OR=1.38, 95% CI=1.10-1.74). There was no significant association between autonomy on visiting friends or relatives and early initiation of ANC care. Women who had autonomy in spending money earned by husband had about higher probability of starting ANC care in early stage of pregnancy (OR=1.54, CI=1.28-1.86). Furthermore, women having low level of overall autonomy were less likely to start ANC care in early stage of pregnancy (adjusted OR=0.68, 95% CI=0.50-0.90). But there was no significance association between women having medium level autonomy and early start of ANC care (Table 10).

Table 10: Odds ratios and 95% confidence interval (CI) for timing of start of ANC with respect to women's autonomy

Women's autonomy	**OR 95% CI**			
	Model I		**Model II**	
	≤3 months	**>3 months**	**≤3 months**	**>3 months**
Health care				
No	1	1	1	1
Yes	1.65 (1.37-1.99)	1.61 (1.95-1.40)	1.46 (1.16-1.84)	1.26 (1.00-1.58)
Large household purchases				
No	1	1	1	1
Yes	1.29 (1.07-1.55)	1.15 (0.94-1.39)	1.38 (1.10-1.74)	1.33 (1.06-1.67)
Visiting friends and relatives				
No	1	1	1	1
Yes	1.05 (0.88-1.27)	0.93 (0.77-1.13)	1.10 (0.87-1.38)	1.07 (0.85-1.35)
Spending money earned by husband				
No	1	1	1	1
Yes	1.54 (1.28-1.86)	1.21 (0.99-1.47)	1.38 (1.09-1.74)	1.27 (1.01-1.60)

Overall autonomy				
High	1	1	1	1
Medium	1.09 (0.86-1.37)	1.56 (1.31-1.87)	1.10 (0.82-1.47)	1.26 (1.00-1.58)
Low	0.82 (0.64-1.06)	1.50 (1.26-1.80)	0.68 (0.50-0.94)	1.26 (0.98-1.60)

Model I: Crude Odds Ratio

Model II: Adjusted for socio-demographic variables

5.4.3 Women's autonomy and attendants during ANC visits

Women having autonomy in health care were significantly more likely to receive care from skilled health personnel (OR=1.51, 95% CI=1.25-1.81). But the association seemed weaker while adjusting for all socio demographic variables still significant (OR=1.34, 95% CI=1.06-1.68). Similarly women who had autonomy in large household purchases were more likely to get antenatal care from skilled providers (Adjusted OR=1.41, CI=1.12-1.78). In the same way, women who had autonomy in spending money earned had higher probability of getting ANC care from skilled health professionals (Adjusted OR=1.37, 95% CI=1.08-1.72). Women who had low level of autonomy were more likely to get ANC care from skilled health workers (Adjusted OR=1.75, 95% CI=1.27-2.42).

Table 11: Odds ratios and 95% confidence interval (CI) for attendants during ANC visit with respect to women's autonomy

Women's autonomy	OR 95% CI					
	Model I			Model II		
	Skilled attendants	Traditional trained attendants	Traditional untrained attendants	Skilled attendants	Traditional trained attendants	Traditional untrained attendants
Health care						
No	1	1	1	1	1	1
Yes	1.51 (1.25-1.81)	1.20 (0.96-1.49)	1.33 (1.06-1.68)	1.34 (1.06-1.68)	1.29 (1.00-1.66)	1.37 (1.05-1.79)
Large household purchases						
No	1	1	1	1	1	1
Yes	1.34 (1.12-1.69)	1.39 (0.91-1.40)	0.99 (0.79-1.25)	1.41 (1.12-1.78)	1.33 (1.03-1.71)	1.25 (0.96-1.64)
Visiting friends and relatives						
No	1	1	1	1	1	1
Yes	1.09 (0.91-1.30)	0.94 (0.75-1.61)	0.86 (0.69-1.08)	1.32 (0.90-1.42)	1.09 (0.85-1.40)	1.04 (0.80-1.36)
Spending money earned by husband						
No	1	1	1	1	1	1
Yes	1.52 (1.26-1.83)	1.17 (0.94-1.47)	1.24 (1.98-1.56)	1.37 (1.08-1.72)	1.22 (0.95-1.98)	1.33 (1.01-1.74)
Overall autonomy						
High	1	1	1	1	1	1
Medium	1.20 (0.96-1.50)	1.00 (0.77-1.30)	1.32 (0.99-1.76)	1.04 (0.77-1.41)	0.88 (0.64-1.21)	1.10 (0.77-1.55)
Low	1.63 (1.28-2.07)	1.31 (0.99-1.73)	1.33 (0.98-1.81)	1.75 (1.27-2.42)	1.48 (1.05-2.10)	1.49 (1.02-2.19)

Model I: Crude Odds Ratio
Model II: Adjusted for socio-demographic variables

5.4.4 Women's autonomy and place of delivery

Women having autonomy in health care were 1.44 times more likely to give birth at health facility (OR=1.44, 95% CI=1.26-1.64). When adjusting for all socio-demographic variables, the significant association was lost). Likewise, women with autonomy in spending money earned had higher probability of giving birth in health center (OR=1.41, 95% CI=1.23-1.61). However the significant was lost when adjusted for all socio-demographic variables. Furthermore, women having low and medium level of autonomy were less likely to give birth at health facility (for low autonomy OR=0.67, 95% CI=0.56-0.80 and for medium level OR=0.70, 95% CI=0.59-0.82) but the association lost its significance when adjusted for all socio demographic variables (Table 12).

Table 12: Odds ratios and 95% Confidence interval (CI) for place of delivery in health facility with respect to women's autonomy

Women's autonomy	**OR 95% CI**	
	Model I	**Model II**
Health care		
No	1	1
Yes	1.44 (1.26-1.64)	1.13 (0.94-1.37)
Large household purchases		
No	1	1
Yes	1.22 (1.08-1.39)	1.14 (0.94-1.37)
Visiting friends or relatives		
No	1	1
Yes	1.10 (0.97-1.25)	1.02 (0.84-1.23)
Spending money earned by husband		
No	1	1
Yes	1.41 (1.23-1.61)	1.14 (0.94-1.38)

Overall autonomy		
High	1	1
Medium	0.70 (0.59- 0.82)	0.79 (0.62-1.02)
Low	0.67 (0.56-0.80)	0.70 (0.53-0.92)

Model I: Crude Odds Ratio

Model II: Adjusted for socio-demographic variables

5.4.5 Women's autonomy and attendants during delivery

Women having autonomy in health care were more likely to get care from skilled providers during delivery (OR=1.46, 95% CI=1.27-1.67). When adjusted for all demographic variables, significant association was lost. Similarly women with autonomy in large household purchases had higher probability to have skilled attendants during delivery (OR=1.24, 95% CI=1.09-1.41). Women who had autonomy in spending money earned were 1.42 times more likely to receive delivery care from skilled health workers (OR=1.42, 95% CI=1.24-1.63). Women with low level of autonomy had higher probability of getting delivery care from skilled attendants (OR=1.54, 95% CI=1.29-1.84) and the association was still remained significant even after adjusting for all socio-demographic variables (Adjusted OR=1.40, 95% CI=1.06-1.85). In the same way, women with medium level autonomy were more likely to get delivery care from skilled attendants (OR=1.46, 95% CI=1.23-1.74) (Table 13).

Table 13: Odds ratios and 95% Confidence interval (CI) for assistance during delivery with respect to women's autonomy

Women's Autonomy	OR 95% CI					
	Model I			Model II		
	Skilled attendants	Traditional trained attendants	Traditional untrained attendants	Skilled attendants	Traditional trained attendants	Traditional untrained attendants
Health care						
No	1	1	1	1	1	1
Yes	1.46 (1.27-1.67)	1.46 (0.79-2.68)	1.06 (0.77-1.46)	1.11 (0.91-1.35)	1.44 (0.75-2.75)	0.96 (0.66-1.40)
Large household purchases						
No	1	1	1	1	1	1
Yes	1.24 (1.09-1.41)	1.53 (0.85-2.75)	0.95 (0.69-1.30)	1.11 (0.92-1.35)	1.54 (0.82-2.88)	0.97(0.68-1.43)
Visiting friends and relatives						
No	1	1	1	1	1	1
Yes	1.12 (0.98-1.28)	1.00 (0.56-1.79)	0.94 (0.68-1.28)	1.00 (0.82-1.21)	1.01 (0.54-1.88)	0.92 (0.63-1.33)
Spending money earned by husband						
No	1	1	1	1	1	1
Yes	1.42 (1.24-1.63)	1.44 (0.78-2.66)	1.30 (0.94-1.81)	1.09 (1.89-1.32)	1.45 (0.76-2.76)	1.31 (0.89-1.93)
Overall autonomy						
High	1	1	1	1	1	1
Medium	1.46 (1.23-1.74)	1.21 (0.53-2.75)	1.59 (1.06-2.37)	1.27 (0.98-1.65)	0.86 (0.36-2.04)	1.45 (0.89-2.38)
Low	1.54 (1.29-1.84)	2.01 (0.92-4.36)	1.18 (0.76-1.82)	1.40 (1.06-1.85)	1.70 (0.74-3.92)	1.22 (0.71-2.11)

Model I: Crude Odds Ratio
Model II: Adjusted for socio-demographic variables

6. DISCUSSIONS

6.1 Summary of findings

The aim of this study was to assess the effects of women's autonomy on maternal health care utilization in Nepal. The present study found low utilization of antenatal and delivery care services among Nepalese women. Majority of women had low to medium level of autonomy regarding decision making in health care, mobility and household purchases. Women with high autonomy in decision making for their own health care were more likely to have antenatal care during early pregnancy and they were also more likely to deliver in health facility and have skilled birth attendants.

6.2 Comparison with earlier studies

6.2.1 Prevalence of maternal health care services

This study showed that almost half of the women had attended ANC visits more than three times and 15% women had no antenatal care at all. This finding of the present study is similar to the findings of one of the recent studies conducted in Ethiopia which showed about 54% women received ANC care during their pregnancy (Tsegay et al., 2013). The present study also found that half of the women received antenatal care from skilled professional which is similar to one earlier study conducted in Bangladesh where 52% women received antenatal care from medically trained personnel (Hossain, 2011). In low- and middle-income countries majority of women cannot make sufficient ANC visits because of several reasons. One of the reasons could be lack of awareness of benefits and also other possible reasons could be feeling ashamed, work load and distance to health facility (Hossain, 2011; Ye et al. 2010).

This study demonstrated that almost half of the women started to receive ANC care in the early stage of pregnancy and 35% started to seek after three months of pregnancy. This result is consistent with the finding of an earlier study conducted in Karachi, Pakistan which found that about half of the women started to receive ANC care during first trimester of their pregnancy (Nishar & White, 2003). However, one study from Kenya showed less percentage of women (14%) starting ANC care in very early period of pregnancy and more than two third of women started care in the second trimester (Eijk et al. 2006).

Similarly the findings from this study showed that two third of delivery had occurred at home and only about one third deliveries were handled by skilled professionals. A study from Ethiopia found the similar findings showing very low institutional delivery and rest of them were occurred at home with the help of traditional birth attendants or family members and friends which figured out that very fewer deliveries were attended by skilled birth attendants (Tsegay et al. 2013). Nevertheless, a study from Kenya also found low institutional delivery with 83% deliveries occurring outside health facility and only 17% deliveries were attended by skilled attendants (Eijk et al., 2006). On the contrary, Nigerian study found high utilization of delivery care services with only 1.5% home delivery and more than half of the women went to government hospitals for delivery (Iyaniwura & Yussuf, 2009). This high utilization of maternity services was found because of high level of awareness of the need for special care for women during pregnancy and majority of women had access to mass media (Iyaniwura & Yussuf, 2009).

6.2.2 Women's autonomy

The present study assessed women's autonomy in terms of decision making power in seeking health care, mobility and financial matters. About 60% of women had autonomy in deciding health care and 53% women were involved in decision making regarding visiting friends or families. Similar results were found in one of the earlier studies conducted in Nepal which showed that about 57% of women were involved in decision making of their own health care 49% involved in deciding visiting friends or families (Adhikari & Sawangdee, 2011). Moreover, this study found 35% women had low level of autonomy and 25% had higher autonomy. This finding of the study consistent with one of the earlier study by Haque et al. (2012) which showed that 33 % women had low autonomy and 31% had high autonomy in Bangladesh. Another study from rural India also found low autonomy regarding involvement of women in decision making. It showed that more than half of the women were not involved in decision making regarding health care (55.4%) and majority of women need to take permission to go to market (71.3%) or to visit friends or relatives (82.2%) (Mistry et al., 2009). In the low- and middle-income countries, women are mostly dominated by men so, their involvement in decision making related to household activities, health care and financial matter is comparatively low. But in context of high-income countries, women are

treated equally as men in every opportunity such as education, employment, freedom etc (Cohen, 2006). Thus, women in high-income countries are found to be involved in household decision making as well as in managerial decision making in different organization.

6.2.3 Socio-demographic factors and maternal health care utilization

This study found that several socio-demographic factors were associated with maternal health care utilization. Women of middle age group were more likely to receive ANC care than the younger and older age group of women. Similar findings were also shown in an earlier study carried out in Bangladesh which found the proportion of ANC care was comparatively lower among the women with low age (Haque et al. 2012). Similar to the finding of this study, earlier study by Furuta & Salway (2006) also supported the result of this present study which found the highest proportion of women seeking ANC care was from middle age group.

Women with higher education were more likely to have ANC care during their pregnancy. Similar result was found in some earlier studies showing that education was the most important factor which had influence on maternal care utilization (Ahmed et al., 2010; Furuta & Salway, 2006). A strong association was found in an earlier study which showed that women who have received primary or higher education were four times more likely to seek health care than uneducated (OR = 4.45, 95% CI= 3.86- 5.14) (Woldemicael & Tenkorang, 2010).

This study also shows that women who were involved in other occupation than farming were more likely to attend three or more ANC visits and likely to start ANC care in early stage of pregnancy. This study also found that women with non farming occupation received maternal care from skilled attendants and they were more likely to deliver in health facility. On the contrary, one previous study had found that employed women were less likely to deliver at a health institution (Matsumura & Gubhaju, 2001). Similarly another study from Nepal also demonstrated that working women had less probability of receiving antenatal services than the women who were not working (OR=0.64) and also working women were 50% less likely to receive delivery services than non working women (OR=0.50) (Paudel & Pitakmanaket, 2010). Women who were employed in informal occupation may not get free time to visit health personnel

for health check up so the findings of some earlier studies showed different result than the present study.

The number of ANC visits by pregnant women increased with the increasing level quintile of wealth of the women in this study. Similar result was also reported from the study conducted in India which showed that women from the richest quintile of wealth index were more likely to use antenatal care than the women from poorest quintile (Singh et al. 2012). A study from Pakistan found that women with high household income were more likely to use maternal health care services (Nishar & White, 2003). The present study also found that women from the poorest quintile of wealth index were more likely to deliver at home. Similar findings was found in an Indian study where poor women were less likely to use delivery care services at health facilities due to inability to afford the high cost of delivery services and medicines (Salam & Siddiqui, 2006).

6.2.4 Women's autonomy and maternal health care utilization

Significant association was found between women's autonomy and use of antenatal care services in the present study. Use of antenatal care services were significantly associated with each indices of women's autonomy such as decision making in health care, household purchases and spending money earned in our study. However the association between antenatal care services and the autonomy regarding visiting friends or relatives was not significant. A study from India also found that all indices of autonomy like freedom of movement, control over finances and decision making power were significantly associated with the use of antenatal care services (Bloom et al. 2001). Another study from Ethiopia and Eritrea also revealed that women who had autonomy in deciding daily household purchases and visiting friends or relatives had strong and positive significance with the use of antenatal care services (Woldemicael, 2007).

Women having low level of autonomy were more likely to attend more than three visits of ANC check-ups than the women with medium level autonomy. However, another study conducted in Bangladesh found that women having high autonomy were more likely to go for frequent antenatal check up (OR=1.92, 95% CI=1.46-2.52) (Haque et al. 2012). Women who had higher power of deciding health care had higher probability of seeking health care services. This study found that women who made sole decision on

their health care were more likely to use antenatal care than the women making joint decision with husbands or others which is similar to the findings of one of the earlier study (Paudel & Patakamanaket, 2010).

Many studies showed that women's autonomy in deciding health care was likely to increase the utilization of maternal and child health care services. A study from Tajikistan found that increase in women's autonomy was likely to increase the use of maternal health care services (Kamiya, 2011). One earlier study from Nepal stressed that infant mortality was lower among the women who had higher autonomy in deciding their health care because such women were more likely to use antenatal and postnatal care services (Adhikari & Sawangdee, 2011). Despite of these results from previous study, a study from rural Egypt showed that participation of women in household decision making had no significant linkage with the use of maternal health services (Chiang et al. 2012). This may be due to full moral support and encouragement from the family members as well as low fee for maternal check up in Egypt.

This study found that women with medium level autonomy were more likely to get delivery care from skilled attendants than women with low level autonomy. This result is consistent with the findings from previous study conducted in Bangladesh that women with medium level autonomy were more likely to get delivery services from skilled attendants (Haque et al. 2012). In this present study women who were involved in decision making regarding large household purchases and spending money earned were found to be significantly associated with the use of delivery services and seeking skilled attendants during delivery. Similar results have been reported in one of the earlier studies from Tajikistan which showed that women with autonomy in buying major items in household and who involved in decision making regarding financial matters had higher probability of using delivery care services from skilled attendants (Kamiya, 2011). However, a study from India showed that decision making autonomy was not found to be significantly associated with delivery care (OR=0.99, 95% CI=0.94-1.04) but other indices of autonomy like financial and freedom of mobility were positively significant with the institutional delivery (Mistry et al, 2009).

6.3 Strength and weakness of study

This study was based on latest Demographic and Health Survey data which is a part of worldwide DHS survey and carried out in every five years. NDHS is a nationally representative, population based household survey. This survey is aimed to provide detailed information on fertility and family planning, child mortality, children's nutritional status, utilization of maternal and child health services, domestic violence, and knowledge of HIV/AIDS to the policy makers and planners. Data from NDHS 2011 allow for comparison of the information collected over a period of time and add to the growing international database on demographic and health related variables. Information regarding socio-demographic and health issues were obtained from the interview of women and men by trained persons using standard questionnaire format. Pre-testing was conducted in different language and possible corrections were made after that. The most important component of pretest was to test the entry program on tablet personal computers as this is the first time that NDHS 2011 use tablet personal computers to collect data from the field. This study was based among the women of reproductive age group from 15-49 years who had given birth to a child five years prior to the study so that recent information could be received from them

Information was collected retrospectively, therefore there is a probability of recall bias regarding the information of antenatal care, delivery care and decision making issues. There were few missing data which were excluded during the analysis which could have some impacts on results. Furthermore, health care utilization was assessed in terms of antenatal and delivery care services but postnatal care services were not considered in this study. Similarly, women's autonomy was assessed only in terms of decision making power in health care, financial matters and mobility which affect the result of this study.

7. CONCLUSION AND FUTURE IMPLICATIONS

This study provides the information regarding current status of maternal health care utilization in Nepal and its association with women's autonomy. The study found low level of maternal health care utilization among Nepalese mothers such as antenatal and delivery care services. Consulting skilled health care provider for maternal care services was still low. Women seeking health care during early period of pregnancy was found to be low and the figure of institutional delivery was very low in Nepal as compared to other low- and middle-income countries. Furthermore, majority of women had medium level of autonomy but most of the women had participation in decision making regarding health care and financial matters. Utilization of maternal health care services was found positively associated with education, urban residence, age, economic status and paid occupation.

Moreover, this study provides important insights about association between women's autonomy and maternal health care utilization in Nepal. Women's autonomy in decision making regarding health care, household purchases and money expenditure was strongly associated with the use of antenatal and delivery care services. This study revealed that higher autonomy of women in household will result in higher utilization of maternal care services.

Women's autonomy is one of the most important elements related to maternal health. The findings of this study imply that women's autonomy is needed to be improved for the better use of maternal health care services which results in low morbidity and mortality among the women of reproductive age group. Participation of women in household decision making and health care decision will increase the health care utilization during pregnancy and delivery leading to better maternal and child health outcome. Similarly, education and employment opportunities should be increased to improve the autonomy of women in health care as well as to increase the utilization of maternal and health care services.

Acknowledgements

This study was carried out at the School of Health Sciences, University of Tampere. I am grateful to the University of Tampere for providing me with the opportunity and support to conduct this study.

I am very pleased to thank many people who support me to make this study possible. Firstly, I express my heartfelt gratitude to my supervisor, Dr. Subas Neupane for his guidance and constant support throughout the entire study period.

My sincere thanks go to Prof. Clas-Håkan Nygård, Prof. Matti Salo, Dr. Tapio Kirsi and Ms Catarina Ståhle-Nieminen for their valueable suggestions and ideas during my study.

I wish to sincerely thank all my classmates of Health Science and friends who provide me assistance and support during the study period.

Finally I would like to express my sincere gratitude to my parents and brother for their love, support and encouragement throughout the process.

Situ K.C.

September 2013

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Appendix

Table 1i: Demographic variables and women's autonomy on health care

N = 4148	Women's autonomy on health care, n (%)		P-value
	Yes	No	
Age group			
15-19	149 (6.0)	185 (11.3)	<0.001
20-24	682 (27.7)	639 (38.9)	
25-29	841 (34.1)	457 (27.8)	
30-34	465 (18.9)	200 (12.2)	
35-49	327 (13.3)	159 (9.7)	
Type of residence			
Urban	291 (11.8)	122 (7.4)	<0.001
Rural	2173 (88.2)	1518 (92.6)	
Highest educational level			
No education	947 (38.4)	852 (52)	<0.001
Primary	484 (19.7)	341 (20.8)	
Secondary	819 (33.3)	400 (24.4)	
Higher	213 (8.6)	47 (2.9)	
Wealth index			
Poorest	553 (22.4)	413 (25.2)	<0.001
Poorer	512 (20.8)	373 (22.8)	
Middle	491 (19.9)	376 (22.9)	
Richer	425 (17.2)	315 (19.2)	
Richest	483 (19.6)	162 (9.9)	
Religion			
Hindu	2038 (82.7)	1371 (83.6)	0.470
Others	426 (17.3)	269 (16.4)	
Occupation			
Farmer	1392 (56.5)	997 (60.8)	<0.001
Non farmer	450 (18.3)	119 (7.3)	
Not working	623 (25.3)	523 (31.9)	
Type of earning			
Not paid	1089 (59.1)	847 (75.8)	<0.001
Paid	753 (40.9)	270 (24.2)	

Table 2i: Demographic variables and women's autonomy on large household purchases

N=4148	Women's autonomy on large household purchases, n (%)		P-value
	Yes	No	
Age group			
15-19	91 (4.6)	242 (11.5)	<0.001
20-24	479 (24.0)	843 (40.0)	
25-29	704 (35.2)	594 (28.2)	
30-34	416 (20.8)	249 (11.8)	
35-49	308 (15.4)	179 (8.5)	
Type of residence			
Urban	243 (12.2)	170 (8.1)	<0.001
Rural	1755 (87.8)	1935 (91.9)	
Highest educational level			
No education	858 (43)	941 (44.7)	0.070
Primary	395 (19.8)	430 (20.4)	
Secondary	597 (29.9)	622 (29.5)	
Higher	147 (7.4)	114 (5.4)	
Wealth index			
Poorest	463 (23.2)	503 (23.9)	<0.001
Poorer	411 (20.6)	474 (22.5)	
Middle	399 (20.0)	468 (22.2)	
Richer	335 (16.8)	406 (19.3)	
Richest	391 (19.6)	255 (12.1)	
Religion			
Hindu	1629 (81.5)	1780 (84.5)	0.011
Others	369 (18.5)	326 (15.5)	
Occupation			
Farmer	1080 (54.1)	1309 (62.2)	<0.001
Non farmer	372 (18.6)	198 (9.4)	
Not working	546 (27.3)	599 (28.4)	
Type of earning			
Not paid	794 (54.7)	1141 (75.8)	<0.001
Paid	657 (45.3)	365 (24.2)	

Table 3i: Demographic variables and women's autonomy on visiting friends or relatives

N=4148	Women's autonomy on visiting friends or relatives, n (%)		P-value
	Yes	No	
Age group			
15-19	90 (4.2)	244 (12.5)	<0.001
20-24	527 (24.4)	795 (40.9)	
25-29	779 (36.0)	519 (26.7)	
30-34	428 (19.8)	237 (12.2)	
35-49	337 (15.6)	150 (7.7)	
Type of residence			
Urban	254 (11.8)	159 (8.2)	<0.001
Rural	1906 (88.2)	1785 (91.8)	
Highest educational level			
No education	919 (42.6)	880 (45.3)	<0.001
Primary	420 (19.5)	405 (20.8)	
Secondary	645 (29.9)	574 (29.5)	
Higher	175 (8.1)	85 (4.4)	
Wealth index			
Poorest	508 (23.5)	458 (23.6)	<0.001
Poorer	474 (21.9)	411 (21.1)	
Middle	409 (18.9)	458 (23.6)	
Richer	353 (16.3)	387 (19.99	
Richest	416 (19.3)	230 (11.8)	
Religion			
Hindu	1766 (81.8)	1643 (84.5)	0.020
Others	394 (18.2)	301 (15.5)	
Occupation			
Farmer	1199 (55.5)	1189 (61.2)	<0.001
Non farmer	410 (19.0)	160 (8.2)	
Not working	551 (25.5)	595 (30.6)	
Type of earning			
Not paid	920 (57.2)	1015 (75.2)	<0.001
Paid	689 (42.8)	334 (24.8)	

Table 4i: Demographic variable and women's autonomy on spending money earned by husband

N=4148	Women's autonomy on spending money earned by husband, n (%)		P-value
	Yes	No	
Age group			
15-19	152 (6.3)	170 (10.8)	<0.001
20-24	678 (28.1)	603 (38.2)	
25-29	807 (33.4)	466 (29.5)	
30-34	466 (19.3)	180 (11.4)	
35-49	312 (12.9)	157 (10.0)	
Type of residence			
Urban	273 (11.3)	131 (8.3)	0.002
Rural	2143 (88.7)	1446 (91.7)	
Highest educational level			
No education	980 (40.6)	772 (49)	<0.001
Primary	496 (20.5)	318 (20.2)	
Secondary	751 (31.1)	418 (26.5)	
Higher	189 (7.8)	69 (4.4)	
Wealth index			
Poorest	523 (21.6)	393 (24.9)	<0.001
Poorer	521 (21.6)	346 (22.0)	
Middle	472 (19.5)	377 (23.9)	
Richer	446 (18.5)	282 (17.9)	
Richest	455 (18.8)	178 (11.3)	
Religion			
Hindu	1994 (82.5)	1320 (83.8)	0.322
Others	422 (17.5)	256 (16.2)	
Occupation			
Farmer	1358 (56.2)	947 (60.1)	<0.001
Non farmer	410 (17.0)	144 (9.1)	
Not working	648 (26.8)	485 (30.8)	
Type of earning			
Not paid	1045 (59.1)	811 (74.3)	<0.001
Paid	723 (40.9)	280 (25.7)	

Table 5i: Demographic variables and attendants during ANC visit

N= 4148	Attendants during ANC visit, n (%)				P- value
	Skilled attendants	Traditional trained attendants	Traditional untrained attendants	No attendants	
Age group					
15-19	185 (8.7)	73 (9.1)	48 (8.2)	27 (4.3)	<0.001
20-24	706 (33.2)	243 (30.2)	226 (38.4)	153 (24.2)	
25-29	721 (33.9)	250 (31.1)	198 (33.7)	142 (22.5)	
30-34	346 (16.3)	132 (16.4)	62 (10.5)	130 (20.6)	
35-49	166 (7.8)	106 (13.2)	54 (9.2)	180 (28.5)	
Type of residence					
Urban	350 (16.5)	13 (1.6)	27 (4.6)	27 (4.3)	<0.001
Rural	1774 (83.5)	791 (98.4)	561 (95.4)	605 (95.7)	
Highest educational level					
No education	751 (35.3)	432 (53.7)	188 (32.0)	451 (71.2)	<0.001
Primary	407 (19.2)	156 (19.4)	152 (25.9)	120 (19.0)	
Secondary	763 (35.9)	192 (23.9)	215 (36.6)	60 (9.5)	
Higher	204 (9.6)	24 (3.0)	33 (5.6)	2 (0.3)	
Wealth index					
Poorest	312 (14.7)	206 (25.6)	139 (23.6)	322 (50.9)	<0.001
Poorer	366 (17.2)	224 (27.9)	143 (24.3)	166 (26.3)	
Middle	432 (20.3)	225 (28.0)	135 (23.0)	81 (12.8)	
Richer	495 (23.3)	104 (12.9)	101 (17.2)	48 (7.6)	
Richest	520 (24.5)	45 (5.6)	70 (11.9)	15 (2.4)	
Religion					
Hindu	1818 (85.6)	602 (74.9)	527 (89.6)	498 (78.8)	<0.001
Others	307 (14.4)	202 (25.1)	61 (10.4)	134 (21.1)	
Occupation					
Farmer	946 (44.5)	565 (70.3)	420 (71.4)	484 (76.5)	<0.001
Non farmer	413 (19.4)	66 (8.2)	59 (10.0)	46 (7.3)	
Not working	765 (36.0)	173 (21.5)	109 (18.5)	103 (16.3)	
Type of earning					
Not paid	758 (55.8)	449 (71.2)	358 (74.7)	392 (74.0)	<0.001
Paid	601 (44.2)	182 (28.8)	121 (25.3)	138 (26.0)	

Table 6i: Demographic variables and assistance during delivery

N= 4148	Assistance during delivery, n (%)				P-value
	Skilled attendants	Traditional trained attendants	Traditional untrained attendants	No attendants	
Age group					
15-19	165 (11.1)	3 (6.4)	11 (6.3)	154 (6.3)	<0.001
20-24	518 (34.7)	13 (27.7)	50 (28.6)	748 (30.7)	
25-29	495 (33.2)	13 27.7)	74 (42.3)	728 (29.9)	
30-34	211 (14.2)	10 (21.3)	29 (16.6)	420 (17.2)	
35-49	102 (6.8)	8 (17.0)	11 (6.3)	387 /15.9)	
Type of residence					
Urban	300 (20.1)	1 (2.1)	14 (8.0)	104 (4.3)	<0.001
Rural	1190(79.9)	46 (97.9)	161 (92)	2333 (95.7)	
Highest educational level					
No education	358 (24.0)	17 (36.2)	76 (43.7)	1370 (56.2)	<0.001
Primary	264 (17.7)	13 (27.7)	41 (23.6)	517 (21.2)	
Secondary	663 (44.5)	16 (34.0)	49 (28.2)	502 (20.6)	
Higher	206 (13.8)	1 (2.1)	8 (4.6)	48 (2.0)	
Wealth index					
Poorest	115 (7.7)	14 (29.2)	29 (16.6)	822 (33.7)	<0.001
Poorer	214 (14.4)	10 (20.8)	46 (26.3)	630 (25.9)	
Middle	288 (19.3)	16 (33.3)	50 (28.6)	519 (21.3)	
Richer	375 (25.2)	5 (10.4)	27 (15.4)	342 (14.0)	
Richest	499 (33.5)	3 (6.2)	23 (13.1)	124 (5.1)	
Religion					
Hindu	1267(85.0)	44 (93.6)	162 (92.6)	1971 (80.9)	<0.001
Others	223 (15.0)	3 (6.4)	13 (7.4)	465 (19.1)	
Occupation					
Farmer	543 (36.4)	39 (83.0)	114 (65.1)	1720 (70.6)	<0.001
Non farmer	335 (22.5)	4 (8.5)	16 (9.1)	228 (9.4)	
Not working	612 (41.1)	4 (8.5)	45 (25.7)	489 (20.1)	
Type of earning					
Not paid	468 (53.3)	33 (78.6)	83 (63.8)	1373 (70.5)	<0.001
Paid	410 (46.7)	9 (21.4)	47 (36.2)	575 (29.5)	

Table 7i: Autonomy variables and attendants during ANC visit

N=4148	Attendants during ANC visit, n (%)				P-value
	Skilled attendants	Traditional trained attendants	Traditional untrained attendants	No attendants	
Women's autonomy on Health care					
Yes	1322(62.7)	461 (58.0)	360 (62.1)	320 (51.5)	<0.001
No	785 (37.3)	334 (42.0)	220 (37.9)	301 (48.5)	
Large household purchases					
Yes	1085 (51.5)	379 (47.7)	261 (45.0)	272 (43.8)	0.001
No	1022 (48.5)	416 (52.3)	319 (55.0)	349 (56.2)	
Visiting friends or relatives					
Yes	1142 (54.2)	409 (51.4)	289 (49.8)	320 (51.5)	0.194
No	965 (45.8)	387 (48.6)	291 (50.2)	301 (48.5)	
Spending money earned by husband					
Yes	1317 (64.0	441 (57.5)	335 (59.1)	324 (54.0)	<0.001
No	742 (36.0)	326 (42.5)	232 (40.9)	276 (46.0)	
Overall autonomy					
Low	777 (37.7)	270 (35.2)	180 (31.7)	176 (29.3)	<0.001
Medium	810 (39.3)	292 (38.1)	253 (44.6)	249 (41.5)	
High	473 (23.0)	205 (26.7)	134 (23.6)	175 (29.2)	