Factors Associated with Completion of Continuum of Care for Maternal Health in Nepal

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ABSTRACT

This paper examines the factors associated with the completion of the continuum of care (which refers to the continuity of use of antenatal care (ANC), skilled birth attendance (SBA), and postnatal care (PNC), for maternal health in Nepal.

Using the dataset from the 2014 Nepal Multiple Indicator Cluster Survey, a total of 2,048 women age 15-49 years who had a live birth two years before the survey were analyzed to examine the levels of service use along the continuum of care they received for their most recent live birth. Three sequential regression models were fitted to identify factors affecting continuation of care along the pathway from pregnancy to the postnatal period.

Results show that less than half of Nepalese women received all three types of maternal care—ANC, SBA at birth and PNC-for their most recent birth, however with substantial variations by background variables. More dropouts occurred between pregnancy and delivery than between delivery and the postnatal period. The results highlight that educational attainment, urban residence, household wealth, and exposure to mass media are associated with women's use of ANC and their continuation to using SBA. Having four ANC visits and receiving better quality of ANC affected women's subsequent use of SBA. Delivery at a health facility is significantly associated with the continuation from having SBA to receiving PNC- the completion of continuum of care.

The study concludes that more focus should be given to the quality of ANC as this is evidently connected to women's use of SBA and PNC. Further, the poorer, less or uneducated women and those living in remote rural areas suffer from lower access to continued care. Thus, maternal health programme efforts should focus on further improving quality of ANC and promoting SBA at especially in health facilities with more attention to rural areas targeting uneducated women from poorer households.

Key words: Maternal health, Continuum of care, Antenatal care, Skilled birth attendant, Postnatal care.

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1. INTRODUCTION

The health care services that a woman receives during pregnancy, childbirth, and the immediate postnatal period are important for the survival and well-being of both the mother and the child. Antenatal Care (ANC), use of skilled delivery attendants and postnatal care (PNC) services are key maternal health services that can significantly reduce maternal mortality. Understanding the factors that affect service utilization helps to design appropriate strategies and policies towards improvement of service utilization and thereby reduce maternal mortality.

Given the importance of each of the three maternal health services, it is essential to provide all of them in a continuum of care to ensure that health of the mother and the newborn child. The term "continuum of care" for maternal, newborn health, and child health usually refers to continuity of care throughout the lifecycle—adolescence, pregnancy, childbirth, post-delivery period, and childhood (Kerber, 2007).

Nepal targets to '*reduce the maternal mortality ratio to less than 70 per 100,000 live births by 2030*' of the Goal 3 of the Sustainable Development Goals as per the commitment of the Government of Nepal for improving the maternal health status. For Nepal to achieve the SDG target of below 70 will require reducing Nepal's current MMR of 258 per 100,000 live births (World Health Organization, 2015) by an average of 6.3 maternal deaths each year between 2016 and 2030. In order to achieve the ambitious target, an effective strategic framework will be necessary toward ending preventable maternal mortality and one of the strategies would be ensuring the continuum of care along the pathway of antenatal, delivery and postnatal care.

Although there exists some empirical studies on the status of use of one or two components of maternal health care separately and examined factors associated with the utilization of the service(s), there are only a limited number of studies regarding the status of completion of the continuum of care for maternal health that encompasses all components as a complete package of quality of care in the country, both in terms of subject content, and size or scope of studies. Along with the gaps in specific subject matter, there is a lack of large-scale research that would allow a more complete view of the status of the completion of the care for maternal health. Nor are there enough localized case studies having methodologies that are sufficiently comparable to allow aggregation of findings across regions or nationally. Further, there exists knowledge gaps in terms of the analysis which enables to have an in-depth understanding of the status of the completion of the continuum of care for maternal health based on a nationally representative study in Nepal. There is no single study which confirms where women drop-out along the pathway from antenatal care during pregnancy to skilled birth attendance for delivery and then to postnatal care. A new line of inquiry would, therefore, led to identify sub-groups of women who do not complete the continuum of care for maternal health and are at greater risk of maternal mortality so that evidence based programme interventions could be designed to target the women who need the most. Further any conceptual framework surrounding determinants of the completion of the continuum of care for maternal health will be a significant contribution to the knowledge gap.

In the context of the above, this study attempts to explore answers to the following specific questions:

1. What is the status of the three maternal health care that constitute the continuum of care—antenatal care, skilled birth attendance, and postnatal care?
2. At what stage do women drop out of the course?
3. How are women who complete the continuum of care different from those who do not?
4. What variables predict the completion of the continuum of care in Nepal?

2. DATA AND METHODS

Study Setting

Nepal, with a population of 28.8 million in 2016 (CBS, 2014), is a landlocked, least developed country is divided into seven federal provinces, five development regions, three ecological zones across east to west: Terai, hill and mountain. These 15 sub-ecological regions are further divided into districts. Each district is divided into local units: municipality covering urban areas and rural municipals representing rural areas. Each municipality in turn consists of small administrative units known as wards.
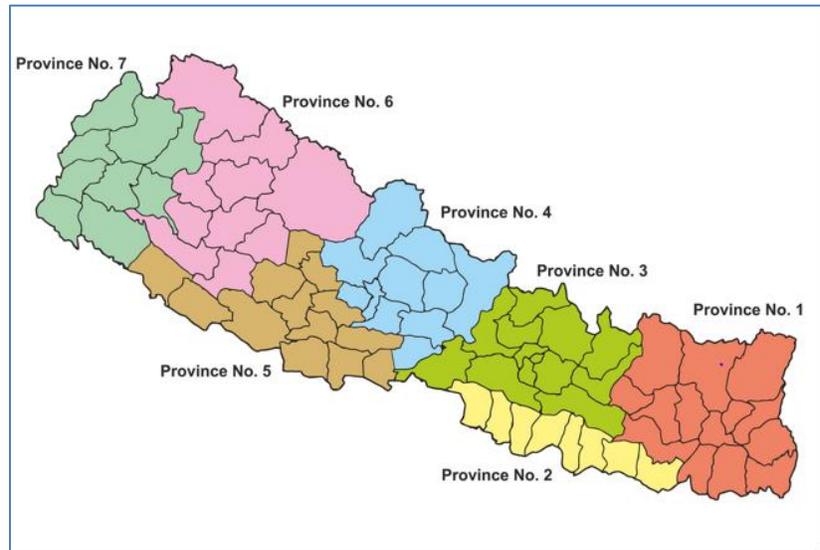
The country is characterized by significant diversity, with 125 caste/ethnic groups, and vast differences in social and economic indicators.

Data Source

This study used data from the 2014 Nepal Multiple Indicator Cluster Survey (NMICS), conducted in 2014 by Central Bureau of Statistics, Government of Nepal, as part of the Global MICS Programme with technical support provided by the United Nations Children's Fund (UNICEF). The Global MICS Programme was developed by UNICEF in the 1990s as an international household survey programme to collect internationally comparable data on a wide range of indicators on the situation of children and women. MICS surveys measure key indicators that allow countries to generate data for use in policies and programmes, and to monitor progress towards development goals.

The 2014 Nepal MICS is one of the most recent and largest data sources in the country which describes the situation of children and women. A detail methodology including the sample design, sampling frame, domains, and sample selection used in the 2014 Nepal Multiple Indicator Cluster Survey is described elsewhere. In summary, NMICS is a community based analytical cross

sectional study that collected data from a nationally representative sample of a total of 14,162 women in the reproductive age group (age 15-49) from 12,975 households of Nepal- the sample being designed to provide estimates for a large number of indicators on the situation of children and women at the national level, for urban and rural areas, and for 15 eco-development regions of the country.

For this study, out of the total 14,162, a total 2,048 women who had at least one birth in the last two years preceding the survey are included in the analysis.

Conceptual Framework

Various explanations have been put forward by theorists to explain the determinants of healthcare facility utilization among people. Anderson (1995), for instance, in his Healthcare Utilization Model identified three basic factors that may determine the utilization of health facility by people. The first one he identified is called the propensity factor, suggesting that an individual will likely utilize a health facility if he/she believes that such health facility will be useful for his/her treatment. The second factor called enabling factor includes access to health insurance, family and community support, as well as the location of the individual, while the third factor, called the basic need factor, which entails perception of the need for health services, is socially evaluated (Andersen, 1995).

Becker (1974) on the other hand came up with the Health Belief Model, which is centered on four basic assumptions. The first assumption suggests that an individual will seek health service if he or she believes he/she is vulnerable to disease. Secondly, health facility utilization depends on the severity of the illness, while the third assumption contends that an individual will seek healthcare service where he/she can get the best service at the minimum cost. However, the last assumption suggests that individuals' choice of healthcare facility utilization depends on influence from friends, family members and the media (Becker, 1974).

The World Health Organization has developed a conceptual framework through its discussion paper titled 'Closing The Gap: Policy into Practice on Social Determinants of Health' which illustrates how an individual's health can be influenced through multiple levels and this framework has can be adapted to present determinants specific to maternal health, but maintains the relationship between structural factors, those that determine distribution of wealth, power and prestige across social groups, and intermediary factors, which establish the extent to which those groups are able to access health and social services for prevention and treatment and to adopt healthy lifestyles. At both structural and intermediary levels, there is a further separation between determinants shaped by formalized social structures and institutions (such as governments, their laws, policies, and the translation of policy into service delivery) and those dependent on social and cultural practices(traditional hierarchies, cultural norms and values, and community-level beliefs and practices (World Health Organization, 2011). The framework has the experiences of individual women at its center -- nested within their families and social networks -- since this is the level at which maternal deaths and morbidities are directly experienced. The core maternal health outcomes are: maternal deaths (a biological outcome measured as deaths to women during pregnancy and in the year following delivery, stillbirth, or abortion), and skilled attendance at

delivery (a behavioral outcome most closely associated with maternal death, and referring to childbirth attended by a doctor, nurse, or trained midwife).

According to World Health Organization, most maternal deaths occur during labor, delivery, and in the first couple of days after childbirth. This makes the intrapartum period (defined as labor, delivery, and the following 24 hours) a particularly critical time for recognizing and responding to obstetric complications and seeking emergency care to prevent maternal deaths. The best way to do so is to ensure all women receive skilled attendance at delivery from a doctor, nurse, or midwife. Delivering within a healthcare facility is the most ideal situation, as basic emergency care is likely to be available on site if required. Whether at home or in a facility, efficient and timely referral to higher levels of emergency obstetric care for complications is required, and all new mothers should be monitored in the first few days after the birth, with particular attention paid to possible signs of hemorrhage (World Health Organization, 2011).

High rates of maternal and neonatal mortality are associated with inadequate and poor-quality maternal health care, including antenatal, delivery, and postnatal care (Li et al., 1996; WHO, 1999). Antenatal care is considered as a key maternal service in improving a wide range of health outcomes for women and children (McDonagh, 1996). Antenatal care represents an opportunity to deliver interventions for improving maternal nutrition, providing health education, and encouraging skilled attendance at birth and use of health facilities for emergency obstetric care (EMOC). All of these interventions could contribute to reducing maternal mortality and improving newborn survival.

Timing and content of antenatal care are important for identifying and treating illness and problems during pregnancy, as well as for preparing women to go to a health facility for delivery. The World Health Organization recommends a minimum of four antenatal care visits. WHO guidelines also specify the content of antenatal care visits, which should include blood pressure measurement, urine testing for bacteriuria and proteinuria, and blood testing to detect syphilis and severe anemia (World Health Organization, 2001). Other services, including giving tetanus immunization, providing iron and foliate tablets, and teaching women about danger signs of pregnancy complications, are also important to improve both maternal and newborn health.

Skilled attendance at birth and access to emergency obstetric care are key factors in reducing the risk of maternal death (De Brouwere, 1998). WHO has defined a skilled attendance as "an accredited health professional—such as a midwife, doctor, or nurse—who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth, and the immediate postnatal period, and in the identification, management, and referral of complications in women and newborns" (World Health Organization, 1999). Providing SBA for delivery care, along with the equipment, drugs, and supplies necessary for effective prevention and management of obstetric complications, has been advocated as the most important intervention in preventing maternal deaths (World Health Organization, 1999).

Postnatal care, especially within the first 48 hours after birth, is critical to the management of postpartum hemorrhage, a leading cause of maternal deaths in many developing countries, including Nepal. In developing countries more than 60 percent of maternal deaths occur in the six weeks of post-delivery, and 80 percent of postpartum deaths are caused by obstetric factors occurring in the first week postpartum (Li et al., 1996). Postnatal care is also a key to neonatal

survival, through the prevention of neonatal sepsis and asphyxia/hypothermia, which are the leading causes of neonatal deaths in developing countries. Postnatal care also helps to promote healthy maternal behaviors, such as exclusive breastfeeding and proper care of babies with low birth weight.

Given the importance of each of the three maternal health services, it is essential to provide all of them in a continuum of care to ensure the health of the mother and the newborn child. The term "continuum of care" for maternal, newborn health, and child health usually refers to continuity of care throughout the lifecycle—adolescence, pregnancy, childbirth, post-delivery period, and childhood (Kerber, 2007).

The concept implies that the health of women, newborns, and children are closely linked and thus should be managed in an integrated way. The continuum of care has two dimensions 1) a time dimension—continuity of care over time for women, newborns, and children; 2) a place dimension—integrated service delivery provided by health facilities and communities (Tinker et al., 2005).

In a study based on the further analysis of the data from the 2010 Cambodia Demographic and Health Survey, Wang, Wenjuan, and Rathavuth Hong have applied a narrowed scope of continuum of care, focusing on women during the period from pregnancy to childbirth and after delivery. During pregnancy, all women should have adequate and high-quality antenatal care; at delivery, they should have skilled birth attendance to proficiently manage normal delivery and to refer complications; and they should have continued care after delivery for themselves and their newborns postpartum, the critical time for reducing neonatal mortality (Wang, 2013).

Wang et al. (2013) argue that overall, completion of the continuum of care leads to better health outcomes for mothers and babies.

The continuum of care has become one of the key program strategies for reducing maternal and newborn deaths and improving maternal and neonatal health and wellbeing. Successful program implementation to improve the continuum of care relies on a better understanding of where the gaps are in seeking care along pregnancy, delivery, and post-delivery and what factors contribute to these gaps (Kerber et al., 2007).

It is an established fact that antenatal care (ANC) is an important determinant of safe delivery that can afford opportunities to encourage women to deliver with a skilled attendant in a health facility (Mrisho M, 2009). The World Health Organization recommends at least four ANC visits for uncomplicated pregnancies (WHO, 2001). All pregnant women should have at least four antenatal care and should, at a minimum, include all the interventions outlined in the new WHO antenatal care model and be spaced at regular intervals throughout pregnancy, commencing as early as possible in the first trimester.

According to World Health Organization, the postnatal period, defined as the time immediately after the birth of the baby and up to six weeks (42 days) after birth, is critical for the newborn and the mother. Immediately after birth, bleeding and infection pose the greatest risk to the mother's life, while preterm birth, asphyxia and severe infections pose greatest risk to newborn. (World

Health Organization, 2010). Two thirds of all neonatal deaths arise from such complications, while inappropriate feeding and cultural practices during the postnatal period may pose further risks to the life of the newborn. All these maternal and neonatal problems could be reduced if women receive appropriate postnatal care. The timing of postnatal care is also crucial to the well-being of the mother and baby. Earlier international studies have shown that some 50% of maternal deaths and 40% of neonatal deaths occur within 24 hours after birth, also known as the 'immediate postnatal period'. Thus it is clear that the first 24 hours after birth is a crucial time to intervene so that any problems can be identified promptly and appropriate intervention can take place. For this reason the WHO recommends that mothers receive postnatal care within the first 24 hours followed by postnatal check on the second or third day, and then on the seventh day after delivery (World Health Organization, 2010).

Around the world, it is recognized that postnatal care is crucial in maintaining and promoting the health of the woman and the newborn baby, while providing an opportunity for health professionals to identify, monitor and manage health conditions that may develop in the mother and newborn during the postnatal period. In addition, postnatal care provides health professionals with the opportunity to promote exclusive breastfeeding, personal hygiene, appropriate feeding practices, and family planning counseling and services. Moreover, postnatal care allows for the provision of postnatal vitamin A and iron supplementation to the mother and immunization of newborns to provide them with optimal start to life (World Health Organization, 2010).

In a discussion paper documented by the United Nations Development Programme (UNDP), maternal mortality is a key indicator for maternal health and reveals dramatic inequalities between and within countries that cannot be attributed to biological differences. Reducing maternal mortality relies on preventing unintended pregnancy through family planning and reproductive health. Skilled attendance at birth and emergency referrals are also required to reduce both maternal complications and resulting deaths. The characteristics of individual women like age, number of previous pregnancies, and education level play a role in determining whether they seek appropriate services, but the underlying factors influencing health behavior operate at inter-related levels of social influence: family and peers, the community in which women live and the health system available to them, wider cultural norms, the legal and policy environment and overarching governance structures (United Nations Development Programme, 2011).

There is a growing body of evidence showing how within countries, maternal health outcomes are inequitably distributed, with the poorest likely to be most disadvantaged. In a study titled 'Huge poor-rich inequalities in maternity care: an international comparative study of maternity and child care in developing countries', Houweling et al. assessed Demographic and Health Survey datasets from 45 developing countries (including Nepal) and found inequalities between the poor and wealthy for maternity care were larger than for other forms of health care; the gap between urban and rural populations was also considerable, and thus the rural poor fared the worst (Houweling et al., 2007). It is argued that in some settings, improvement in the national maternal mortality ratio (MMR) hides the existence of persistent internal inequities, some of which continue to increase even when aggregate trends improve (Houweling, 2007).

There is growing interest, therefore, in comparing maternal health outcomes between communities with different social and economic development contexts. The most common way to measure

health inequities within countries is by using socio-economic data to divide the population into five equally-sized groups according to asset wealth or income, and then to compare specific outcomes or health behaviors in the lowest wealth quintile with the highest. Analyses from Demographic and Health Surveys in developing countries have repeatedly found large gaps between the poorest and least-poor quintiles in maternal health coverage, particularly for skilled attendance at delivery. For instance, in a community survey of 2,164 deliveries in Bangladesh, women in the wealthiest quintile were more than twice as likely to have a skilled birth attendant at delivery as those in the poorest, and over 1.5 times as likely to receive postnatal (Anwar, 2008). Many studies have focused on individual attributes, which are the characteristics of women found to be associated with specific health behaviors. There has been a lot of interest in what kinds of women are more or less likely to deliver in facilities or seek skilled attendance, as is recommended for all pregnant women given that obstetric emergencies have proved difficult to predict. A woman's age, the number of children she has already had, her knowledge of services, and previous birthing experience can all influence pregnancy and delivery care (Say and Raine, 2007). For instance, younger women having their first baby may be more likely to seek medical care due to apprehension about a new experience; women who already have several children may choose to deliver at home, either because they view the birthing experience as a natural and healthy one that does not require intervention, or because they have domestic responsibilities that make it difficult for them to travel from home. On the other hand, if a woman has had a previous facility-based delivery or experienced a complication, she is much more likely to try to obtain skilled attendance again.

Various studies show that the status of women in society is a particularly important social determinant of maternal health. The level of women's empowerment determines access to education, economic self-sufficiency, and autonomy in daily life and decision-making, all of which affect women's ability to achieve their rights and make healthy choices, including when and with whom to have sex, use of modern methods of contraception, and use of health services during pregnancy and delivery. While these are important human rights, they also translate directly into positive health outcomes. Where women have access to their own livelihood opportunities, they are also more likely to be self-sufficient and able to take decision that will protect themselves and their families. Financial independence provides women with an important means of social protection, and access to an income becomes a resource on which women can draw, and can also raise women's status within their families and communities. There is empirical evidence that earning potential is associated with uptake of health services, such as in Bangladesh, where women with employment were almost 5 times more likely to have a doctor, nurse, or midwife present at their delivery than those without (Rahman et al., 2008).

Numerous studies on the determinants of skilled attendance at delivery from contexts as diverse as Namibia, Kenya, Bangladesh and Tajikistan have identified a woman's level of education as a key predicting factor (Chowdhury, 2007). For example, in Namibia, women with post-secondary education were over twice as likely to deliver with a skilled attendant compared to those with no education, and seven times more likely to obtain a Caesarean section (Zere, 2010). The close association between education and use of maternal health services partly results from the fact that formal schooling exposes women to information about reproductive health and pregnancy care. Education also enhances women's self-efficacy and has been associated with other important precursors of safe motherhood, such as use of contraception, more equitable marital relationships,

and greater economic independence, once again illustrating the close link between biological and social explanations (Grown, 2005).

In a study titled 'Determinants of skilled birth attendants for delivery in Nepal', Baral YR, Lyons K, Skinner J, and van Teijlingen ER, have explored the factors affecting the uptake of skilled birth attendants for delivery and the issues associated with women's role and choices of maternal health care service for delivery in Nepal. Literature was reviewed across the globe and discussed in a Nepalese context. The review of the literature suggests that several socio-economic, cultural and religious factors play a significant role in the use of Skilled Birth Attendance for delivery in Nepal. Availability of transportation and distance to the health facility; poor infrastructure and lack of services; availability and accessibility of the services; cost and convenience; staff shortages and attitudes; gender inequality; status of women in society; women's involvement in decision making; and women's autonomy and place of residence are significant contributing factors for uptake of Skilled Birth Attendance for delivery in Nepal. Although the qualitative studies are very limited, findings of quantitative research show that different social demographic, economic, socio-cultural and religious factors are responsible for the utilization of maternal health services but very few studies discussed how and why these factors are responsible for utilization of skilled birth attendants in pregnancy. It is suggested that there is a need for more qualitative research to explore the women's role and choice regarding use of skilled birth attendants' services and to find out how and why these factors are responsible for utilization of skilled birth attendants for delivery. Qualitative research will help further exploration of the issues and contribute to improvement of maternal health services (Baral, 2010).

In another cross-sectional study conducted by Choulagai et al. (2013), which examined the characteristics associated with utilization of SBA services in Mid- and Far-western Nepal, used bivariate and multivariate analyses to assess the association between antenatal and delivery care visits and the women's background characteristics. Results showed that knowing the danger signs of pregnancy and delivery (e.g. premature labor, prolonged labor, breech delivery, postpartum hemorrhage, severe headache) associated positively with four or more antenatal care visits (OR = 1.71; 95% CI: 1.41-2.07). Living less than 30 min from a health facility associated positively with increased use of both antenatal care (OR = 1.44; 95% CI: 1.18-1.77) and delivery services (OR = 1.25; CI: 1.03-1.52). Four or more antenatal are visits was a determining factor for the utilization of SBAs. Distance from health facilities and inadequate transportation pose major barriers to the utilization of SBAs. Providing women with transportation funds before they go to a facility for delivery and managing transportation options will increase service utilization. Moreover, SBA utilization associates positively with women's knowledge of pregnancy danger signs, wealth quintile, and completed antenatal care visits. Nepal's health system must develop strategies that generate demand for SBAs and also reduce financial, geographic and cultural barriers to such services (Choulagai, 2013).

In the study by Pandey et al. (2013), a two set analysis was carried out to examine the association of caste, ethnicity, and regional identity with use of antenatal care services. The first step examined the net effect of caste, ethnicity, and regional identity and the second step examines the independent effects of social group, after taking into consideration a number of other variables that might influence the outcome of interest. The logistics regression that tests the effect of caste/ethnicity and regional identity on the likelihood of women receiving antenatal care services

found an influence of caste/ethnicity for some groups. It was found that compared with Dalit women, Brahman/Chhetri and Newar women have 2.6 and 7.0 times higher odds of using ANC services, respectively. The other caste groups are not significantly different from the Dalits. Further, after controlling for all the other factors, it was found that, compared with Dalit women, Newar women have significantly higher odds of ANC service utilization (OR 2.0). the results also showed that wealth, educational attainment, number of children, and decision-making by women on their own health care all have highly significant effects on the odds of using ANC services. Although wealth seems to have a stronger impact on ANC service utilization, caste, ethnicity, and regional identity still matter for some groups (Pandey, 2013).

To summarize, maternal health care improve the survival and quality of life for mothers but are often underutilized by those mothers who are in greatest need. One of the challenges in public health is to identify high-risk groups and to provide them with needed health services. The use of health services, including maternal health, is a complex behavioural phenomenon. It is related to the organization of the health-delivery system and is affected by the availability, quality, costs, continuity and comprehensiveness of services; social structure and health beliefs also affect use (Fiedler, 1981). For preventive services like prenatal care, family planning or immunizations, the perception of need is more complicated than in the case of disease recognition, and involves beliefs about susceptibility, consequences and effectiveness of the intervention (Rosenstock, 1966).

Conceptually, it is clear that the completion of continuum of care for maternal health can be influenced by many of individual attributes (for instance: age, number of parities, knowledge) while also recognizing that the family and peer influences (such as income, access to resources, family structures and decision making) which are nested within the intermediary determinants (including availability of maternal health services and community context) which are further influenced by broader structural determinants including the health governance and policies and prevalent socio-cultural values.

Figure 1: The Social Determinants of Continuum of Care for Maternal Health

Structural Determinants of Health Inequities

Health Governance and Policies

- Education
- Health finance and infrastructure
- Social protection
- Laws (gender equality and anti-violence
- Reproductive health and rights

Culture and Social Values

- Women's status
- Gender norms
- Religion
- Health beliefs
- Cultural cohesion

Intermediary determinants of health

Health Services

- Availability of relevant services (ANC, SBA and EmOC referrals)
- Staff skills and technical competence
- Acceptability to community

Community Context

- Rural/Urban Residence
- Social position (Class, wealth and ethnicity
- Awareness of care
- Perceptions of quality
- Distance to facilities
- Social capital

Family and peer influences

- Family structures & decision making
- Marital relationships
- Spousal communication
- Income
- Access to resources
- Support networks

Individual attributes

- Age
- Number of birth
- Knowledge
- Education
- Self efficacy

Completion of Continuum of Care

Maternal Health Outcomes

Source: Adapted from WHO (2011) Closing the Gap: Policy into Practice on Social Determinants of Health. Discussion Document for the World Conference on Social Determinants of Health. Geneva: World Health Organization: page 7.

Hence, in this study attempt has been made to analyze the dependents variables- mainly the status of utilization of maternal health services and the completion of the continuum of care for the maternal health, against selected background variables such as age of women, number of parity, wealth index (as a measure of economic status), education (as a measure for knowledge) and access to mass media (as one of the means of access to resources for awareness and knowledge) among other variables. As the framework suggests, the completion of continuum of care and hence the maternal health outcomes, can be co-influenced by a number of other factors and thus a confounding variables such as place of delivery, caste/ethnicity have also been examined specially in the multivariate analysis models.

Measurements and definitions of variables

The key indicators for this analysis are antenatal care, skilled birth attendance, and postnatal care. In this study the woman is used as the unit of analysis and focus on the most recent live birth. In consistent with the study objective, the following dependent and independent variables were considered both at the bivariate and multivariate levels.

Dependent variables include:
- Use of Antenatal Care (ANC)
- Delivery by skilled birth attendant (SBA)
- Use of Post-natal care (PNC)
- Completion of Continuum of Care-ANC, SBA and PNC

Independent Variables include:
- Education
- Wealth quintile

Control Variables:
- Mother's age at birth
- Birth Order
- Place of residence
- Exposure to mass media.
- Caste/Ethnicity
- Place of delivery

They are measured according to the WHO definitions.

Analytical Approach

In line with the objectives of the study, the analysis starts with the description of the level of use for individual maternal health services and comparison of Nepal with selected countries in the South/Southeast Asia region with similar contexts. This is followed by an examination of the patterns of service use along the continuum of care as well as differentials in use according to women's background characteristics.

Based on the pathway for the continuum of care, figure below shows the possible paths that a woman can follow to use three types of services during pregnancy, at delivery, and after delivery. Based on this diagram, three regression models were applied to identify factors facilitating the continuation of care along the pathway as follows:

1. To identify factors associated with use of antenatal care at the stage of pregnancy, Model I was fitted with receiving antenatal care as the outcome. It was coded 1 if a woman received any antenatal care and 0 otherwise. Among women who received antenatal care, some went on to receive skilled birth attendance; some did not.

2. Model II was run among women who received antenatal care to determine the factors associated with the continuity from having antenatal care to having skilled birth attendance. The outcome for Model II is 1 for receiving antenatal care and skilled birth attendance, and 0 for receiving antenatal care but not skilled birth attendance.

3. After delivery, some women received postnatal care and some did not. Thus Model III was fitted among women who received antenatal care and skilled birth attendance to identify factors associated with completion of the continuum of care. The two categories of the outcome for Model III are 1 for receiving antenatal care, skilled birth attendance, and postnatal care, and 0 for receiving antenatal care and skilled birth attendance but not postnatal care.

Figure 2: Women's use of maternal health services: Possible Pathway
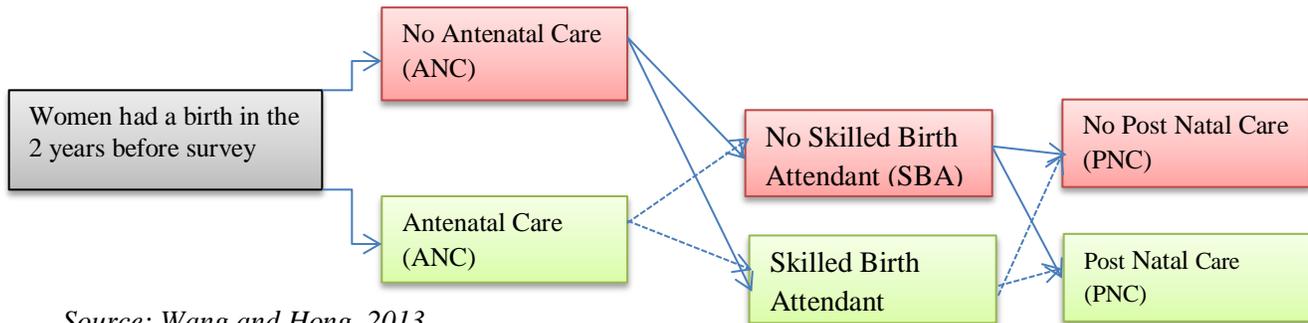
Source: Wang and Hong, 2013

For all three models, random-effects logit regressions were fitted to account for the clustering effect of the data. The 2014 NMICS data are in a hierarchical structure with individuals nested within clusters and clusters nested within sub-regions. Because women living in the same cluster or sub-regions may not have independent behaviors, the estimates from the regular regression analyses assuming all individuals are independent will not be efficient. The random-effects model accounts for the fact that people who live in the same area share similar characteristics (Raudenbush S. , 2005). Further, in their publication titled 'Application of Random-Effects Probit Regression Models', Gibbons RD. and Hedeker D., explains that a random-effects probit model is developed for the case in which the outcome of interest is a series of correlated binary responses. These responses can be obtained as the product of a longitudinal response process where an individual is repeatedly classified on a binary outcome variable, or in "multilevel" or "clustered" problems in which individuals within groups are considered to share characteristics that produce similar responses (Gibbons, 1994).

The random-effects model also enables partitioning of the total variation in the outcome into within-group and between-group components, which allows distinguishing the relative contributions of individual-level and group-level variables. Lastly, random-effects models allow for simultaneous investigation of the effects of predictors at different levels. In this analysis we are interested in two levels—the individual level and the sub-regional level. Despite the unavailability of sub-regional level predictors in this analysis, random-effects models provide information on the proportion of total variation that is explained by sub-regions factors (unobserved). In the 2014 NMICS, several small VDCs are grouped together to make 15 survey domains (15 sub-regions). For the convenience of presenting results, we still call them sub-regions although some could be the group of clusters.

Predictors in the models include women's socio-demographic characteristics, urban-rural residence, household wealth quintile, and exposure to mass media. In addition, the content of antenatal care provides an indication of the quality of care. Therefore, variables related to services received during antenatal care were included in Model II and Model III, and place of delivery was also included in Model III.

3. FINDINGS

The Continuum of Care

In Nepal, while nearly 87 percent of women received antenatal care, but a substantial of them (about 39 percent) did not continue on the pathway to receive skilled birth attendance. In other words, 53.1 percent who received antenatal care were attended by a skilled health provider at delivery. After delivery, another 7.4 percent did not go on to receive postnatal care. Overall, 45.7 percent of women had the full range of services for the continuum of care (Figure 3).

Figure 3: Percentage of women age 15-49 completing the continuum of maternal health care in Nepal, Nepal, 2014
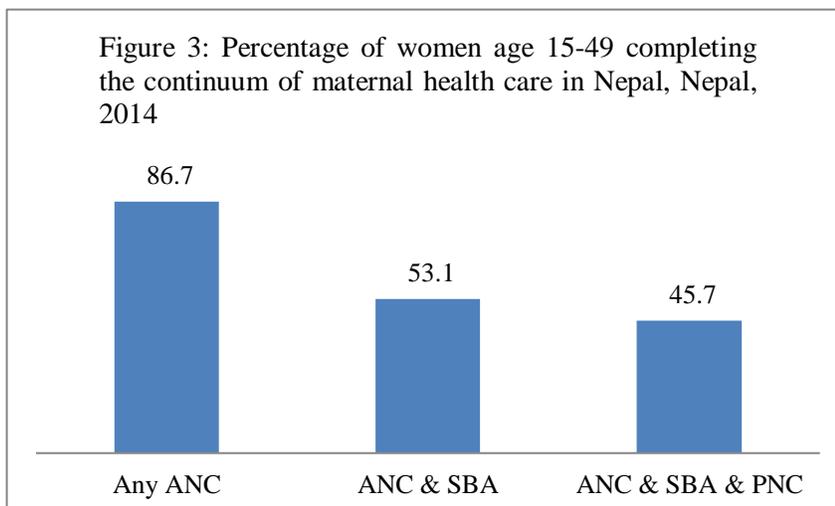
Table 1 illustrates the percent distribution of women different types of maternal health services along the continuum of care received for the last birth two years preceding the survey. 'Yes' indicates that the women received specific service and 'No' indicates that the women did not receive specific service. The data shows that about 46 percent of the women age 15-49 who had a live birth in two years preceding the survey completed the continuum of maternal services; received antenatal care, delivery was attended by skilled birth attendant and received postnatal health check-up within two days of delivery. It was also found that nearly one in every ten (10.1 percent) of the women did not receive any of the services.

Table 1: Percent distribution of women age 15-49 who had a live birth in two years preceding survey by different types of maternal health services received for the most recent birth, Nepal, 2014

	ANC	SBA	PNC	Percent	Number of Women
	No	No	No	10.1	207
	Yes	No	No	23.4	479
	Yes	Yes	No	7.4	152
	Yes	Yes	Yes	45.7	936
	Yes	No	Yes	10.2	209
	No	Yes	No	1.2	25
	No	No	Yes	0.7	14
	No	Yes	Yes	1.3	27
Total	**86.7**	**55.6**	**57.9**	**100.0**	**2,048**

Yes: Received the service
No: Did not receive the service
Source: NMICS, 2014 Dataset

Differentials in Receiving Maternal Health Care Services by Women's Background Characteristics and Antenatal Care Received

Table 2 shows the percentage of women who received different types of services by their background characteristics. Older women were less likely than younger women to have received all three services. Only about 36 percent of women age 35 or older received antenatal care, skilled birth attendance, and postnatal care compared with 52 percent of women under age 20. High birth order is associated with low likelihood of completing the continuum of care. Mothers were least likely to get all three maternal health services for birth orders 4 or higher and most likely not to receive any of the services, or to receive antenatal care only.

The likelihood of receiving all three services was also associated with women's educational attainment. The more schooling a woman had the more likely she was to complete the continuum of care. The data shows that more than three in every four (76.9 percent) women with SLC and above level of education reported having received antenatal care, skilled birth attendance, and postnatal care; but only about 15 percent of the women without any education did so. Women with no education were more likely to receive antenatal care only compared with other women with primary education or higher.

Achieving a continuum of care was more likely in urban than rural areas. Slightly less than two-third of women (64.5 percent) in urban areas reported receiving all three services compared with just about 29 percent in rural areas. Some variations in the completeness of care by ecological zones were also observed. About 57 percent living in Terai received antenatal care, skilled birth attendance, and postnatal care compared to about 35 percent of those who live in Mountain region.

Not surprisingly, completion of the continuum of care was associated with household wealth. Women from the richest households were most likely to report receiving all three maternal services. In contrast, women from the poorest households were least likely to have received any of the maternal services. Further, in terms of the exposure to mass media, the women who were exposed to television, radio and newspapers at least once week were more likely to complete the continuum of care.

Table 2: Percent distribution of women who had a live birth in the two years preceding the survey by types of maternal health services received according to selected background variables, Nepal, 2014

Background Variables	ANC & SBA & PNC	ANC & SBA only	ANC & PNC only	ANC only	Other	None	Total	Total number of women
Mother's age at birth								
<20	51.9	8.6	10.6	18.2	1.8	8.9	100	349
20-34	48.7	7.4	10.1	20.6	3.4	9.8	100	1,580
35-49	35.8	6.3	9.8	31.4	5.2	11.5	100	119
Birth order								
1	60.6	8.7	8.6	16.2	1.2	4.7	100	643
2-3	52.8	7.4	9.4	18.6	3.4	8.4	100	936

4-5	42.5	6.2	10.8	25.6	3.5	11.4	100	303
6 or more	26.8	7.2	11.6	33.4	4.8	16.2	100	166
Education								
None	14.8	9.2	15.2	37.6	6.6	16.6	100	585
Primary	36.4	6.8	12.1	29.4	4.1	11.2	100	290
Some secondary	54.4	7.6	10.6	19.6	2.7	5.1	100	467
SLC and above	76.9	6.7	3.8	6.9	1.1	4.6	100	433
Caste/Ethnicity								
Dalit	34.5	14.3	12.2	16.5	5.2	17.3	100	260
Disadvantaged Janajatis	47.4	9.3	10.3	23.6	5.2	4.2	100	416
Disadvantaged non-dalit Terai caste groups	37.3	14.6	13.2	19.5	1.2	14.2	100	279
Religious Minorities	35.9	7.6	12.4	31.8	5.2	7.1	100	188
Relatively advantaged Janajatis	68.6	4.6	3.2	13.5	1.2	8.9	100	43
Brahman/Chhetri	62.5	1.2	9.3	24.6	1.2	1.2	100	844
Others	38.9	4.5	10.2	31.2	2.2	13.0	100	18
Residence								
Urban	64.5	4.6	3.2	13.5	1.2	13.0	100	262
Rural	29.4	10.3	17.3	30.6	5.2	7.2	100	1,786
Ecological Zone								
Mountain	34.6	9.8	11.4	26.4	5.4	12.4	100	147
Hill	46.2	7.6	10.9	20.6	4.9	9.8	100	827
Tarai	57.3	4.8	7.9	21.3	3.1	5.6	100	1,074
Development Region								
Eastern	56.3	5.8	9.9	21.3	3.1	3.6	100	432
Central	49.2	7.6	11.6	20.6	4.2	6.8	100	679
Western	44.3	9.8	10.9	21.3	3.1	10.6	100	401
Mid-western	37.6	6.9	11.4	27.3	3.4	13.4	100	322
Far-western	39.3	4.8	15.9	21.3	3.1	15.6	100	214
Wealth quintile								
Poorest	23.8	9.8	15.4	29.8	5.8	15.4	100	454
Second	38.4	9.6	11.6	21.6	5.5	13.3	100	436
Middle	45.4	7.8	10.8	21.3	3.1	11.6	100	441
Fourth	52.6	7.2	8.5	20.9	2.1	8.7	100	401
Richest	76.6	2.2	4.7	14.6	0.6	1.3	100	316
Exposure to mass media*								
Yes	55.2	8.6	3.2	29.7	1.5	1.8	100	775
No	35.8	5.6	14.8	17.1	8.0	18.7	100	1,273
Total	**45.7**	**7.4**	**10.2**	**23.4**	**3.2**	**10.1**	**100**	**2,048**

*Refers to read a newspaper or watch TV or listen to radio at least once a week

Source: NMICS, 2014 Dataset

Factors Associated with the Completion of Continuum of Care

As illustrated in the Model I, the association between use of antenatal care and background variables including mother's age at delivery, birth order, education, place of residence, household wealth quintile, exposure to mass media has been examined. The results show that use of antenatal care is significantly associated mother's age at birth, lower birth order, education level, urban place of residence, wealth, and exposure to mass media. Table 3 shows the estimated odds ratios and 95% confidence intervals for the variables included in the model.

Household wealth and level of education and have relatively stronger effects than the other predictors. The odds of using antenatal care are nearly 1.5 times higher for women with SLC or higher education than for women with no education. The wealthier the household a woman lives in, the more likely she is to report antenatal care. For instance, the women from the richest are four times more likely to use the antenatal care compared to the women from poorest households. Similarly, regular exposure to mass media increases the odds of antenatal care.

Table 3: Results of the random-effects models

	Model I		Model II		Model III	
	ANC		ANC & SBA		ANC & SBA & PNC	
	Odd ratio	95% CI	Odd ratio	95% CI	Odd ratio	95% CI
Mother's age at birth (r=age<20)						
20-34	0.97**	0.69-1.41	1.01**	0.86-1.30	1.07	0.82-1.44
35-49	0.84**	0.61-1.06	1.03**	0.87-1.32	1.33	1.10-1.67
Birth order (r=1)						
2-3	0.97***	0.63-1.38	1.01**	0.90-1.30	0.87	0.55-1.46
4-5	0.89***	0.70-1.12	1.03**	0.82-1.20	0.70	0.51-0.84
6 or more	0.79***	0.60-1.01	1.02**	0.70-1.40	0.44	0.23-0.52
Education (r= no education)						
Primary	1.13***	0.90-1.78	1.03**	0.80-1.30	2.46***	1.81-3.10
Some secondary	1.29***	1.00-1.56	1.02**	0.67-1.39	3.68***	2.20-4.58
SLC and above	1.49***	1.00-2.23	1.03**	0.78-1.32	5.20***	3.86-7.11
Caste/Ethnicity (r= Dalit)						
Disadvantaged Janajatis	1.43	1.01-1.85	0.65	0.41-0.88	1.37	1.02-1.76
Disadvantaged non-dalit Terai caste groups	1.18	0.98-1.45	1.02	0.66-1.36	1.08	0.86-1.26
Religious Minorities	1.93**	1.32-2.48	0.53	0.38-0.72	1.04	0.67-1.45
Relatively advantaged Janajatis	0.82	0.66-1.06	0.32	0.18-0.46	1.99**	1.47-2.49
Brahman/Chhetri	1.49	1.21-1.78	0.08	0.02-0.14	1.81**	1.37-2.24
Others	1.89**	1.32-2.45	0.31	0.10-0.52	1.13	0.08-2.18
Place of residence (r=Urban)						
Rural	0.80**	0.60-1.01	0.94**	0.62-1.34	0.46**	0.32-0.61
Ecological Zone (r=Mountain)						
Hill	1.08	0.80-1.61	1.02	0.66-1.41	1.34	1.12-1.66
Terai	1.07	0.76-1.38	1.06	0.79-1.34	1.66**	1.30-2.11
Wealth quintile (r=Poorest)						

	Model I		Model II		Model III	
Second	2.75***	1.32-4.19	3.27***	2.32-4.19	1.61**	1.29-1.91
Middle	2.80***	1.38-4.24	3.55***	2.35-4.68	1.91**	1.40-2.69
Fourth	2.84***	1.43-4.28	4.36***	3.02-6.06	2.21***	1.80-2.79
Richest	4.32***	2.18-6.43	4.45***	3.04-6.18	3.22***	2.21-4.41
Exposure to mass media (r=No)						
Yes	1.18***	1.08-1.42	1.06**	0.69-1.44	1.43**	1.12-1.72
Had 4 or more ANC visits (r=No)						
Yes			1.32**	1.11-1.67	1.80**	1.21-2.52
Blood pressure measured (r=No)						
Yes			1.09	0.80-1.37	1.56	1.30-1.86
Urine sample taken (r=No)						
Yes			1.13	0.90-1.36	1.77	1.18-2.41
Blood sample taken (r=No)						
Yes			1.11	0.80-1.46	2.23**	1.76-2.88
Delivery at health facility (r=No)						
Yes					5.39***	2.38-8.66
Rho®	0.13		0.15		0.23	
Number of women		1,776		1,087		936

***p<0.01; **p<0.05
Rho®: Intra-class correlation coefficient, which measures the proportion of variation in the use of maternal services

As is also presented in the Table 3, Model II was run among women who received antenatal care to determine the factors associated with the continuity from having antenatal care to having skilled birth attendance. The outcome for Model II is 1 for receiving antenatal care and skilled birth attendance, and 0 for receiving antenatal care but not skilled birth attendance.

Variables related to antenatal care services (indicators of the quality of care) are introduced to this model in addition to individual background variables examined in Model I. As in the Model I, most of the variables related to women's background characteristics remain significant predictors. Interestingly, women with higher ages are associated with a higher likelihood of skilled birth attendance.

Further, as evident from the Model II, having four or more antenatal care visits is associated with subsequent use of skilled birth attendance. The likelihood of having skilled birth attendance increases by 32 percent for women with four or more antenatal visits compared with women with fewer than four visits. It was found that although statistically not significant, the likelihood of having skilled birth attendance increases for women who received blood pressure measurement, urine sample taken, and blood sample taken as part of antenatal services.

In line with the pathway of continuum of care, after delivery, some women received postnatal care and some did not. Thus Model III was fitted among women who received antenatal care and skilled birth attendance to identify factors associated with completion of the continuum of care. The two categories of the outcome for Model III are 1 for receiving antenatal care, skilled birth attendance, and postnatal care, and 0 for receiving antenatal care and skilled birth attendance but not postnatal care. Therefore, Model III examines the effects of predictors on the continuation of care from

delivery to the post-delivery period among women who received both antenatal care and skilled birth attendance. All of the variables related to women's characteristics and all of the variables related to antenatal care remain in the model, while place of delivery (delivery at a health facility or not) is added.

Level of education, household wealth, exposure to mass media, caste/ethnicity and place of delivery are statistically significant. It was found that women from richer households are more likely to receive postnatal care than women from poorer households; however the effect of wealth on postnatal care appear to be weaker as its effect on antenatal care and skilled birth attendance. On the other hand, the effect of education on postnatal care appears to be stronger as its effect on antenatal care and skilled birth attendance. Delivering in a health facility is strongly associated with postnatal care—nearly five times higher compared with not delivering in a health facility. Similarly, it was also found that the effect of exposure to mass media appear to be stronger as its effect on antenatal care and skilled birth attendance. Further, by caste/ethnicity, typically more privileged women such as those who belong to Relatively Advantaged Janajatis and Brahman/Chhetri caste/ethnic groups are nearly twice as likely to have completed the continuum of care for maternal health compared with the Dalits and Religious minority groups. Hence, education, household wealth and exposure to mass media are key determinants of the completion of continuum of care of maternal health.

4. DISCUSSION AND CONCLUSION

Overall findings show that Nepal has made some good progress towards extending the coverage of ANC, SBA, and PNC. Nearly 87 percent of women studied had at least one ANC visit during pregnancy; 56 percent had SBA during delivery; and 58 percent of women had a postnatal checkup within 48 hours after delivery. This shows that, compared to Afghanistan and Bangladesh, level of use of the key maternal health services in Nepal as shown by the 2014 NMICS is better. However, the status of the three maternal health indicators for Nepal are much lower compared to those of Maldives and Cambodia. It is interesting to note that SBA for Nepal is slightly higher compared to Pakistan although the ANC by a skilled health provider is higher for Pakistan.

Although nearly 87 percent women have access to ANC only about 46 percent of pregnant women in Nepal completed the continuum of care, receiving all three types of maternal services—ANC during pregnancy, SBA at delivery, and PNC within 48 hours after delivery. In other words, a substantial of them (about 39 percent) did not continue on the pathway to receive skilled birth attendance. Further, about 53 percent who received antenatal care were attended by a skilled health provider at delivery. After delivery, another about 14 percent did not go on to receive postnatal care. This means that after receiving ANC many women dropped out from the pathway of continued care and did not have a SBA or PNC. More dropouts occurred between pregnancy and delivery than between delivery and the postnatal period.

This study has identified a number of important factors that are associated with the completion of continuum of care for maternal health among women in Nepal. The multivariate regression analysis show that education, household wealth and exposure to mass media are the most significant predictive factors for the completion of continuum of care. For instance, women from the wealthiest households are about three times more likely to report use of all ANC, SBA and PNC compared with women from the poorest households. Similarly, the likelihood of receiving

all three services was also associated with women's educational attainment. Women with SLC or higher level of education were almost five times more likely to complete the continuum of care for maternal health compared with women with education. These findings are consistent with similar studies such as the study 'Determinants of Maternal Health Care Utilization in Bangladesh by Rahman (Rahman, 2009).

The analysis also revealed that the quality of antenatal care services that women receive, such as making at least four antenatal visits, is significantly associated with their subsequent use of skilled birth attendance. When women receive high-quality antenatal care, they become better informed about pregnancy and more likely to recognize the importance of skilled delivery care. This synergetic effect is also found between delivery in a health facility and receiving postnatal care.

The results also highlight that social inequities in access to maternal health care services continue to be alarmingly high. The typically more privileged women such as those who belong to Relatively Advantaged Janajatis and Brahman/Chhetri caste/ethnic groups, are nearly twice as likely to have completed the continuum of care for maternal health compared Dalits and Religious minority groups. This implies that barriers related to caste/ethnicity matter just as much as education and household wealth. The lower rates of maternal health service utilization by Dalits and Religious minorities indicate that continued social discrimination against these caste groups by service providers and other community members may impede their access to services. Outreach may increase if health service providers are of similar social and cultural backgrounds and are equipped with specific communication materials tailored to the disadvantaged groups. At the same time, however, further in-depth exploration on the barriers and community perceptions of the practices in terms of services access is necessary.

The study also showed a clear difference in high use and low use of maternal services by ecological zones and development regions. The central and eastern development regions demonstrate higher levels of completion of continuum of care, possibly due to the fact that regions are more socio-economically developed and have better access to a large number of health providers, including both public and private services. In contrast, the Far-western has the lowest use of maternal services, in part because of the limited health resources available. Therefore, more programme efforts should be directed to these regions.

To conclude, less than half of women in Nepal complete the continuum of care from pregnancy to post delivery. Quality of antenatal care is connected to women's use of SBA and PNC and should be given more focus. Poor, uneducated women and those living in remote rural areas and Dalits suffer from lower access to continued care. Thus, future programme efforts should focus on further improving quality of ANC and promoting SBA at especially in health facilities with more attention to rural areas, mountain regions, Mid and Far-western regions targeting uneducated women from poorer households where the lowest level of service use was found.

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