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Mother's Autonomy and Health Outcome in Nepal

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Abstract

This paper investigates the influence of women's autonomy and husbands' roles in decision making on the utilization of antenatal care, a primary indicator of women's health and well-being. Using data on 4,018 Nepalese mothers who had at least one birth within the last 5 years, I employ multilevel logistic regression and find that women's autonomy in decision making significantly and positively contributed to antenatal care visits. Similarly, joint decision making by a couple also positively contributed to antenatal care visits. If decision making is controlled by husbands alone, however, women are significantly less likely to use antenatal care. These findings suggest that women's autonomy and husbands' roles are important for the enhancement of women's health and well-being in a patriarchal socio-cultural context of Nepal.

Keywords

Antenatal care, Decision, Women, Husband, Health, Nepal, South Asia

Introduction

This paper investigates the influence on antenatal care (ANC) of women's autonomy and husbands' roles in decision making in three key dimensions of household activities: mother's health care (personal care autonomy), large household purchases (financial autonomy); and visits to family and relatives (movement autonomy). Antenatal care is one of the important approaches to ensure better health and well-being of mothers and babies. Both women's autonomy and husband's roles are important for antenatal care decisions in a patriarchal societal context of Nepal where maternal mortality is still high.

Much progress has been achieved in reducing maternal deaths, one of the Millennium Development Goals (MDG-5), in the last two and half decades. Globally, maternal mortality ratio (MMR) declined by 45 percent, from 380 to 210 deaths per 100,000 live births, between 1990 and 2013 [1]. The achievement in Nepal is also quite noteworthy. Between 1996 and 2010, MMR declined from 539 to 170 deaths per 100,000 live births [2,3]. Despite the significant decline in maternal mortality, the World Health Organization (WHO) reported that the global maternal mortality ratio is well below the annual target of 5.5 percent required to achieve MDG-5 [4]. Thus, much effort is needed to further reduce and sustain the already achieved MMR to make the UN's Sustainable Development Goal (SDG-3) - to live a long and healthy life - a success.

Pregnancy and childbirth related complication is one of the leading causes of high maternal mortality [1]. In 2013, 289,000 mothers (800 per day) died due to pregnancy and childbirth related complications [1,4]. 99 percent of these deaths occurred in developing countries. Southern Asia and sub-Saharan Africa together accounted for 86 percent of such deaths. Based on data from 2003-2009, haemorrhage was the leading cause of maternal deaths. Other major complications are infections, high blood pressure during pregnancy, complications from delivery and unsafe abortion. As most of these deaths are preventable [1,5], health-care interventions such as antenatal care, skilled care during childbirth and care and support in the weeks after childbirth are important to prevent or manage these complications and save lives of mothers and babies. While attendance by skilled health care professionals such as doctors, nurse and midwives at the time of child birth is crucial for safe delivery, visiting minimum recommended requirements of antenatal care is equally important for timely identification and prevention of complications during pregnancy. During ANC visits, women receive a basic care package, which includes nutritional advice, information about warning signs indicating possible problems during pregnancy, and additional resources to help prepare for a safe delivery. WHO recommends a minimum of four ANC visits to ensure better health and well-being of mothers and babies?

In 2014, only 52 per cent of pregnant women in the developing regions received the recommended number of ANC visits [1]. South Asia is the lowest in terms of progress with only 36 percent of the mothers aged 15-49 who made four plus visits to any ANC provider compared to 49 percent in sub-Saharan Africa and 84 percent in South-Eastern Asia. In Nepal, slightly over 50 percent of the mothers reported that they made four or more ANC visits during their most recent pregnancy in 2011, which increased from 29 percent in 2006 [2]. Despite the effort by the government, about 15 per cent mothers did not make any ANC visits and slightly over one-third mothers made 1-3 visits. The results are consistent with the findings of a community based study in Nepal conducted in 2011 [5]. This scenario signifies a large gap in the uptake of a minimum recommended ANC visits in Nepal.

A large number of studies worldwide have examined the effects of various factors contributing to antenatal care visits [for example, 6-15]. In Nepal, these studies reveal that age, parity, education, occupation, and economic status are associated with both attendance at four or more ANC visits and the receipt of good quality health

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care [5-7,10,13,16-18]. Other factors include religion, caste/ethnicity, husband's education and occupation, access to health services, and affordability.

Nepal, in general, has a patriarchal society. Gender-based discrimination is prevalent, men have domination over women's every sphere of life, and women's autonomy is considered low. Nepal's caste system further reinforces the patriarchal system and gendered social structure. The existing patriarchal system sets up men's control over women thus influencing women's autonomy in every sphere of their life [19-21]. A few studies reported the role women's autonomy and husband's involvement on the utilization of antenatal care. These studies suggest a positive contribution of women's autonomy on the use of ANC [10-13]. Conversely, in Nigeria, husband's refusal was one of the major reasons for non-utilization of antenatal care [14]. In Nepal, at least one study to my knowledge, examined the role of mothers-in-law on the utilization of ANC by daughters-in-law and found that mothers-in-law negatively influenced ANC uptake by daughter-in-law [15]. Chaudhury et al. [22] also reported similar findings from rural Bangladesh. But less is known about the influence of and the mechanism behind the roles women's autonomy and other family members including husbands' involvement may have on maternal health care in the Nepali context [10,12,21,23,24].

Considering this important research gap, this study aims to answer: to what extent do women's autonomy and husband's role in decision making in three key dimensions of household activities: mother's health care, large household purchases, and visits to family and relatives influence the utilization of antenatal care by mothers? This study uses a nationally representative sample of mothers from the 2011 Nepal Demographic Health Survey (NDHS). This paper extends the literature in two ways. First, this study goes beyond existing research and examines the influence of women's autonomy and husband's roles in mother's health and well-being. Second, from a methodological perspective, unlike many previous studies, the analysis takes into account clustering effects using a multilevel modelling approach. When clustering occurs, error terms are not independent and the standard errors computed will be biased suggesting for a multilevel modelling [25]. Most previous studies used linear modelling approach, which results in inaccurate estimations of slope coefficients. This advancement is possible because of the availability of recently collected uniquely detailed nationally representative multilevel data clustered by geographic place of residence of mothers also called the primary sampling units (PSUs) and a rich set of measures of decision making.

Nepal, in general, has a patriarchal society based on Hindu philosophy (according to 2011 census there are 81 per cent Hindus in Nepal). According to the Hindu *Dharmashastras (Manusmriti, the Hindu civil code),* "…women should be under the strict control and supervision of their fathers until marriage, under the control of the husband after marriage, and that of a son after the death of the husband" [26]. The patriarchal system thus empowers men and subordinates women and sets the stage for men's control over women's body, labor, income, mobility, sexuality, ideology and even identity [3,19,20]. A man is the head of a household. The access to property, resources and power are controlled by a man. Men are the major actors in almost all major decisions within the household. Although there is a gradual change, still a woman's relative level of autonomy is deeply rooted and strongly influenced by patriarchal norms and values.

The patriarchal system and the gendered structure of decision-making power is manifest in many forms. One such manifestation of this power dynamic is the long-held tradition that women move to their husband's house immediately following marriage. As most major personal decisions are influenced and constrained by marriage, kinship, and family relationships [27], a bride (a daughter-in-law) has very little say on almost every decision in the household. Moreover, Bloom, Wypij and das Gupta [12] observe that woman's roles, rights, and responsibilities are defined by household structure. For instance, in addition to being subject to their husbands, Nepali women are also subject to their mothers-in-law or other senior women in their household. The senior women are responsible for training of younger women, including daughters-in-law, as well as the right and responsibility of exercising authority and power over them [15]. A woman's power in the family is also determined by her continuation of relationships with her natal home [3,19]. If she has a good relationship with the natal home, she is better off in terms of enjoying her personal autonomy. Overall, women have less power than their male counterparts in household decisions including her own health care [28-30].

The patriarchal system and gendered social structure is further reinforced by Nepal's caste/ethnicity. Nepal is an admixture of various caste, sub-caste and ethnic groups of Indo-Aryan and Tibeto-Mongoloid origins. The 2011 census reported 126 such caste/ethnic groups in Nepal (CBS, 2012). The caste hierarchy is fundamental to the Hindu religion. The classical model of caste hierarchy involves four major domains: Bahun, Chhetri, Vaishya and Shudra [26]. Bahun and Chhetri are also termed as Tagadhari (sacred-thread wearing) caste groups are at the top of the caste hierarchy. This is followed by other groups such as Newar and Hill Janajati, for example, who belong to Vaishya (also termed as *Matawali* for whom alcohol is acceptable). These three caste groups belong to clean/pure caste categories. Upper caste Hindus (e.g., Bahun and Chhetri) and Newar (ethnic group) are considered at the top of the social hierarchy and are presumed to be socio-culturally, economically and politically advantaged as compared to other caste/ethnic groups [26,28,31-33]. These groups are believed to have the most access to various economic and non-economic resources and opportunities. Shudras are the impure caste groups also called untouchables (water unacceptable, also officially known as *Dalit* or skilled castes) and are at the very bottom of the caste hierarchy. *Dalits* (e.g., Kami, Sunar, Damai, Sarki) and other Janajati ethnic groups and Muslims are among the most disadvantaged groups in many respects [26]. Although Nepali constitution legally abolished discriminatory practices based on caste/ethnicity in 1962, people are often considered advantaged/disadvantaged based on their caste/ethnicity [28,33,34].

Women's autonomy differs by caste/ethnicity and is considered low among Indo-Aryan group (particularly the Bahun/Chhetriand *Dalit*) compared to other caste/ethnic groups. Men often restrict the freedom of women. Traditionally, a newly married couple are not expected to communicate openly for some time, although this practice is gradually falling out of practice today. Although men may not restrict women visiting a health care provider *per se*, newly married women may refrain from asking for permission. This will, of course, influence their mobility and therefore the likelihood of health care utilization by women. Moreover, even if husbands approve, women are not allowed to travel alone and husbands do not accompany their wives when travelling, for example, going to market or health care centres. Rather, women will have to seek accompany from other females in their house or community or natal home. If this is not a possibility, then, they will most likely not visit the health care provider. This often happens during peak working seasons when there is demand for work at home and finding a mate to travel to a distant health care provider is difficult. Moreover, following marriage, a daughter-in-law is expected to perform domestic duties under the supervision of her mother-in-law, who is usually the primary decision maker in matters of child-rearing and care of the family [15]. Thus, such a social and gendered power structure within the family has important implications on women's autonomy as well as their health and wellbeing. However, women who belong to Newar, Tibeto-Burman group (e.g. Gurung, Magar, Tamang), and TeraiJanajati (e.g. Tharu, Darai and Kumal) have relatively more freedom of mobility, financial management, and travel [35]. In summary, Manandhar [36] notes that Bahun/Chhetris and *Dalits* have the lowest level of women's autonomy, Newars and Tharus have the intermediate and the Tibeto-Burman groups have the greater autonomy. Evidence suggests that a low level of women's autonomy is associated with poor maternal health service utilization [10,12,13,24]. Thus, I hypothesize that, net of all other controls, women's autonomy in three key dimensions

of household activities (personal health care, large purchases in the household, and visits to family and relatives) enhances the utilization of antenatal care services. This also holds true when both husband and wife jointly make the decisions. However, if a husband has greater decision-making power, it is expected that women are less likely to visit antenatal care providers.

Data

I used the nationally representative Nepal Demographic Health Survey (NDHS) data collected in 2010-11. The detailed procedure for sampling and data collection is provided in the NDHS 2011 report [2]. The purpose of the survey is to collect information and provide estimates of key population and health indicators for the country as a whole using a representative sample.

The research design itself is multi-level in nature, and therefore, used multi-stage sampling. In Nepal, there are 75 administrative districts. The districts are divided into administrative units called village development committees (VDCs) and municipalities. These VDCs and municipalities are further divided into small wards. For the purpose of this survey, in the first stage, an enumeration area (EA) or a cluster was defined and selected which is a ward in VDCs and a sub-ward (wards divided into sub-wards) in municipalities. Altogether, a total of 289 EAs (194 rural and 95 urban) were selected. In the second stage, upon complete household listing of all EAs, 35 households from each rural cluster and 40 households from each urban cluster were randomly selected.

Three questionnaires were administered–the Household Questionnaire, the Women's Questionnaire and the Men's Questionnaire. The household questionnaire collected household level information including the listing of household members. The household questionnaire was used to identify eligible men and women for Women and Men's surveys. The data utilized in this study comes from the Women's Survey that was administered to 15-49 year old mothers using a face-to-face interview technique. This survey collected information such as background characteristics, pregnancy and family planning, health care utilization and more from the eligible woman in a face-to-face interview format. The interview was conducted individually in private by trained interviewers and strict ethical procedures were used to collect the information. Prior to the interview, an informed consent was read, women were informed of the aim of the study, their participation is voluntary, and they were assured that their identity and the information they provided will be confidential. The response rate of women's survey was 98 percent.

For this study, the data came from 4,018 mothers from children's recode file (out of a total 4,079 mothers of 5,306 children), which has one record for every child of eligible women born in the last five years (0-59 months). These mothers were between the age ranges of 15-49 years. Of the total 4,079 unique mothers, 61 were excluded due to missing values in some variables. Of particular interest to this study, these data contain detailed information on mothers' antenatal care visits, the role of mothers and other family members in health care decisions, and other socio-demographic characteristics.

Measures

Antenatal care visit by mothers during the most recent live birth is the outcome measure. This variable was measured as the total number of antenatal visits for the most recent live birth. As WHO recommends at least four ANC visits [2], this measure is dichotomised as - four or more visits reported by a mother for the most recent live birth (coded 1) and otherwise (coded 0). This is the commonly used measure of antenatal care (for example, [7-9]).

Women's autonomy and husband's roles are the major eexplanatory measures. Following Dyson and Moore [27] and Basu [37], I conceptualize autonomy 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.' Women who enjoy freedom of movement, control over property and resources, as well as control over own personal life events, are thought to experience high levels of personal autonomy [27,37,23]. Mistry, Galal and Lu [38] also consider autonomy as, 'the freedom of women to exercise their judgment in order to act for their own interests.' Thus, utilizing these conceptualizations, I consider women's autonomy as the ability to influence and make decisions about a range of personal and household affairs. Women's autonomy and husband's roles are measured in three key dimensions of household decision making: (a) decision on mother's (respondent) health care, (b) decision on large household purchases, and (c) decision about visits to family or relatives. Participation on decision making on mothers health care was collected by asking, 'Who usually makes decisions about health care of yourself?' Participation on decision making on large household purchases was collected by asking, 'Who usually makes decisions about making major household purchases?' Similarly, the information on participation in decision making about visits to respondent's family or relatives was collected by asking, 'Who usually makes decisions about visits to your family or relatives?' Responses were categorized as: respondent (mother herself) only, respondent and her husband/partner, husband/partner only, and someone else. The husband only was used as the reference category.

I used a rich set of controls theoretically known to influence both outcome and explanatory measures. These controls are measured as: mother's age (number of years at the time of survey and age squared); mother's and father's education (measured as: no education, primary education, secondary and higher education); parity (number of children ever born to a mother); living arrangement with husband; mother's occupation (not working; professional, clerical or service; agriculture; and others-skilled, unskilled and others); and father's occupation (professional, clerical; service; skilled manual: unskilled manual: agriculture, and others-others and don't know). Other controls are mother's caste/ethnicity (Bahun/Chhetri (Hill and Terai); Terai Others; Hill *Dalit*; Terai *Dalit*; Newar; Hill *Janajati*; Terai *Janajati*; and Muslims); a household's socio-economic status using wealth quintile (wealth index as poorest, poorer, middle, richer and richest), the perceived access to health service (measured as a dichotomy- whether distance to health facility is a big problem or not), rural-urban residence, and geo-ecological regions.

Analytic Strategy

First, I calculate descriptive statistics of measures used in this study. Next, I estimated multivariate models using multilevel modeling (hierarchical linear modeling) technique. The outcome measure antenatal care visit is a dichotomy coded "1" if a mother visited a health provider for antenatal care for four or more times during her most recent pregnancy and "0" otherwise. Due to the dichotomous outcome measure and the hierarchical structure of the data, multilevel logistic regression models are estimated using the SAS GLIMMIX procedure. This strategy takes into account of clustering of individuals, here mothers, by geographic clusters.

I first estimated the null or unconditional model. The results of unconditional model provide just the random effects for the intercept and do not include the effects of any predictors (results are not shown). Results from the null model estimated level-1 intercept of the outcome measure whether a mother visited a prenatal care provider for four or more times or not as a random effect of level-2 geographic clusters (289 PSUs) with no other predictors at level-1 or level-2. The intercept is the level-2 random intercept representing the log odds of visiting a health care provider for antenatal care by a mother in a typical cluster. The random intercept (0.310; $p < .001$; result not shown) is statistically significant which implied that there is a variation in antenatal care visits by mothers by geographic clusters suggesting for a multilevel modeling as a better approach of analysis.

Next, I estimated three random coefficient models. Results in model 1 are the fixed effects of level-1 predictor, women's autonomy, role of husbands, both and others for the health care of mother adjusting for the effects of all other controls that are theoretically known to influence both the outcome and explanatory variables.

Table 1: Descriptive statistics of measures, Nepal 2011 (N = 4,018).

Measures	Sample (n)	Mean (Median)/Proportion	Std. Dev.	Confidence Intervals (95%)
Outcome measure				
Antenatal care visit				
Total number of visits	4,018	3.63 (4.00)	2.54	3.55-3.71
Four or more visits(= 1)	2,121	0.53	0.49	0.51-0.54
Explanatory measures				
Who usually decides on respondent's health care?				
Women alone	915	0.23	0.42	0.21-0.24
Husband and wife both	1,519	0.38	0.48	0.36-0.39
Husband only	963	0.24	0.48	0.23-0.25
Others	621	0.15	0.43	0.14-0.17
Who usually decides on large household purchases?				
Women alone	1,099	0.27	0.45	0.26-0.29
Husband and wife both	867	0.22	0.41	0.20-0.23
Husband only	892	0.22	0.42	0.21-0.23
Others	1,160	0.29	0.45	0.27-0.30
Who usually decides on visits to family or relatives?				
Women alone	971	0.24	0.43	0.23-0.25
Husband and wife both	1.204	0.30	0.46	0.29-0.31
Husband only	719	0.18	0.38	0.17-0.19
Others	1,124	0.28	0.45	0.27-0.29
Controls				
Mother's characteristics				
Age (years)	4,018	26.9	6.04	26.80-27.17
Age squared	4,018	764.8	360.1	753.65-775.93
Education				
No education	1,728	0.43	0.50	0.41-0.45
Primary	807	0.20	0.40	0.19-0.21
Secondary	1,214	0.30	0.46	0.29-0.32
Higher education	269	0.07	0.25	0.06-0.08
Number of children ever born	4,018	2.64 (2.00)	1.81	2.59-2.70
Currently living with spouse/partner (Yes = 1)	2,638	0.66	0.47	0.64-0.67
Occupation				
Not working	954	0.24	0.43	0.22-0.25
Professional, clerical, service	420	0.10	0.36	0.09-0.11
Agriculture	2,463	0.61	0.37	0.60-0.63
Others (skilled, unskilled and others)	181	0.05	0.43	0.04-0.05
Caste/ethnicity				
Bahun/Chhetri	1,529	0.38	0.49	0.37-0.40
Terai Others	277	0.07	0.25	0.06-0.08
Hill Dalit	564	0.03	0.35	0.13-0.15
Terai Dalit	126	0.03	0.17	0.03-0.04
Newar	115	0.03	0.17	0.02-0.03
Hill Janajati	905	0.23	0.42	0.21-0.24
TeraiJanajati	348	0.09	0.28	0.08-0.10
Muslims	143	0.04	0.19	0.03-0.04
Husband's education				
No education	732	0.18	0.38	0.17-0.19
Primary	981	0.24	0.43	0.23-0.26
Secondary	1,793	0.45	0.50	0.43-0.46
Higher	512	0.13	0.33	0.12-0.14
Husband's occupation				
Professional/clerical	661	0.16	0.37	0.15-0.18
Service	1,034	0.26	0.44	0.24-0.27
Skilled manual	616	0.15	0.36	0.14-0.16
Unskilled manual	641	0.16	0.37	0.15-0.17
Agriculture	957	0.24	0.43	0.23-0.25
Others (others and don't know)	109	0.03	0.31	0.02-0.03
Wealth index				
Lowest quartile	1,136	0.28	0.45	0.27-0.30
Second	815	0.20	0.40	0.19-0.22
Third	731	0.18	0.39	0.17-0.19
Fourth	669	0.17	0.37	0.15-0.18
Highest quartile	667	0.17	0.37	0.15-0.18
Distance to health facility				
A big problem	2,164	0.54	0.50	0.17-0.19
Geo-ecological regions				
Mountain	734	0.18	0.38	0.17-0.19
Hill	1,627	0.40	0.49	0.39-0.42

Terai	1,657	0.41	0.49	0.40-0.43
Rural-urban residence				
Rural	885	0.78	0.41	0.77-0.79
Urban	3,133	0.22	0.41	0.21-0.23

Results

Descriptive results

Table 1 shows the descriptive statistics of the measures used in the analysis. Results show that 53 percent of the mothers visited the health care provider four or more times during their most recent pregnancy. On average, a mother visited a health care provider for pre-natal care for about 3.63 times (with a median of 4). The results are similar to the findings of a community based study in Nepal conducted in 2011 by Dhakal and colleagues [5].

24 percent of the mothers reported that the decision about her health care is made by husband only. About equal proportion of the mothers reported that the decision is made by her. 38 percent of them reported that the decision is made jointly by her and her spouse and 15 percent of them reported that the decision is made by someone else. Similarly, 27 percent mothers reported that they make the decision on large household purchases by themselves. 20 percent each reported the decision is made jointly and by her husband only. 29 percent reported that the decision is made by someone else. 24 percent of the mothers reported that they themselves decide about the visits to family or relatives. One in three mothers reported that the decision is made jointly and 18 percent of them reported that the decision is made solely by her husband. 28 percent mothers reported that the decision is made by others.

The average age of mothers at the time of survey was nearly 27 years, ranging from 15-49. Half of the mothers had at least 2 children and the average numbers of children born to these mothers were 2.64. 66 percent of these mothers were currently living with their husband. Although nearly 33 per cent of the women were living separately, a small fraction of them reported that the decision is made jointly or solely by husbands. The proportion of mothers with no education was nearly half (43 percent). One-fifth of them had primary education, 30 percent of them had secondary education and only 7 percent had higher education. 24 percent of the mothers were not working, 63 percent of them were engaged in farming, and only 10 percent had professional, clerical and service sector jobs. Five percent of them reported that they were involved in any (skilled, unskilled and other) type of job. Slightly over half of them reported that the distance to health facility was a big problem.18percent of the mothers' husbands had no education, 24 percent had primary education, 45 percent had secondary education and about 13 percent had higher education. 16 percent of the mothers reported that their husbands had professional/clerical job, 26 percent had service job, 24 percent were engaged in farming, 16 percent were doing non-skilled jobs and 15 percent were had skilled jobs. 20 percent of the mothers belonged to the poorest households and 17 percent of them belonged to the richest households. 38 percent of these mothers were Bahun/Chhetri, 23 percent were Hill *Janajati*, 9 percent were Terai *Janajati* and 7 percent were Terai other caste/ethnic groups. Muslims, Newar, Terai Dalit and Hill Dalit were each less than 4 percent. Eighteen per cent of the mothers were from the Mountains, 40 per cent from the Hills and 41 per cent from the Terai region. Nearly one-fifth of the mothers were residing in rural area.

Multivariate results

Results of the multilevel multivariate analysis are provided in table 2. Below I describe the results separately for each dimension of household activities.

Decision on mother's health care (personal care autonomy) and antenatal care: Results in model 1 (Table 2) provide the level-1 fixed effects controlling for the effects of all other covariates. The adjusted coefficients suggest that those mothers who report that they decide themselves for their own health care are significantly more likely to make 4 or more antenatal care visits compared to those who reported that their husbands solely make the decisions. To be more precise, the odds of making four or more antenatal care visits among mothers who make decisions about their own health care are35 percent greater than the odds for mothers whose husbands solely make the decision. Similarly, for mothers who jointly make health care decisions with their husbands, the odds of making four or more antenatal care visits are 42 percent greater than the odds for mothers whose husbands solely make health care decisions. If health care decisions are made by someone else in the household, mothers' odds of making four or more antenatal care visits is greater but the result was not statistically significantly different from mothers who reported that this decision is made by husband only. These results suggest that women's autonomy does matter in her health and well-being. Moreover, the influence of interpersonal communication between husband and wife is even a stronger predictor.

Decision on large household purchases(financial autonomy) and antenatal care: Results in model 2 (Table 2) suggest that controlling for important demographic and socioeconomic covariates, those mothers who have financial independence (financial autonomy) are significantly more likely to make 4 or more antenatal care visits compared to those who reported that the decision is solely make by their husbands. Mothers are 32 percent more likely to make 4 or more antenatal care visits if they themselves make financial decisions than those whose husbands solely make the decision. Similarly, if the decision is made jointly or by someone else in the household, they are also more likely to utilize antenatal care services. However, the statistical significance was not strong enough to make us confident of this finding.

Decision on visits to family or relatives (movement autonomy) and antenatal care: Women's movement autonomy also matters on their health. Results in model 3 (Table 2) suggest that net of all other covariates, husbands' sole decision making role about visits to family or relatives is a significant barrier for wives' health and well-being. Mothers who had freedom of movement (could decide independently) to visit family or relatives, or could decide jointly with her husband or was decided by someone else are more likely to make 4 or more antenatal care visits compared to those the decision is made solely by their husbands. These results also suggest for an important association between mother's independence on movement and their health and well-being.

Commensurate with other studies, these results also provide evidence of the important roles demographic and socioeconomic covariates play on antenatal care of women. Net of all other covariates, women's own education, parity, and caste/ethnicity did statistically significantly matter antenatal care visits [6,7,9,10,12,13,39,40]. For example, adjusting for all other covariates, compared to women with no education, educated mothers were significantly more likely to make four or more antenatal care visits. Similarly, mothers with higher number of parities were less likely to make four or more visits [41,42]. In addition, mothers who belonged to other Terai castes, Terai *Dalit*, Hill *Janajati* and Muslims were significantly less likely to make four or more visits compared to those who belonged to Bahun/Chhetri [13,28,43]. However, the disadvantage was not consistent across all caste/ethnicity groups [44,45]. Newar, Hill *Dalit* and Terai *Janajati* were more likely to make four or more visits to antenatal care providers, although the results were not statistically significantly different from Bahun/Chhetri mothers. Similarly, mother's age and occupation did not statistically significantly matter antenatal care visits [6,13].

As per expectation, husband's education was an advantage [6,7,13,46]. Mother's whose husbands had higher education are significantly more likely to uptake antenatal care. Similarly, women

Table 2: Multilevel models (odds ratios) estimating antenatal care visits, Nepal 2011 (N = 4,018).

Measures	Model 1	Model 2	Model 3
Explanatory variables			
Who decides on women's health care (Ref = Husband only)			
Women alone	1.35*	-	-
Husband and wife both	1.42***	-	-
Others	1.07	-	-
Who decides on household purchases? (Ref = Husband only)			
Women alone	-	1.32*	-
Husband and wife both	-	1.24+	-
Others	-	1.22	-
Who decides on visits to family or relatives? (Ref = Husband only)			
Women alone	-	-	1.32*
Husband and wife both	-	-	1.25+
Others	-	-	1.29*
Controls			
Mother's age (years)	1.04	1.05	1.06
Mother's age squared	1.00	1.00	1.00
Education (Ref = No education)			
Primary	1.75***	1.75***	1.77***
Secondary	2.28***	2.34***	2.37***
Higher education	7.32***	7.55***	7.57***
Number of children ever born	0.81***	0.81***	0.81***
Currently living with spouse/partner (Yes = 1)	0.83+	0.87	0.87
Occupation (Ref = Not working)			
Professional, clerical, service	1.02	1.05	1.04
Agriculture	0.90	0.89	0.89
Others (skilled, unskilled and others)	1.16	1.18	1.17
Caste/ethnicity:(Ref = Bahun/Chhetri)			
Terai Others	0.69+	0.67+	0.67+
Hill Dalit	1.12	1.10	1.11
Terai Dalit	0.55*	0.55*	0.55*
Newar	1.39	1.37	1.38
Hill Janajati	0.69***	0.69***	0.69**
TeraiJanajati	1.23	1.21	1.21
Muslims	0.67	0.66	0.67
Husband's education (Ref = No education)			
Primary	1.32*	1.32*	1.31*
Secondary	1.70***	1.67***	1.65***
Higher	1.46*	1.45*	1.43+*
Husband's occupation (Ref = Agriculture)			
Professional/clerical	1.35*	1.33*	1.36*
Service	1.30*	1.29*	1.31*
Skilled manual	1.06	1.05	1.06
Unskilled manual	0.98	0.98	0.99
Others (others and don't know)	0.76	0.75	0.75
Wealth Index (Ref = Lowest quartile)			
Second	1.05	1.05	1.05
Third	1.32*	1.32*	1.32*
Fourth	1.71***	1.68***	1.66**
Highest quartile	2.54***	2.52***	2.49***
Distance to health facility: A big problem (Yes = 1)	0.80*	0.81*	0.80*
Geo-ecological regions			
Hill	0.96	0.96	0.96
Terai	0.84	0.82	0.84
Rural-urban residence			
Rural	1.02	1.00	0.99
Intercept	0.39	0.34	0.30
Generalized chi-square	3557.12	3554.61	3559.67
-2 Res log pseudo-likelihood	18642.15	18624.97	18626.96

+p < .10, *p < .05, **p < .01, ***p < .001

whose husband's occupation was professional or clerical and those who were in service are significantly more likely to make more visits compared to those whose husbands were engaged in agriculture. Obviously, household economic status, as measured by the household wealth index is strongly associated with antenatal care visit. Women living in wealthier households are significantly more likely to make four or more visits than those who belonged to the poorer households. These results are consistent with the previous findings [7,10,42]. Rural residence or residence in the Hills and in the Terai did not make any difference in the use of antenatal care. These consistent findings provide assurance of the internal validity of the results and increase the confidence on the conclusion.

Discussion and Conclusion

Using the nationally representative 2011 demographic health survey data from Nepal, this study examined the influence of women's

autonomy and husband's roles in three key areas-mother's health care, large household purchases, and visits to family and relatives on antenatal care utilization by a mother. The evidence suggests that women's autonomy in these three key dimensions significantly and positively contributed to four plus antenatal care visits. Specifically, women who can make decisions independently about their own health care, on household financial matters, and regarding their own movement are significantly more likely to visit antenatal care service providers four plus times compared to women whose spouses solely make the decision in these three key areas, adjusting for all other factors. Similarly, mother's joint decision with her husband also positively influenced antenatal care.

The results further suggest that less educated, unemployed mothers with higher parity and currently living with their husbands are the ones who are most likely to report that their husbands solely make the decision (results not shown) regarding women's health care, large household purchases and visits to family and relatives. In addition, consistent with the expectation, Bahun/Chhetri mothers were more likely to report that these decisions are made by husbands compared to mothers of other ethnic groups. This could be due to the fact that women who belong to Tibeto-Burman group have relatively more freedom of mobility, financial management, and travel [36,35].

In conclusion, the findings reveal that women's autonomy as well as husband's role in household decision-making such as on women's health, finances and movement outside of home play important roles in the of uptake of antenatal care visits. These findings have important health policy implications in reducing maternal mortality and increasing women's health and well-being through increasing the utilization of antenatal care. From a health policy perspective, increasing women's autonomy will enhance the utilization of antenatal care, which will lead to seek other maternal health related services such as institutional delivery, delivery assisted by trained professionals, and seek advice for pregnancy complications as well as for post-delivery complications [47]. Similar findings are reported in a recent study in Nepal, in which the researchers found that husbands' role in decision-making contributed toward a greater likelihood of mothers giving birth at home rather than at a medical facility [45]. This will ultimately help reduce maternal as well as child mortality [48]. This finding provides an important insight for the UN's Sustainable Development Goal (SDG-3) to make a success.

In the past, health policy has much focused on providing access to health services. There is no doubt that the access to health services is a key concern in health care utilization [6,40,42,43,49-52]. However, as the results hold true even after adjusting for perceived access to health service and rural-urban residence suggest that mere provision of health services is not a sufficient condition for greater use of antenatal care. Idris, Sambo, and Ibrahim [53], in a study in Nigeria, also reported that the nearness to health facility was not a factor influencing the utilization of maternal health services. Thus, the findings clearly suggest that understanding the decision dynamics within the household is important for health policy interventions in Nepal. Research has indicated that enhancing women's autonomy alone may reduce husbands' involvement in pregnancy health care [16].

We should not also forget the important roles existing socio-cultural context and other socio-economic and demographic factors may play in health care utilization. The Nepali societal structure is complex. The health belief systemsand practices vary among and within caste/ethnicity lines [36]. Furthermore, Manandhar [36] in her comprehensive review on ethnographic and obstetric health issues in Nepal reveal that there is plurality in the health belief system and practices. Nepalis use a combination of health care services ranging from traditional healers to non-western (aurvedic medicines) and western medicines [18,36,54]. For example, the Tharu (Terai Janajati) and Magars (Hill Janajati) heavily rely on traditional healers and traditional birth attendants. However, whenever necessary they also rely on modern health care services. Thus, it is crucial to deeply understand the socio-cultural context of mothers and the prevailing health belief systems and practices before targeting any specific health care programme. While these results pertain especially to Nepal, they provide the basis for further research in other cultural contexts within and outside Nepal where men often control the decisions on major household activities. While, only half of women in developing countries receive the recommended amount of health care they need, this study provides insights in ensuring healthy lives and promoting the well-being for women and babies in a complex patriarchal societal context of Nepal, which will ultimately help achieve one of the UN's Sustainable Development Goals (SDG-3) in the country.

Finally, while this study addresses an important gap in existing research using the nationally representative data with multi-level characteristics, one of the major limitations is its cross-sectional nature. Thus, the results are rather associational than cause-effect relationships. This limitation strongly suggests for the need of panel data in order to determine the cause-effect relationships among interest measures. Moreover, this paper also does not focus on the quality of visits which a few studies have examined more recently [7]. While this study took into account of the variations in women's perceived distance to health service, rural-urban residence, and three ecological regions as key proxy measures of the access to health facilities, it was not possible to use the exact distance or time to travel to health service due to unavailability of these measures. Moreover, due to lack of measures such as past obstetric history and women's state of health, this study is also not able to control these factors in the analysis. There are some issues to be considered by researchers in the future.

Conflict of Interest Statement

The author declares no conflict of interest and this manuscript has not been published or submitted for publication previously in the present form or as an abbreviated version.

Ethical Consideration

The author is granted permission to use the NDHS data analysed here. Moreover, the author is certified with the human subjects' protection "Program for Education and Evaluation in Responsible Research and Scholarship" at the University of Michigan. The NDHS 2011 is approved by the Nepal Health Research Council (NHRC) and the ethical review board of ICF Macro international. Thus, an independent ethical approval is not required.

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