Women's Status, Household Structure and the Utilization of Maternal Health Services in Nepal

Even primary-leve1 education can significantly increase the chances of a woman using maternal health care from a modem health facility

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It is well recognized that maternal health services have a critical role to play in the improvement of women's reproductive health in developing countries (Magadi and others, 2000; Bhatia and Cleland, 1995; Becker and

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others, 1993; WHO, 1989). It is also well known that the utilization of maternal health services is undoubtedly influenced by the characteristics of the health delivery system such as the availability, quality and cost of the services. However, this does not necessarily mean that where there is a good supply of services, demand is created in and of itself, which will then lead to increased utilization. Thus, there has been considerable debate in the literature recently as to whether the mere provision of health services will lead to increased utilization (Magadi and others, 2000; Obermeyer, 1993; Basu, 1990). It may be true that, even under the same condition of availability, some women are more likely to use maternal health services than others. If so, characteristics of the health delivery system may not be the only explanatory factors for the utilization of maternal health services. Other factors such as the social structure and characteristics of individuals should also be considered in promoting the utilization of maternal health services.

Studies on health-seeking behaviour have identified the importance of the characteristics of health services such as the availability and accessibility of services to the general population in determining increased utilization (Develay and others, 1996; Becker and others, 1993; Magadi and others, 2000). The focus of such studies is mainly on the supply side of services; increasing the availability and accessibility of the health services is sufficient to increase utilization (e.g. Rosenzweiz and Shultz, 1982; Elo, 1992; Kumar and others, 1997). However, other studies argue that the mere existence of health services is not enough to lead to better utilization (e.g. Basu, 1990). Since health care is a consistent choice of individuals, the factors that change women's perception of the available alternatives and their motivation to seek care need to be understood properly. In the case of preventive health care such as maternal health services, women must realize the potential benefits of utilizing the services.

In this article, factors influencing the under-utilization of maternal health services among Nepalese women are investigated. Nepal has one of the highest maternal mortality rates in South Asia partly owing to the low utilization of maternal health services (UNICEF, 1996). Particular focus is given in the article to women's status and household structure, while controlling for the accessibility factor. It has been argued that changes in women's status have been the key to differentiate the behaviour of those seeking modern health care from those following traditional practices (Florez and Hogan, 1990). In general, women with low status are less likely to use modern facilities, whereas women with higher status take the initiative in seeking care for themselves and their children (Caldwell, 1996). It has also been pointed out that differences in household characteristics influence the utilization of maternal health services (Wickrama and Keith,

1990). This is partly because, in developing countries, the decision to use any kind of health care for women is made at the household level. These two aspects of potential users of services are integrated into a single study and the effects examined of women's status and household structure on the utilization of maternal health services in Nepal.

Women's status is measured using three indicators derived from a large sample of Nepalese women. Measures include education, employment status and intra-household decision-making power. Education of women is an important status indicator. In general, women with higher education tend to have a better position in society (WHO, 1989). In some cases, however, education alone may not be sufficient to increase women's empowerment. Women's employment is also considered an important factor in enhancing the status of women (Hogan and others, 1999). Thus, we also include the employment status indicator to measure women's status. In addition, women's involvement in intra-household decision making is used as another indicator of women's status. Their ability to communicate with their spouses or other members of the family indicates their decision-making autonomy. Women with greater decision-making power are presumed to have greater autonomy and a high status in the household.

Also measured are household characteristics using four indicators derived from the same sample: nuclear or extended household, family size, male- or female-headed household and economic status. Although the decision to use health services is an individual choice and related to individual characteristics such as women's status, various household characteristics may also act as determining factors in influencing the individual decision. Particularly in the case of developing countries, the decision to use any kind of health services is often made at the household level. A woman cannot visit a clinic or hospital without the permission of her husband, mother-in-law or the head of the household (WHO, 1989). Thus, the effect of nuclear or extended type of households and household size is first examined. On the one hand, in a nuclear family unit, there is less pressure on the value of an obedient daughter-in-law than is often observed in most joint families. Since value is placed on the individual's own abilities and attributes, women in nuclear families may be more likely to take the initiative in seeking care for themselves (Caldwell, 1996). On the other hand, in nuclear households, women's freedom is limited since they have to take responsibility for the full burden of housework, while there is much more sharing of tasks between women in extended households, thereby enabling pregnant women to seek care outside the home (Momsen, 1991).

Similarly, the effect of the sex of the household head has been debated. On the one hand, female-headed households are more likely than male-headed households to have a positive influence on health-seeking behaviour owing to the greater autonomy and decision-making power of the female (Wickrama and Keith, 1990). As a result of their position, women who are household heads have more control over the household's resources, part of which could be devoted to seeking health services outside the home (Kishor and Neitzel, 1997; Momsen, 1991). However, female-headed households are often poorer than male-headed households. They are usually the sole providers for the household (Kishor and Neitzel, 1997). Thus, their lower economic status might pose a burden to female-headed households in terms of seeking health care services. Finally, we examine the economic status of the household as a determinant of use of health services, because several studies have shown the relationship between the use of modern health care and the financial stability of the household (Celik and Hotchkiss, 2000; Pebley and other, 1996).

In what follows, the relationships are examined between these indicators and women's utilization of maternal health services. The analysis is based on survey data for a large national sample of Nepalese women. First, it is hypothesized that the higher the women's status, the greater is the utilization of maternal health services. It is also hypothesized that women from a nuclear household structure have greater autonomy compared with women from the traditional extended/joint family structure and are therefore more likely to seek care. The hypotheses are tested while controlling for the availability of services. Before analysing the data, a brief review of the situation of maternal health services in Nepal is in order.

Maternal health services in Nepal

Nepal has one of the highest maternal mortality rates in South Asia. Of the estimated 927,000 pregnancies that take place in Nepal every year, 40 per cent of the pregnancies are considered to be highly risky for both the mother and the child (UNICEF, 1996). Frequent pregnancies and inadequate nourishment of women during pregnancy place women at high risk during delivery. Furthermore, the low availability and utilization of maternal health services during pregnancy increase the risks to expectant mothers. Thus, maternal health services, such as prenatal care, skilled assistance during delivery and post-natal care, along with adequately equipped health institutions, play a major role in the reduction of maternal mortality and morbidity.

In the past, traditional faith healers and traditional birth attendants provided health care in Nepal. It was during the end of the nineteenth century that the concept of modern medicine was introduced in Nepal. Starting from the mid-1950s, planned national-level efforts towards the development of modern health services were initiated. Since then, progress has been made in the development of modern health services, and in recent years modern health care has penetrated into various parts of Nepal. However, the services are still limited in number, especially in remote rural areas. At present, both modern and traditional forms of medicine co-exist simultaneously in the country (UNDP, 1998; Niraula, 1994; Gubhaju, 1986).

In Nepal, relatively few women use maternal health services during pregnancy. For example, according to the Nepal Family Health Survey (NFHS) of 1996 56 per cent of women did not receive any antenatal care during pregnancy. In addition, most children are delivered at home with the help of a trained traditional birth attendant or family members. Over 90 per cent of births in Nepal are delivered at home, while only 8 per cent are delivered at health facilities. The utilization of post-natal services is also very low. Only 12 per cent of women receive post-natal care from a health professional (UNICEF, 1996; DHS, 1996).

Some reasons for the low utilization of maternal health services are a result of the poor quality, unavailability and inaccessibility of services. While the low utilization of maternal health services in Nepal is partly due to the poor provision of services, the problem of non-use of health services is further exacerbated by various other social factors. One of the major contributing factors is the general lack of awareness among people of the availability and importance of maternal health care. In Nepal, the prevailing attitude towards pregnancy is that it is not considered a condition that requires special treatment. Therefore, antenatal care and medical care during childbirth are not considered essential components of pregnancy. In addition, for cultural reasons women are reluctant to seek antenatal care, especially from a male health worker. Consequently, in some cases, even when adequate services are available, women are reluctant to use them (UNICEF, 1996). In addition to the accessibility, cost and availability of the services, which are important factors in the low utilization of services, the prevailing attitudes among women towards such services should also be taken into consideration. The under-utilization of services indicates that, despite the existence of such services, people have neither the knowledge nor the incentive to use the services available.

Among districts, there is also a wide variation in the number of prenatal visits made by women. A study conducted by the Ministry of

Health (Department of Health Services, 1998) showed that the use of prenatal services was high (30 to 80 per cent) in 25 districts of Nepal and low (less than 10 per cent) in nine districts. Districts with low utilization are scattered throughout the country. Furthermore, the higher utilization of maternal health services was not confined to the regions where maternal health services are more accessible (Department of Health Services, 1996 1998).

This suggests that there are other reasons, apart from accessibility, that account for variations in the use of maternal health services between districts. Hence, the interventions to increase the utilization of maternal health services may require more than just making the services available. Social factors that influence an individual's demand for such care also need to be considered. If women in Nepal are to be encouraged to seek prenatal care, aside from improving the quality and accessibility of services, further efforts need to be made to change people's attitudes towards the importance of maternal health care. In order to persuade women to use maternal health care services, the benefits of using such services must be made known among the general population. At the same time, it is necessary to understand better the constraints making women reluctant to utilize maternal health services.

Data and operationalization of variables

The data for this study come from the 1996 NFHS, which is part of the worldwide Demographic and Health Surveys. The NFHS is a nationally representative survey of ever-married women 15 to 49 years of age. Data were collected from 8,429 ever-married women to provide detailed information on fertility, family planning, infant and child mortality, maternal and child health, and nutrition, Two types of questionnaires were used in the NFHS: a household questionnaire and an individual questionnaire.

The sampling frame for the NFHS was the 1991 population census. Administratively, Nepal is divided into 75 districts; each district is subdivided into village development committees (VDCs) and each VDC into wards. The primary sampling unit was a ward or group of wards in rural areas and sub-wards in urban areas. The sample for the NFHS was a two-stage stratified sample consisting of 253 wards (or sub-wards).

The sample used for this study comprised those women who had at least one birth in the year prior to the survey. Hence, only service utilization behaviour associated with the most recent pregnancy was considered. The sample was selected based on the rationale that mothers

Table 1. Descriptive statistics of dependent variables, Nepal

Variable	Description		Total		Urban		Rural	
			N	%	N	%	N	%
Prenatal care	Used prenatal care from a modern source	Total	1,388	100	120	100	1,268	100
		Yes (1)	504	36	77	64	427	34
		No (0)	884	64	43	36	841	66
Place of delivery	Home vs. health facility	Total	1,388	100	120	100	1,268	100
		Health facility (1)	123	8.9	49	41	74	5.8
		Home (0)	1,265	91	71	59	1,194	94
Professional assistance	Received assistance from a modern source	Total	1,388	100	120	100	1,268	100
		Yes (1)	142	10	51	43	91	7.2
		No (0)	1,246	90	69	58	1,117	93

would most accurately be able to recall such utilization behaviour for a pregnancy that had occurred within the previous year. It was felt that utilization behaviour that had occurred prior to this interval might not have been accurately reported. Also, only the usual residents of the household were selected since corresponding information of the individual's household was essential to this study. After excluding cases with missing values, a total sample of 1,388 women has been included in this study.

This study analyses the utilization of three types of maternal health services: prenatal care, delivery at a modern health facility and professional assistance at delivery. They are all dichotomous variables indicating the use or non-use of these three maternal heath services. Table 1 shows descriptive statistics for these variables. Separate statistics for urban and rural samples are shown. Prenatal care indicates whether the care was sought from a modern source (coded as 1); if care was sought from a traditional birth attendant or no prenatal care was sought, it was coded as 0. Of the total sample of women who gave birth in the year prior to the survey, 36 per cent received prenatal care from a modern source. Urban women were more likely to have received prenatal care from a modern source than rural women (64 and 34 per cent respectively).

Place of delivery indicates whether the place of delivery was at home (coded as 0) or a health facility (coded as 1). The category "health facility"

includes all types of institutional deliveries such as those at government hospitals, health centres, health posts, private hospitals, clinics and nursing homes. As table 1 shows, the majority of births in Nepal are delivered at home. Even in urban areas, about 60 per cent of the births are delivered at home.

Professional assistance at delivery indicates the type of assistance received during delivery. Assistance received from a medical doctor, nurse/midwife, maternal and child health worker, village health worker and other health professionals is considered modern professional assistance (coded as 1). Assistance received from a traditional birth attendant, or a relative/friend and no help are considered as no professional assistance (coded as 0).

Independent variables

Several proxy variables are used as measures of women's status and household structure. The *education* variable measures the level of education that a woman has completed. This variable is dichotomous and has been categorized as less than primary (coded as 0) and more than primary (coded as 1). The category "less than primary" includes women who have never attended school and those who have not completed primary-level education. The category "more than primary" includes all women who have completed at least the primary level of schooling. The rationale for this categorization is that the majority of women in Nepal have never attended school; therefore, completion of even a primary level of education would make a positive difference in their status. The number of women who have completed secondary and higher levels of education is too small to be treated under separate categories; therefore, such women are included in the "more than primary" category.

Work status of women indicates whether the woman is employed in any type of work aside from her own housework. The definition of employment used here is very broad as it includes all forms of women's labour force participation: formal and informal work, work inside and outside the home, and work for payment in cash, payment in kind or no earnings. This is a dichotomous variable: work (coded as 1) or do not work (coded as 0).

Job type further narrowly defines the employment of the woman. The informal type of work (coded as 0) with no cash earnings, such as agricultural and domestic work, is separated from modern-sector occupations (coded as 1), which enable women to earn cash. Modern-sector occupations are most likely to be associated with higher autonomy and

status compared with the informal type of work. This category includes women working as professionals and in managerial, technical and clerical positions or those doing manual work.

Cash income is the variable that indicates whether the woman is engaged in any income-generating activities. Women who are not working and those who are working but not earning any cash are placed in the no cash income category (coded as 0), whereas the women who are earning cash for their work are placed in the cash income category (coded as 1).

Decision-making by women is a composite score of four variables related to women's decision-making power in the household. Three of the variables are related to decision-making pertaining to family planning matters: discussion of family planning with husband, discussion of family planning with mother-in-law and ever-use of contraceptives. One additional variable, "usually listen to radio", is also included in the composite score. When the number of affirmative responses for the above variables is counted, the result can be represented on a scale from 0 through 4. A count of 0 is categorized as little decision-making power (coded as l), a count of 1 or 2 is categorized as moderate decision-making power (coded as 2) and a count of 3 or 4 is categorized as strong decision-making power (coded as 3).

Several measures of household characteristics are also included in this study. The variable *family strucrure* is a proxy indicator for a nuclear and extended type of family structure. Households with three or more related adults are assumed to have an extended/joint family structure (coded as 0), while households with two related adults of opposite sex are assumed to have a nuclear family structure (coded as 1). Separately, the number of household members is used as an indicator of household size (household *size).* In addition, the sex of the household head is indicated by the *male/female-headed* variable (male-headed coded as 1, female-headed coded as 0).

Economic status of the household is measured by a composite score of several indicators of household possessions. The question was asked whether the household had such items and facilities as piped water, toilet, non-dirt floor, electricity, radio, television, telephone and bicycle. Affirmative responses to eight items are counted and a composite scale ranging from 0 through 8 is created. The higher the score, the higher is the economic status of the household. About 67.7 per cent of the households are below scale 2, while 28.2 per cent of the households range between 2 and 4, and 4.1 per cent of the households are above 4.

Control variables

Two additional variables are used to control for the accessibility and availability of maternal health services. The first is a dichotomous variable, *urban-rural.* Services are more accessible for women residing in households in urban areas compared with those in rural areas. Second, for the rural samples, the region of residence is used as the indicator for the availability of services. Nepal is divided into five development regions. Based on statistics provided by the Department of Health Services, the five regions are categorized into three groups: regions with scarce facilities (mid-western and far-western regions), those with moderate facilities (eastern and western regions) and the one with adequate facilities (central region).

Multivariate analyses of utilization of maternal health services

This section presents the results of the logistic regression analyses predicting the utilization of maternal health services using various independent variables related to the women's status and household structure. Three models using three dependent variables — prenatal care, place of delivery and professional assistance at delivery — were fitted for all women of the selected sample for both urban and rural areas. Additionally, since the majority of the population in Nepal live in rural areas (91 per cent), separate models were fitted for women only in the rural areas. For each model, regression coefficients and odds ratios are presented.

Use of prenatal care

The results of the prenatal care model are shown in table 2. Of the individual-level characteristics related to women's status, the education level of the woman is the only variable that has a positive and statistically significant impact on the use of prenatal care. The results show that women with more than primary-level schooling were significantly more likely to use prenatal care from a modern source compared with women with less than primary-level schooling, after controlling for all other variables in the model. For a woman with more than primary education, the estimated odds of using prenatal care multiply by $\exp(\beta) = 2.50$ compared with a woman with less than primary education.

With respect to household-level characteristics, the economic status of the household has a positive and significant impact on the use of prenatal care. For every one unit increase in the economic status scale, the expected odds of a woman from that household using prenatal care multiply by 1.55; that is, there is a 55 per cent increase. Women from households with a

Table 2. Logistic regression results for use of prenatal care, Nepal

Variables	Total			Rural		
	Beta	Exp(β)	S.E	Beta	Exp(β)	S.E.
Education	0.92	2.50	(0.21)[a]	0.89	2.44	(0.23)[a]
Work status	0.01	1.01	(0.15)	0.09	1.09	(0.16)
Job type	0.3 1	1.36	(0.37)	0.23	1.26	(0.39)
Cash income	0.25	1.28	(0.32)	0.40	1.50	(0.33)
Decision-making						
Little decision-making (reference group)						
Moderate decision-making	0.16	1.17	(0.13)	0.13	1.14	(0.14)
Strong decision-making	0.50	1.65	(0.28)	0.36	1.44	(0.30)
Economic status scale	0.44	1.55	(0.06)[a]	0.47	1.60	(0.06)[a]
Family structure (Nuclear = 1)	-0.63	0.53	(0.15)[a]	-0.59	0.56	(0.16)[a]
Male/female-headed (Male = 1)	-0.79	0.45	(0.28)[a]	-0.70	0.50	(0.29)[b]
Household size	-0.07	0.94	(0.02)[a]	-0.06	0.94	(0.02)[a]
Urban-rural (urban= 1; rural = 0)	0.28	1.33	(0.25)			
Region (dummy)						
Scarce (= 3)	-0.38	0.68	(0.17)[b]			
Moderate (= 2)	-0.03	0.97	(0.16)			
Adequate (= 1)						
Intercept	0.08		(0.35)	0.02		(0.38)
N	1,388			1,268		

[a] $p < 0.01$

[b] $p < 0.05$

nuclear type family were substantially less likely to use prenatal care than women from households with an extended/joint type of structure. The expected odds of women from nuclear households using prenatal care decrease by 47 per cent compared with women from extended households. Women from male-headed households were also significantly less likely to use prenatal services. The expected odds decrease by 55 per cent. The results of the model derived from rural women are similar to the results derived from the total sample.

Place of delivery

Table 3 shows the results of the logistic regression model predicting *place of delivery*. Two of the women's status variables, education and occupation of women, have a positive and significant association with place of delivery. Women with more than primary schooling are 3.44 times more likely to have an institutional delivery. Additionally, the expected odds of giving birth at a health facility for women who work in modern-sector occupations are 4.17 times higher. Interestingly, the relationship between

Table 3. Logistic regression results for place of delivery, Nepal

Variable	Total			Rural		
	Beta	Exp(β)	S.E.	Beta	Exp(β)	S.E.
Education	1.24	3.44	(0.27)[a]	1.18	3.26	(0.32)[a]
Work status	-0.57	0.57	(0.25)[b]	-0.37	0.69	(0.29)
Job type	1.43	4.17	(0.62)[b]	0.79	2.20	(0.77)
Cash income	-0.87	0.42	(0.67)	-0.90	0.40	(0.84)
Decision-making						
Little decision-making (reference group)						
Moderate decision-making	0.01	0.99	(0.26)	0.02	1.02	(0.29)
Strong decision-making	0.81	2.24	(0.40)[b]	0.57	1.77	(0.46)
Economic status scale	0.34	1.40	(0.08)[a]	0.38	1.46	(0.10)[a]
Family structure (Nuclear = 1)	-0.20	0.82	(0.29)	-0.02	0.98	(0.33)
Male/female-headed (Male = 1)	-0.95	0.39	(0.41)[b]	-0.67	0.51	(0.49)
Household size	0.01	1.01	(0.03)	0.01	1.01	(0.04)
Urban-rural (urban = 1; rural = 0)	1.23	3.40	(0.32)[a]			
Region (dummy)						
Scarce (= 3)				-0.71	0.49	(0.34)[b]
Moderate (= 2)				-0.43	0.65	(0.31)
Adequate (= 1)						
Intercept	-2.32		(0.56)[a]	-2.39		(0.70)[a]
N	1,388			1,268		

[a] $p < 0.01$

[b] $p < 0.05$

women's work status and place of delivery has an inverse and significant association. Women who are currently working, aside from doing their own housework, are only 0.57 times as likely to give birth at a health institution. In other words, the expected odds decrease by 43 per cent. The majority of women in Nepal work in the agricultural sector. Therefore, this factor may negatively affect their status and lead to decreased utilization.

Although not statistically significant, it is surprising that women who earn money are less likely to deliver at a health facility. Women who work for money may be associated with households of low economic status, and for this reason, an inverse association may have been found. In terms of women's decision-making in the household, moderate decision-making in comparison to little decision-making does not significantly influence the place of delivery. However, strong decision-making has a significant impact. Women with strong decision-making power in the household are 2.24 times more likely to deliver at a health facility compared with women with little such power.

Table 4. Logistic regression results for professional assistance at delivery, Nepal

Variable	Total			Rural		
	Beta	Exp(β)	S.E.	Beta	Exp(β)	S.E.
Education	1.32	3.75	(0.26)[a]	1.13	3.10	(0.29)[a]
Work status	-0.96	0.38	(0.23)[a]	-0.94	0.39	(0.25)[a]
Job type	1.30	3.66	(0.56)[b]	0.88	2.42	(0.63)
Cash income	-0.31	0.74	(0.57)	-0.07	0.93	(0.61)
Decision-making						
Little decision-making (reference group)						
Moderate decision-making	0.09	1.09	(0.24)	0.15	1.16	(0.26)
Strong decision-making	0.42	1.52	(0.40)	0.14	1.15	(0.47)
Economic status scale	0.32	1.38	(0.08)[a]	0.32	1.38	(0.09)[a]
Family structure (Nuclear = 1)	-0.20	0.82	(0.27)	-0.07	0.93	(0.31)
Male/female-headed (Male = 1)	-0.90	0.41	(0.40)[b]	-0.60	0.55	(0.47)
Household size	0.03	1.03	(0.03)	0.05	1.05	(0.03)
Urban-rural (urban = 1; rural = 0)	0.94	2.56	(0.30)[a]			
Region (dummy)						
scarce (= 3)				-0.73	0.48	(0.34)[b]
Moderate (= 2)				0.14	1.15	(0.28)
Adequate (= 1)						
Intercept	-2.06		(0.53)[a]	-2.34		(0.64)[a]
N	1,388			1,268		

[a] $p < 0.01$

[b] $p < 0.05$

Two of the household variables, household economic status and male-headed households, have a significant association with place of delivery. When the household economic status scale increases by one unit, the expected odds of women of the household delivering at a health facility increase by 40 per cent. Also, women from male-headed households are 61 per cent less likely to give birth at a health facility. In the rural model, the education of women and household economic status were the only two variables that emerged as statistically significant.

Professional assistance at delivery

The results for *professional assistance* at delivery are presented in table 4. In this model, three individual-level variables significantly influence receiving modern assistance at delivery. The odds of women with more than primary education receiving assistance from a modern source during delivery are 3.75 times higher than for women with less than primary

education. Women who are currently working are 62 per cent less likely to receive assistance at delivery. However, if the woman is working in a modern-sector occupation, then the odds of receiving assistance are 3.66 times greater.

Predicted probabilities of receiving maternal health services

Influence of education on receiving prenatal care

The education level of the woman was chosen from the individual-level characteristics since it was shown to have the strongest significant effect in the model. Urban-rural place of residence was included in the prediction in order to control for the effects of the accessibility of the health services. A separate logistic regression analysis was run with only the two independent variables mentioned above. The predicted probabilities were thus calculated as follows:

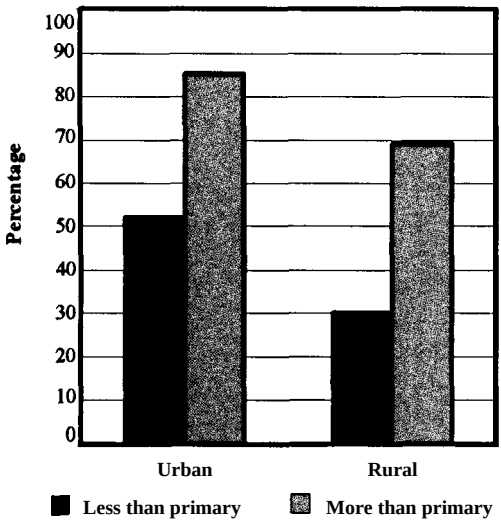
$$\text{logit (probability of using prenatal care)} = -0.8483 + 1.6494\,(X_1) + 0.9193\,(X_2)$$

where X_1 is the level of education and X_2 is urban-rural status. As seen in figure 1, the probability of using prenatal care by a rural woman with less than primary schooling is only 30 per cent [$1 / 1 + e^{-[-0.8483 + 1.6494\,(0) + 0.9193\,(0)]} = 0.2998$]. However, if she has more than primary-level schooling, her probability increases to nearly 70 per cent [$1 / 1 + e^{-[-0.8483 + 1.6494\,(1) + 0.9193\,(0)]} = 0.6903$]. The predicted probability of educated women using prenatal care is higher for both urban and rural areas. This shows that education has a significant influence on utilization behaviour, regardless of the residential difference. However, the probability of a woman living in an urban area with less than primary schooling using prenatal care is 52 per cent [$1 / 1 + e^{-[-0.8483 + 1.6494\,(0) + 0.9193\,(1)]} = 0.5177$], which is higher than for women living in rural areas with less than primary schooling. This is also an indication that the availability and accessibility of health services is important in determining their utilization. However, a woman living in an urban area, who has more than primary schooling, has a predicted probability of 85 per cent [$1 / 1 + e^{-[-0.8483 + 1.6494\,(1) + 0.9193\,(1)]} = 0.84821$. Hence, where health services are available, education increases the chances of women using maternal health care.

Influence of household structure on place of delivery

The predicted probabilities for place of delivery are calculated by three independent variables: education, male/female-headed households

Figure 1. Predicted probabilities of using prenatal care by education and urban-rural status, Nepal



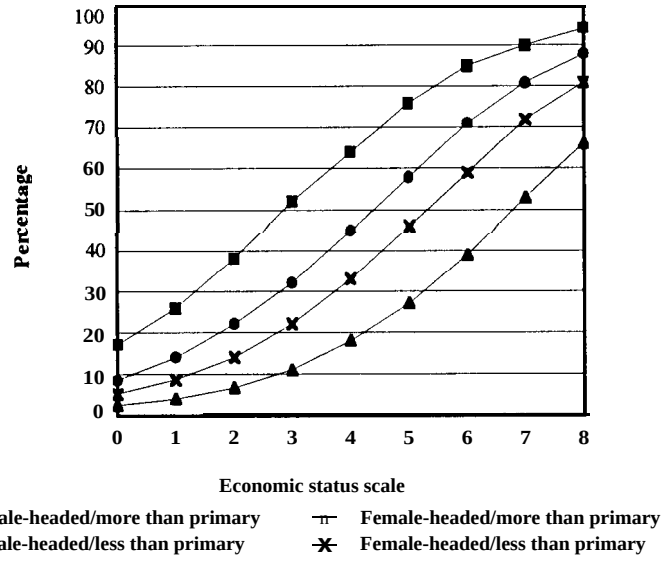
and household economic status. These three variables are put in a separate logistic regression analysis in order to examine their effects on the dependent variable:

$$\text{logit (probability of delivery at a modern health facility)} = -2.8931 + 1.3170(X_1) - 0.8105(X_2) + 0,5459(X_3)$$

where X_1 is the level of education, X_2 is the household head and X_3 is the economic status scale (discrete variable ranging from 0 to 8).

As shown in figure 2, the probability of delivering at a health facility increases as the economic status of the household increases. However, there are differences in the predicted probabilities depending on the sex of the household head and the educational level of women. The predicted probabilities are clustered together towards the lower end of the economic scale. When the economic status of the household is low, differences in educational levels and the sex of the household head do not seem to affect substantially the place of delivery. Inability to pay for the costs of an institutional delivery seems to be the major factor in determining place of

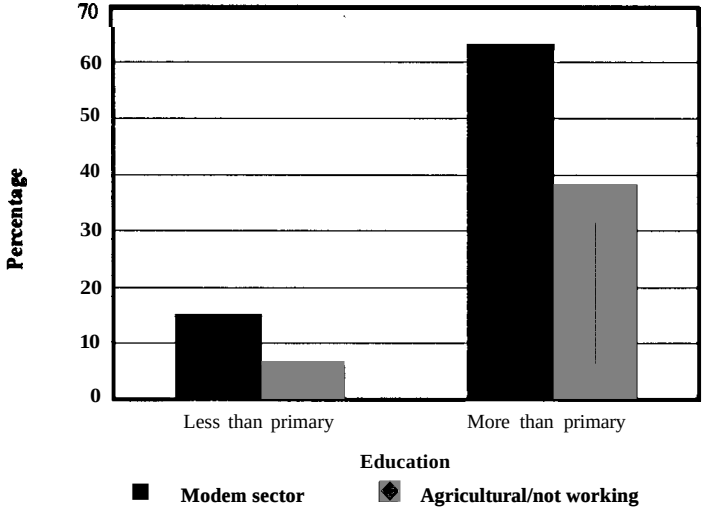
Figure 2. Predicted probabilities for place of delivery by economic status, education and household bead, Nepal



delivery. Nonetheless, there are slight differences in the probabilities where a woman with less than primary education living in a male-headed household has the lowest probability of seeking care, i.e. 2.4 per cent [$1 / 1 + e^{-[-2.8931 + 1.3170\ (0) - 0.8105\ (1) + 0.5459\ (0)] - 0.0240}$],

As economic status increases, the gap between the different groups widens This indicates that when the resources are available, individual and household characteristics determine how the resources will be used. Education obviously has an impact as women with more than primary education from both male- and female-headed households have higher probabilities than women with less than primary education. Women from female-headed households are also substantially more likely to deliver at a health facility. It may be the case that when resources are available, female heads of household are more likely to allocate resources to the health care of women. Hence, women with more than primary education from female-headed households have the highest probability of delivering at a health facility. At the highest economic scale, these women have a 94 per cent [$1 / 1 + e^{-[-2.8931 + 1.3170\ (1) - 0.8105\ (0) + 0.5459\ (8)]} = 0.9422$] probability of having an institutional delivery.

Figure 3. Predicted probability of receiving professional assistance at delivery by education and occupation, Nepal



Influence of education on professional assistance at delivery

Predicted probabilities for using *professional assistance* at delivery are calculated by selected independent variables that were statistically significant in the logistic regression model. Both education and occupation of women were shown to have the strongest significant correlation in the model. Therefore, a logistic regression analysis was run with these independent variables to predict probabilities of receiving professional assistance from a modern source during delivery:

$$\text{logit (probability of receiving assistance)} = -2.7943 + 2.2858\,(X_1) + 1.0292\,(X_2)$$

where X^1 is the level of education and X_2 is the occupation.

The predicted probabilities show the dramatic impact of education on receiving assistance from a modem source at delivery (figure 3). Women with more than a primary level of education have substantially higher probabilities compared with women with less than primary education. Additionally, among women who have more than primary education, working in the modern sector increases their chances of seeking modern

assistance. The predicted probability for women in modern-sector occupations is 63 per cent [l / 1 + $e^{-[-2.79431 + 2.2858\ (1) + 1.0292(1)]}$ = 0.62731, compared with 38 per cent [1 / 1 + $e^{-[-2.79431 + 2.2858\ (1) + 1.0292(0)]}$ = 0.3755] for women who are not working or engaged primarily in agricultural work. Among women who had not finished primary school, 5 per cent of those who work in agriculture received professional assistance during their last delivery, while 15 per cent of those who work in the modern sector received such assistance (figure 3). Thus, working in the modern sector has a significant impact on receiving professional assistance during delivery even when controlling for education.

Conclusions and discussion

In this article, an attempt has been made to examine the effects of women's status and household-level characteristics on women's maternal health care utilization behaviour. The results of our analysis reveal that education of women is the most important factor in determining increased utilization of maternal health services, even after controlling for the availability factor. This finding is consistent with that of many previous studies which showed education of women to be the most significant predictor of increased utilization of health services (Bhatia and Cleland, 1995; Becker and other, 1993; Celik and Hotchkiss, 2000; Obermeyer, 1993).

There are a number of reasons why education of women has a significant positive relationship with maternal health care utilization. Educated women are more likely to realize the benefits of using maternal health services; therefore, they are more likely to use the services. In addition, education may enhance female autonomy, hence increasing women's ability to make decisions regarding their own health. Education also increases the knowledge of modern health care, thus increasing the demand for modern health services (Jejeebhoy, 1995; Celik and Hotchkiss, 2000).

Employment of women was negatively associated with the use of maternal health services. This may be due to the fact that most women in Nepal live in rural areas and work in the agricultural sector. The workload that is associated with agriculture in the rural areas most likely does not give women any time away from their work. Also, women who are employed are faced with a double burden of work both in their home and outside their home. Therefore, they would not have the time to seek care, which makes them less likely to use the services available. A few previous studies have shown that agricultural employment or employment in the informal sector

does not necessarily raise the status of women. In some instances, it may even be negatively associated with some aspects of women's autonomy (Riley, 1997; Momsen, 1991). This seems to be the case in the context of Nepal as there is a high concentration of women in low-status and low-paying jobs (Singh, 1987).

In terms of the household-level characteristics, household economic status was significant in predicting utilization behaviour. This shows that the relative cost associated with the use of health services has a significant impact on the decision to seek care. It reflects the household's willingness to pay the expenses that are related to health care use. The results of this study show that even among households of high economic status, differences in the structure of the household determine how the resources will be allocated.

Household structure was significantly related to the utilization of prenatal care. Contrary to our hypothesis, however, women from extended households are more likely to use maternal health care. There may be a number of reasons for this. Women from extended households receive family support that is not available in nuclear households. They have more contact with family members and receive encouragement to seek care (Conrad and others, 1998). Also, other women are present in extended households to share their household tasks. Especially in the case of prenatal and post-natal care, a woman has to take time out from performing her household chores in order to seek such services. Therefore, her willingness to seek care is dependent on the ability of other members within the household to take over her responsibilities. Another explanation, as shown by the literature, postulates that nuclear households are indeed relatively poorer than extended households. Extended family systems and large household sizes are associated with wealth and prestige (Gage and others, 1997).

In order to encourage women to make use of maternal health services, first and foremost the status of women in Nepal must be enhanced. The status of women in Nepal is very low and only 12 per cent of women have completed primary-level education. The results of this study have shown that even primary-level education can significantly increase the chances of a woman using maternal health care services from a modern health facility. Education has emerged as one of the most significant predictors of increased utilization, even after controlling for all other factors. Therefore, it can be concluded that education is the key to improving women's status. Hence, the importance of ensuring at least a primary level of education for all women must be emphasized.

Furthermore, Nepal is predominantly an agricultural society and most of the women who are employed are engaged primarily in agricultural work. In such a context, employment appears to perpetuate the low status of women. Most women are burdened with their household duties along with long hours of work outside the home. In rural areas of Nepal, pregnant women continue working until the time of birth and resume working very shortly after giving birth (WHO, 1989). The situation becomes worse when the women are from households with poor economic status and from nuclear-type households. Efforts to increase the utilization of health care should specifically target women of such types of household since they are the least likely to use the services available.

In conclusion, in addition to making basic health care accessible to all women in Nepal, providing women with education is imperative to promote increased use of maternal health care as well as to raise the status of women. However, bringing about changes in women's status will take several decades. Although every effort is required to bring about changes in this area, programmatic efforts should also target the most vulnerable groups and advocate the importance of using maternal health care, so as to increase people's awareness of the benefits of such services to women's health.

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