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2008 No. 59

October 2008

This document was produced for review by the United States Agency for International Development.

DEMOGRAPHIC
AND
HEALTH
RESEARCH

The *DHS Working Papers* series is an unreviewed and unedited prepublication series of papers reporting on research in progress based on Demographic and Health Surveys (DHS) data. This research was carried out with support provided by the United States Agency for International Development (USAID) through the MEASURE DHS project (#GPO-C-00-03-00002-00). The views expressed are those of the authors and do not necessarily reflect the views of USAID or the United States Government.

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Factors Affecting Maternal Health Care Seeking Behavior in Rwanda

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ABSTRACT

In this paper, we examine factors affecting maternal health care seeking behavior in Rwanda using three rounds of Rwanda Demographic and Health Survey (RDHS) data (1992, 2000, and 2005). We pool the three cross-sectional data sets to construct a wealth index based on household assets that are available in all the three rounds of data. Results show that women who gave birth in the five years preceding the 2000 and 2005 RDHS are less likely to deliver in a health facility than those who gave birth in the five years preceding the 1992 RDHS. We also find that women are more likely to deliver at home with professional assistance in 2000 and 2005 compared to 1992. The findings of this study provide insight that progress towards increasing the share of assisted deliveries has been slow. There has been no significant increase in the proportion of women seeking antenatal care. This could partially explain why a large proportion of women continue to deliver at home without professional assistance.

ACKNOWLEDGEMENTS

We are grateful to Vinod Mishra and Bryant Robey for their comments and Yuan Gu for formatting the paper. The usual disclaimer applies.

INTRODUCTION

The International Conference on Population and Development (ICPD), held in Cairo in 1994, gave new impetus to reducing maternal mortality by bringing the issue of reproductive health to the fore. The ICPD Program of Action called for the provision of information on reproductive health services to promote increased use of health services for antenatal and delivery care (United Nations 1995).

From a programmatic perspective, the most often tracked indicator is the proportion of births attended by skilled health personnel. The objective is to ensure that by 2015 at least 90 percent of the births worldwide are attended by skilled health personnel (World Health Organization 2007). Progress towards this objective will help reduce Maternal Mortality Ratio (MMR). It is estimated that 52 percent of current maternal deaths worldwide can be averted by providing access to essential obstetric care (Wagstaff and Claeson 2004).

One of the objectives of the United Nations Millennium Development Goals (MDG) was to reduce MMR by an average of 5.4 percent every year over the period 1990-2015. Most sub-Saharan African countries are not on track for meeting the targets pertaining to MMR. Recent estimates suggest that the average annual rate of reduction in MMR in sub-Saharan African countries is less than 1 percent. Of the 14 countries in the world with a MMR of more than 1000 per 100,000 live births, 13 are in sub-Saharan Africa (of which Rwanda is one). In sub-Saharan Africa, the lifetime risk of dying in pregnancy or childbirth is 1 in 13, the highest among all the regions of the world (World Health Organization 2007).

The problems involved in estimating MMR, particularly in the absence of reliable data are well known. Consequently, among the accepted proxies for monitoring progress towards reducing MMR include trends in antenatal, delivery care, and postnatal care. In this paper, we

examine factors affecting maternal health care seeking behavior in Rwanda using three rounds of Rwanda Demographic and Health Survey (RDHS) data. The three surveys were conducted in 1992, 2000, and 2005. We estimate a multinomial logit model to analyze the factors determining the choice that a woman makes at the time of child birth — deliver at a health facility, deliver at home with professional assistance, or deliver at home without professional assistance.

Background

There are compelling reasons for understanding factors determining reproductive health outcomes in case of Rwanda. First, Rwanda is one of the 41 heavily indebted poor countries of the world and also one of the nine¹ post-conflict heavily indebted poor countries. The country is now ranked very low on the Human Development Index: in 2007-08, it was ranked 161st out of 177 countries². Rwanda is heavily dependent of foreign assistance. In 2002, 30 percent of total health expenditures were provided by external resources. The annual public expenditure on health as a percentage of GDP was in the range of 4 – 4.3 percent of GDP over the period 2000-2002 and increased to 7.2 percent in 2005³. Second, in 2007, for Rwanda the MMR is estimated to be at 1,300 per 100,000 live births (World Health Organization 2007). The number of maternal deaths is determined by two factors: “the risk of mortality associated with a single pregnancy or a single live birth, and the number of pregnancies or births that are experienced by women of reproductive age” (p.4 World Health Organization 2007). Both these factors are important in case of Rwanda. The total fertility rate (TFR) has not declined over the period 1992-

¹The other eight post-conflict HIPC are Afghanistan, Burundi, Chad, Republic of Congo, the Democratic Republic of the Congo, Guinea-Bissau, Haiti, and Sierra Leone (International Development Association and International Monetary Fund 2007).

²Source: <http://hdr.undp.org/en/statistics/>

³Source: WHO Statistical Information System, <http://www.who.int/whosis/en/>

2005. The TFR was 6.2 in 1992 and stood at 6.1 in 2005 (Institut National de la Statistique du Rwanda (INSR) and ORC Macro 2006⁴). Also, the lifetime risk of maternal death is 1 in 16 in Rwanda, one of the highest in the world, and in fact higher than the average in sub-Saharan Africa. Third, among the sub-Saharan countries, the case of Rwanda drives home the point that conflict can wipe out decades of progress in health outcomes. Rwanda was characterized by conflict in the beginning of the 1990's and the conflict escalated into the genocide in 1994⁵. The infant mortality rate increased from 106 per 1000 live births in 1990 to 110 in 2000. Similarly, the under-five mortality rate increased from 175 per 1000 live births in 1990 to 183 in 2000⁶. Thus it appears that conflict did contribute to a worsening of health outcomes⁷. This is consistent with the findings elsewhere in the literature which has established that infant mortality rates, under-five mortality rates, and maternal mortality rates increase during periods of conflict and do not decline sharply following restoration of peace⁸.

⁴Henceforth we refer to this report as RDHS 2006

⁵The composition of the population changed with over a million deaths on account of the genocide in 1994 and the return of over a million former refugees who were living in exile (RDHS 2006). The refugee problem also contributed to a worsening of health outcomes. Verwimp and Bavel (2005) find that refugee women in Rwanda had higher fertility and their children had lower chances of survival. Another study found that girls born in regions of Rwanda affected by crop failure and strife have lower height-for-age z-scores (Akresh, Verwimp, and Bundervoet 2007).

⁶Source: WHO Statistical Information System, <http://www.who.int/whosis/en/>

⁷It is also true that women and children suffer disproportionately from the long term effects of civil war (Ghobarah, Huth, and Russett 2003). They establish that there was an increase in the incidence of death and disability.

⁸Based on an analysis of data from 32 countries covering the period 1950-2000, Garenne and Gakusi (2006) find an increase in under-five child mortality rates in eight countries during periods of political or economic crises. What is of greater concern is that mortality rates do not decline immediately following the end of conflict. Hoeffler and Reynal-Querol (2003) find that the infant mortality rate does not decline to pre conflict levels within the first five years of peace following conflict. In fact, they find that infant mortality is 11 percent higher than the baseline.

DATA AND METHODS

The nationally representative 1992, 2000, and 2005 RDHS used in our analysis covered 6,252, 9,696, and 10,272 households respectively. In each of these rounds a total of 6,551, 10,421 and 11,321 women in age 15-49 were interviewed. Details on the survey procedures and sampling design are available in the individual survey reports (RDHS 2006; Office National de la Population Rwanda et ORC Macro 2001; Barrère et al. 1994).

In addition to household specific information and characteristics of the woman and her spouse, information on birth histories was also collected. For all births within five years preceding the survey, information is available on place of delivery, i.e. whether the woman delivered at home without assistance, delivered at home with professional assistance, or sought institutional care for delivery. Institutional care includes delivery at both private sector and public sector health facilities. Delivery at home with professional assistance includes help from doctors, nurses, and trained birth attendants only.

We pool the three cross-sectional data sets for the survey years 1992, 2000, and 2005 to construct a wealth index. We use the statistical method of principal components to construct a wealth index. We restrict our choice of proxies of wealth or indicators of well being to only those which are available in all the three rounds of data. The indicators that we use to construct the index are the following, viz. whether household owns a radio, refrigerator, bicycle, motorcycle, car, type of flooring of the house, has electricity, toilet facility, and water facility. Note that among these indicators electricity, toilet facility and water facility are key infrastructure variables. Thus the wealth index is likely to be correlated with access to other infrastructural services including possibly health care. We group households into four wealth categories: households with a wealth index of -1.23, households with a wealth index of -0.98 to -0.34,

households with a wealth index of -0.33 to 0.32, and households with a wealth index of 0.33 to 14.1. Based on these cut-offs, 30 percent of households are in wealth class 1, 30 percent in wealth class 2, 20 percent in wealth class 3, and 20 percent of households in wealth class 4⁹.

Our objective is to analyze factors determining place of delivery for women who gave birth in the five years preceding the survey. We estimate a multinomial logistic regression model where the dependent variable represents three choices that a woman can make during delivery: deliver at an institution (at a health care facility), deliver at home with professional assistance, and deliver at home without professional assistance.¹⁰ The base category is delivering at home without professional assistance.

Independent variables in the analysis include residence (urban, rural), sex of the household head (male, female), wealth index, age of the woman at the time of last birth, number of antenatal visits, birth order, educational attainment, work status, husband's educational level, and a dummy for the survey year (1992, 2000, and 2005). We also include the community-level

⁹There are no households with a value of wealth index between -0.98 and -1.23. When we split households into these groups 30 percent of the households get the lowest wealth index score of -1.23. Given that 60 percent of the population lived below the poverty line in 2000, splitting households into the four wealth groups, with the first two groups reflecting the population living below the poverty line, makes sense instead of grouping households into four quartiles.

¹⁰The probability of each option (j) can be written as follows.

$$\text{Prob (Y=j)} = \frac{e^{\beta_j' x_i}}{1 + \sum_{k=0}^2 e^{\beta_k' x_i}} \text{ for } j = 1,2 \quad (1)$$

$$\text{and Prob (Y=0)} = \frac{1}{1 + \sum_{k=0}^2 e^{\beta_k' x_i}} \quad (2)$$

$$\text{The multinomial logit model is given by: } \ln \left[\frac{P_{ij}}{P_{i0}} \right] = \beta_j' x_i \quad j = 0,1,2 \quad (3)$$

We can obtain relative risk ratios by exponentiating the coefficients from the multinomial logistic regression. Notice that the relative risk ratio does not depend on other choices and this follows from the assumption of independence of irrelevant alternatives.

average education of the women¹¹ to capture the effect of a community variable on individual decision making.

Since the RDHS data do not have information on access to health services and cost of health services, we were unable to control for supply factors such as the proximity of health facilities or presence of professional providers.

¹¹We first add the total numbers of years of education of women within a cluster and divide this sum by the total number of women residing within the clusters.

RESULTS

Background characteristics

Table 1a, 1b, and 1c report summary statistics by place of delivery assistance for 1992, 2000, and 2005, respectively. An examination of trends based on the three rounds of RDHS data suggests modest improvements in use of health care after 2000. Of the births in the five years preceding the 2005 survey, 59 percent were delivered at home without assistance compared with 69 percent of the births in the five years preceding the 2000 survey, and 70 percent of the births in the five years preceding the 1992 survey (Tables 1a – 1c). The proportion of births delivered at home with professional assistance rose from 4 percent in 1992 to 11 percent in 2005. Births delivered at a health facility increased from 26 percent in 1992 and 2000 to 30 percent in 2005.

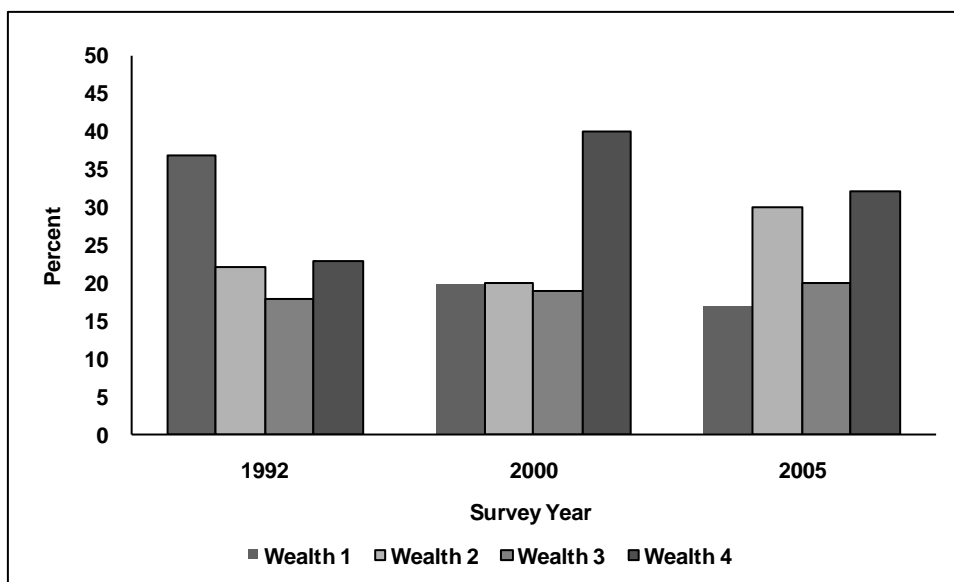
In line with expectations, we find that a greater proportion of births in urban areas occur in a health facility. The numbers from the 1992 survey reveal that 68 percent of urban births took place in a health facility compared to 24 percent of births in rural areas. Comparison with data from 2005 survey reveals that there was a decline in the proportion of urban births in a health facility to 56 percent. There was only a 2 percentage point increase in the proportion of rural births in a health facility.

We find that among women in male-headed households a higher proportion of births took place in a health facility compared to women from female-headed households.

We now turn to a discussion on births delivered in a health facility, since this option is preferable for safe delivery compared with birth at home, with or without professional assistance. Figure 1 presents the share of each wealth class in total births in a health facility for each survey. Among births in the five years preceding the 1992 survey, 37 percent of births in health facility were accounted for by households in the first (lowest) wealth class. In contrast in the five years

preceding the 2005 survey, only 17 percent of births in health facility were accounted for by households in the lowest wealth class. In contrast, the share of births accounted for by households in the second wealth class increased from 22 percent to 30 percent. When we focus on the year 2005, we find that a large proportion (58 percent) of births in households from the fourth (highest) wealth class occur in a health facility compared to 20 percent of births among women from households in the first (bottom) wealth class (Table 1c).

Figure 1: Percentage of women who delivered in a health facility by wealth class and survey year



The number of antenatal visits by a pregnant woman has a bearing on where they deliver. In general, the more antenatal visits, the higher the chance of the birth occurring in a health facility. The World Health Organization (WHO) recommends at least four antenatal care visits throughout the pregnancy. There has not been any significant increase in the percentage of women reporting at least three antenatal visits: it increased from 12 percent in the 1992 survey to 13.3 percent in the 2005 survey. One reason for this could be the limited availability of antenatal care. The 2001 Rwanda Service Provision Assessment survey conducted in a representative

sample of 233 health facilities found that antenatal care was available in most facilities but only for one or two days a week (Ministry of Health [Rwanda], National Population Office [Rwanda], and ORC Macro 2003).

A comparison across the three rounds reveals the following picture. In 1992, 58 percent of women who had over three antenatal visits delivered at home with no professional assistance, while 38 percent delivered at a health facility. In 2000, 48 percent of women with over 3 antenatal care visits delivered at home with no professional assistance, and an equal percentage delivered in a health facility. It is only in 2005 that we find that the percentage of women with over 3 antenatal visits who delivered in a health facility to be greater than the percentage who delivered at home without assistance, 50 percent compared with 31 percent (Tables 1a – 1c).

In 1992, 18 percent of women with no education gave birth at health facility compared with 30 percent of women with primary education and 66 percent of women with above primary education who delivered at a health facility. There is no appreciable change evident from the 2005 survey. We find that in 1992, 58 percent of women whose husband had completed at least primary education delivered in a health facility while in 2005 this statistic was at 56 percent.

Table 1a: Sample distribution of births in the five years preceding the 1992 survey by type of assistance and selected characteristics, Rwanda 1992

	Home no professional assistance	Health facility	Home with professional help
Total Percent	70	26	4
Residence			
Rural	72	24	4
Urban	30	68	2
Sex of the household head			
Male	70	27	4
Female	71	24	5
Wealth Class			
Wealth Class 1	76	21	3
Wealth Class 2	72	23	5
Wealth Class 3	68	28	3
Wealth Class 4	50	48	3
Age at time of last birth	31	28	29
Antenatal visits			
None	89	7	5
Between 1 - 2 visits	76	21	4
3 Visits	64	33	3
Over 3 visits	58	38	4
Birth order at time of last birth			
First child	40	56	4
Second or third child	70	26	4
Fourth or fifth child	77	19	4
Sixth or seventh child	78	16	5
Eighth child and above	82	17	1
Education			
No education	79	18	3
Primary	66	30	4
Above primary	32	66	2
Work status			
Not working	26	73	1
Working	71	25	4
Husband's education			
No education	77	20	3
Primary	71	25	4
Above primary	40	58	2
Number of observations	2,221	1,040	119

Table 1b: Sample distribution of births in the five years preceding the 2000 survey by type of assistance and selected characteristics, Rwanda 2000

	Home no professional assistance	Health facility	Home with professional help
Total Percent	69	26	5
Residence			
Rural	75	19	6
Urban	31	65	4
Sex of the household head			
Male	68	27	6
Female	72	24	5
Wealth Class			
Wealth Class 1	80	16	4
Wealth Class 2	75	20	6
Wealth Class 3	73	21	6
Wealth Class 4	33	61	6
Age at time of last birth	30	28	29
Antenatal visits			
None	90	8	3
Between 1 - 2 visits	75	19	6
3 Visits	62	32	6
Over 3 visits	48	48	4
Birth order at time of last birth			
First child	48	47	6
Second or third child	67	26	7
Fourth or fifth child	73	22	5
Sixth or seventh child	80	16	4
Eighth child and above	79	16	4
Education			
No education	82	13	5
Primary	68	26	6
Above primary	24	70	5
Work status			
Not working	52	44	4
Working	71	23	6
Husband's education			
No education	81	14	6
Primary	71	24	6
Above primary	36	59	5
Number of observations	3,168	1,469	271

Table 1c: Sample distribution of births in the five years preceding the 2005 survey by type of assistance and selected characteristics, Rwanda 2005

	Home no professional assistance	Health facility	Home with professional help
Total Percent	59	30	11
Residence			
Rural	63	26	11
Urban	36	56	8
Sex of the household head			
Male	59	31	11
Female	62	27	10
Wealth Class			
Wealth Class 1	70	20	10
Wealth Class 2	65	23	12
Wealth Class 3	58	31	12
Wealth Class 4	33	58	8
Age at time of last birth	31	28	29
Antenatal visits			
None	79	10	10
Between 1 - 2 visits	67	22	11
3 Visits	55	34	11
Over 3 visits	41	50	9
Birth order at time of last birth			
First child	35	55	10
Second or third child	60	29	11
Fourth or fifth child	63	26	11
Sixth or seventh child	71	17	11
Eighth child and above	70	22	9
Education			
No education	71	20	10
Primary	59	29	12
Above primary	25	69	6
Work status			
Not working	53	38	9
Working	62	27	11
Husband's education			
No education	70	20	11
Primary	60	28	12
Above primary	36	56	7
Number of observations	3,083	1,665	548

Table 2 reports summary statistics for the pooled sample. The patterns that we uncovered in each of the cross sections (Tables 1a-1c) are evident in the pooled sample also. We only highlight the salient features of the pooled sample. Compared to rural areas where only 23 percent of births occurred in health facility, a larger proportion of births (61 percent) in urban areas occurred in a health facility. Among households in the first wealth class, only 19 percent of births occurred in a health facility compared to 57 percent in case of births in households in the highest wealth class. The pooled data reveals the strong association between number of antenatal visits and place of delivery (see Figure 2). Women who have had at least 3 antenatal visits are less likely to deliver at home without professional assistance than women who did not go for any antenatal visits. Strikingly, 86 percent of women who had no antenatal visits delivered at home without assistance, and only 8 percent in a health facility.

Figure 2: Percentage of women who delivered at home with no professional assistance, at home with professional assistance, and at a health facility by number of antenatal visits

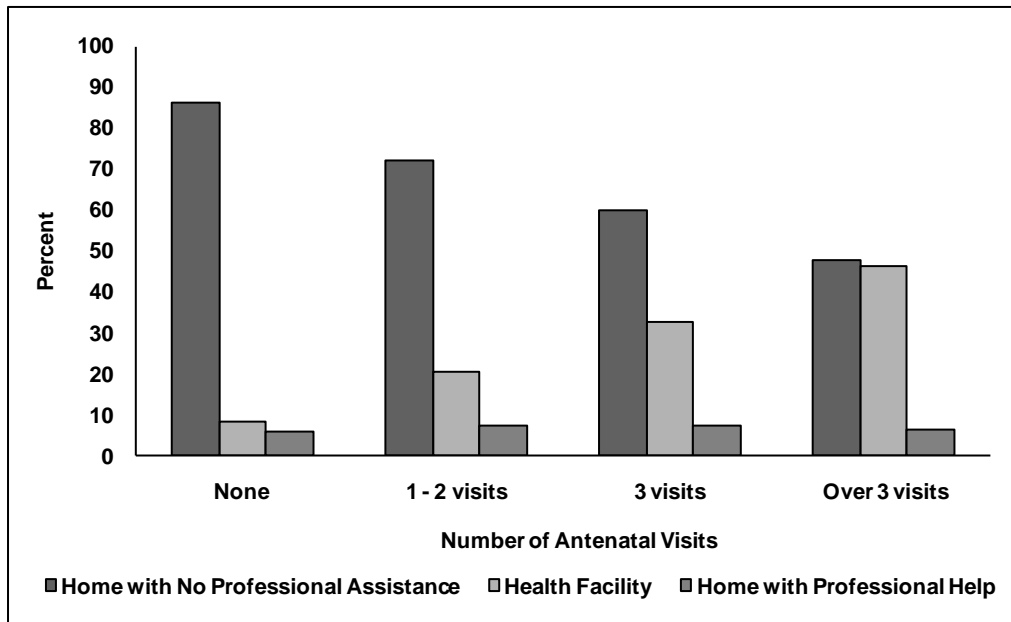


Table 2: Sample distribution of births by type of assistance and selected characteristics for the pooled sample, Rwanda 1992 - 2005

	Home no professional assistance	Health facility	Home with professional help
Total Percent	65	28	7
Residence			
Rural	70	23	7
Urban	33	61	6
Sex of the household head			
Male	65	28	7
Female	68	25	7
Wealth Class			
Wealth Class 1	76	19	6
Wealth Class 2	70	22	8
Wealth Class 3	66	26	8
Wealth Class 4	37	57	6
Age at time of last birth	31	28	29
Antenatal visits			
None	86	8	6
Between 1 - 2 visits	72	21	7
3 Visits	60	33	7
Over 3 visits	48	46	6
Birth order at time of last birth			
First child	41	52	7
Second or third child	65	27	8
Fourth or fifth child	70	23	7
Sixth or seventh child	76	17	7
Eighth child and above	77	18	5
Education			
No education	77	17	6
Primary	64	28	8
Above primary	26	69	5
Work status			
Not working	52	41	7
Working	68	25	7
Husband's education			
No education	76	17	7
Primary	67	26	7
Above primary	37	58	5
Number of observations	8,472	4,164	938

Results from Multivariate Analysis

Table 3 presents the adjusted effects (relative risk ratio) of factors on the likelihood of delivering in a health facility or at home with professional assistance compared with delivering at home with no assistance.

Our results show that women living in urban areas are more likely to deliver in a health facility rather than at home without assistance. Urban areas typically have better access and availability of health facilities. We find that women from female-headed households are less likely to deliver in a health facility compared to households headed by a man.

The wealth class to which the household belongs is a significant factor in determining the place of delivery. The higher the wealth class, the greater is the likelihood of delivering in a health facility. We also find a similar result when we consider the likelihood of delivering at home with professional assistance.

In line with the literature, we find that number of visits for antenatal care is a key determinant of whether a woman giving birth seeks institutional care or professional assistance at home compared with delivering at home without professional assistance. In general, a woman who goes for antenatal care is more likely to deliver in a health facility or deliver at home with professional help than a woman who does not go for antenatal check-up. The likelihood of delivering in a health facility or at home with professional help increases with number of antenatal visits.

Table 3: Relative risk ratios from multinomial logit model for assistance during delivery, Rwanda 1992 - 2005

	Health Facility	Home with Professional Assistance
Residence (Rural)		
Urban	2.04 ^{***}	1.11
Sex of the household head (Male)		
Female	0.81 ^{***}	0.95
Wealth index (Wealth Class 1)		
Wealth Class 2	1.14 ^{**}	1.30 ^{***}
Wealth Class 3	1.51 ^{***}	1.37 ^{***}
Wealth Class 4	2.62 ^{***}	1.67 ^{***}
Age at time of last birth	1.02 ^{***}	0.99
Antenatal visits (None)		
Between 1 - 2 visits	2.63 ^{***}	1.43 ^{**}
3 Visits	4.58 ^{***}	1.76 ^{***}
Over 3 visits	7.15 ^{***}	1.90 ^{***}
Birth order of the last birth (First child)		
Second or third child	0.25 ^{***}	0.64 ^{***}
Fourth or fifth child	0.19 ^{***}	0.59 ^{***}
Sixth or seventh child	0.72 ^{***}	0.92 ^{***}
Eighth child and above	0.79 ^{***}	0.91 ^{***}
Education (No Education)		
Primary	1.18 ^{***}	1.12
Above Primary	3.43 ^{***}	1.58 ^{***}
Work status (Not working)		
Working	0.71 ^{***}	1.09
Husband's education (No Education)		
Primary	1.07	1.04
Above primary	1.71 ^{***}	1.06
Survey Year Dummy (1992)		
2000 survey	0.63 ^{***}	1.38 ^{***}
2005 survey	0.76 ^{***}	2.78 ^{***}
Cluster Variable		
Average level of education	7.13 ^{***}	3.17 ^{***}

N = 12,338

The reference group for the categorical variables are mentioned within parenthesis

Level of significance: ***p* ≤ 0.05; *** *p* ≤ 0.01

There is a strong association between birth order and use of health care services. Compared to the first child, subsequent children are more likely to be born at home without assistance rather than at health facility or at home with professional assistance. We also find that women who work are less likely to deliver at a health facility, and we do not find any significant relation between work status and delivery at home with professional assistance. In line with expectation, likelihood of seeking delivery assistance in a health facility increases with increasing level of education of the woman. In addition, a woman whose husband has educational attainment above the primary level is more likely to deliver in a health facility.

Finally, the survey year dummy is significant in predicting place of delivery. Compared with births in the five years preceding the 1992 survey, births in the five years preceding the 2000 and 2005 surveys are less likely to take place in a health facility. We also find that they are more likely to occur at home with professional assistance.

DISCUSSION

We now turn to a discussion of our findings based on the results of the estimation of the multinomial logit model. We focus on three key issues, viz. importance of antenatal visits, differences in utilization of maternal health care across households in different wealth classes, and health seeking behavior of female-headed households. We also proffer our conjecture on whether we see improvements in utilization of health care since the 1990s.

We found that a woman who goes for antenatal care is more likely to deliver in a health facility or deliver at home with professional help than a woman who does not go for antenatal check-ups. Given our strong finding, it is critical that that the Rwanda government work towards its objective of ensuring that at least 65 percent of women have three or more antenatal visits. While it unlikely that this target will be achieved in the short run, the importance of antenatal visits has to be recognized as a critical part of reproductive health strategy. In the literature it is well established that antenatal visits combined with the use of skilled attendant during delivery are associated with the reduction of maternal mortality (Shen and Williamson 1999; Magadi et al. 2001).

The prevailing level of poverty needs to be borne in mind while interpreting the results on wealth index. Recall that the results from the empirical model gave us the result that higher the wealth class, the greater is the likelihood of delivering in a health facility. However, we also found that in the first three wealth classes over 66 percent of births occur at home without any professional assistance (Table 2). The wealth index is useful for ranking the socio economic status of households. It however does not reflect the income levels of the households nor does it reflect whether the household can afford to utilize health services (Montgomery et al. 2000).

Not only are a majority of the households living below the poverty line, households end up bearing a substantial portion of health care costs (Ministry of Health, Republic of Rwanda 2006). Given the prevailing level of poverty the ability of the households to finance out of pocket expenditures could be limited. There is evidence from cross country studies that the poor in most developing countries do not get free health care services financed by the government. These households have to borrow money to meet health expenditure (Banerjee and Duflo 2007). Wagstaff and Claeson (2004) provide compelling evidence to the effect that medical expenses can indeed push non poor households below the poverty line. There is evidence to suggest that costs of seeking institutional care indeed acts as a deterrent in case of poor households (Caldwell 2005).

In Rwanda, female-headed households are more vulnerable and often have lower socio-economic status than households headed by men and thus are less likely to have access to health care. Also, the independent effect of work status on delivery at health facility could be due to socio-economic conditions rather than work participation.

Women bore a disproportionate brunt of the violence in Rwanda, with many subject to sexual violence and forced marriages (Human Rights Watch 1996). In the genocide, more men than women were killed, resulting in an increase in female-headed households. In 1992, before the genocide, 13 percent of households were headed by a woman while in 2005 nearly 21 percent of households were headed by a woman. Because of perceived risk associated with first pregnancy, a woman may be more likely to seek maternal health care services for first-order than higher-order births. Having more children may also cause resource constraints, which have a negative effect on health care use. Women having a large number of children typically do not take full advantage of available health services because they have too many demands on their

time that often force them to forgo health care. Our findings suggest that the higher the overall educational level in a community, the more likely are the mothers to deliver in a health facility and to deliver at home with professional assistance compared with delivery at home with no assistance.

Another important finding of our analysis — the lower likelihood of delivery in a health facility in 2000 and 2005 compared with 1992 — can be interpreted as reflecting the long-term damage to health delivery systems caused by strife and civil wars¹². Earlier we had highlighted the fact that there has been deterioration in important health indicators following the conflict. There was also a steady increase in incidence of poverty in the 1990s. The percentage of households below the poverty line increased from 47.5 in 1990 to 70 percent by 1997. By 2000, it is estimated the percentage of households below the poverty line had declined marginally to 64 percent (Government of Rwanda 2002). Thus the increase in the proportion of poor households could have affected their ability to seek health care.

Our finding that births are more likely to occur at home with professional assistance can be explained as follows. One of the findings of the Rwanda Service Provision Assessment Survey conducted in 2001 was that many women preferred to seek the help of the traditional birth attendant. It is reasonable to assume that training traditional birth attendants is easier to implement in the short run than increasing access to institutional delivery care and that this effect is reflected in our results.

¹² There are different channels through which health systems and health outcomes are affected. In times of war and conflict, there is a marked reduction in expenditure on public health. Higher the risk of civil war, higher is the military expenditure as a percentage of gross domestic product (Collier, Elliot, and Hegre 2003). One of the consequences of this shift in expenditure is that it leads to a reduction in availability of health services and thereby contributes to a marked deterioration in health outcomes. In addition, an increase in violence, incidence of poverty, destruction of infrastructure, and displacement of people also contribute to worsening health outcomes.

Supply side factors including availability and quality of services, access, and costs of seeking health care are important. Due to data limitations, we could not include any indicators reflecting availability of health care services. One can however glean some insights from the Rwanda Service Provision Assessment survey which found that delivery services providers are available for 24 hours in 94 percent of the facilities. However, protocols for managing complications of labor and delivery care were absent in 70 percent of the facilities (Ministry of Health [Rwanda], National Population Office [Rwanda], and ORC Macro 2003). Such findings leave little doubt that there is considerable scope for improvement in provision of health services. The government appears to have recognized the need, as reflected by the fact that the share of health expenditures in total government expenditures steadily increased to 7.2 percent by 2005.

CONCLUSION

In Rwanda, the conflict appears to have overturned decades of progress in improving health outcomes. Progress towards increasing the proportion of women receiving three or more antenatal visits and increasing the share of assisted deliveries has been slow since the end of the conflict. While there has been a marginal increase in the use of institutional health care in Rwanda, many women still do not seek antenatal care and continue to deliver at home without professional assistance. At the same time, we found that the likelihood of delivering at a health facility is lower in 2000 and 2005 compared to 1992.

Without a substantial increase in the percentage of women who seek and receive antenatal and delivery care, it is unlikely that Rwanda will meet the United Nations Millennium Development Goals (MDG) relating to reproductive and child health by 2015. Central to the ability to achieving reductions in maternal mortality is providing basic health care information and services to women, increasing access to antenatal and postnatal care, training health care personnel, and increasing the share of births delivered in health care facilities and births at home attended to by skilled health providers. Professionalization of maternity care and availability of skilled health workers are crucial in this regard. The 2002 Rwanda Poverty Reduction Strategy Paper recognized the need to improve reproductive health outcomes and prioritized maternal mortality and morbidity reduction as part of the Gender Action Plan. Because the majority of the population in Rwanda lives in poverty, a substantial increase in the government's budgetary allocation for reproductive health care seems essential. In light of the fact that the country's gross domestic product has been growing recently at over 6 percent per year, there is optimism that allocations to the social sector can increase.

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