Determinants of non-institutional deliveries in Malawi, 2004

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Abstract

Background: Malawi has one of the highest maternal mortality ratios in the world. One of the contributing factors to high maternal mortality is non-use of health facilities during pregnancy and delivery. The aim of this study is to examine the factors associated with home deliveries in Malawi.

Methods: Data from 2004 Malawi Demographic and Health Survey were used. Multinomial logistic regression analyses were used to assess the association between place of delivery and selected socio-economic factors.

Results: The study population comprised of 7,218 women, who had at least one child, aged less than five years, at the time the survey. Of these women, 58% delivered at a health facility, 29.4% delivered at home and 12.6% delivered at the home of a traditional birth attendant. After multivariate analysis, Region (OR = 1.29 for Central Region), place of residence (OR=0.319 for urban areas), wealth status (OR=6.289 for poor, OR=4.683 for middle), education (OR=3.823 for no education, OR=2.265 for primary education), number of prenatal visits (OR=4.732 no visits, OR=1.696 1-3 visits) and ever use of family (OR=1.29 for never used) showed significant association with home deliveries.

Conclusion: Findings from this study indicate that home deliveries are associated with residing in rural areas, low education, region and non-use of family planning methods. These factors should be considered in designing strategies to improve the maternal health care system in Malawi.

Key Words: Home deliveries, Malawi, multinomial logistic regression

Introduction

Maternal and neonatal morbidity and mortality arising from inadequate health services are an important global health concern. Mortality rates are higher in developing than developed countries where investment in human resources and medical resources are limited (Rasch, 2007; Lech and Mngadi, 2005; Lule, et. al, 2005). Globally, maternal deaths have declined from around 536,000 in early 1990s to an estimated 358,000 in 2008[4,5]. The majority of maternal deaths occur in Africa and Asia (Lech and Mngadi, 2005; Lule, et. al, 2005, World Health Organization, 2007; United Nations, 2000, 2010). In the case of the former, sub-Saharan Africa is largely responsible for the depressing maternal death figures for that region, contributing approximately 98% of the maternal deaths (World Health Organisation, 2007; United Nations, 2000, 2010).

The subject of maternal health was first brought to the international platform with the adoption of the Safe Motherhood Initiative in 1987 (Lule, et. al, 2005). In the past decade, the importance of maternal health was rekindled following its expected inclusion within the eight Millennium Development Goals (MDGs) (Lule, et. al, 2005, World Health Organization, 2007; United Nation 2000). This study is interested in MDG number 5 which aims at reducing between 1990 and 2015, maternal mortality by 75 per cent (United Nations, 2000).

The major causes of maternal mortality in developing countries including Malawi are haemorrhage, eclempsia, malaria, infections, abortions and complications of obstructed labour (Mpembeni, et. al, 2007; Bisika, 2008; Geubbels, 2007; Michael, et, al, 2006). A closer look at these factors indicates that the causes of maternal mortality are preventable if health facilities are used during pregnancy and delivery. Unfortunately, in developing countries, use of health facilities is limited due to among other factors poor accessibility in terms of distance, inadequate transport infrastructure, poverty and culture (Tlebere, et al, 2007; Koblinsky, et. al., 2006; Kruk, Prescott, and Galea, 2008).

Statement of the Problem

Maternal mortality and morbidity are still major health problems in Malawi. Maternal mortality rates in Malawi are among the highest in the world (World Health Organization, 2007; United Nation 2010). The Maternal Mortality Ratio (MMR) almost doubled between 1992 (620 maternal deaths per 100000 live births) and 2000 (1120/100000) in 2000) and declined to around 984 in 2004 (Malawi Government, 1994, 2002, 2006). One explanation for poor health outcomes among women in the country is related to the non-use of modern healthcare services by a sizeable proportion of the Malawian women. In part, non-use of modern health care services is due to limited availability and accessibility of these services. For instance, Malawi like many other developing countries has a serious shortage of health care workers. In 2003, there were 252 doctors registered by the Medical Council of Malawi (Muula, 2006). With an estimated population of 10 million in 2003 this implies that a doctor-population ratio of 1:39682, a figure that is eight-times higher than the WHO global standard pegged at 1:5,000.

Objectives

In view of the foregoing, the overall objective of this study is to examine the social, economic and demographic factors influencing the place of delivery and discuss their implications for achieving MDG 5 in Malawi. It is important to understand the characteristics of women who are not using modern health facilities during pregnancy and delivery in order to design interventions specific to such groups.

Methods

Data

The study is based on the analysis of data obtained from the 2004 Malawi Demographic and Health surveys (Malawi Government, 2006). The survey was conducted by the National Statistical Office (NSO) as part of United States Agency for International Development's (USAID) global mission to help developing countries collect and use data to monitor and evaluate population, health, and nutrition programs conducted this survey. Through this initiative, a

project named MEASURE DHS, has provided technical assistance to more than 240 surveys in over 85 countries throughout Africa, Asia, the Near East, Latin America, and the Caribbean.

The 2004 MDHS involved the use of three basic questionnaires. First, a questionnaire that recorded information on all household members to identify men and women who are eligible to take part in the survey. Second, a questionnaire on individual women that recorded detailed information on eligible women who were identified from the household questionnaires. The 2004 MDHS collected data for 11698 women aged 15-49. The questionnaires on individuals collected information on the respondent's background characteristics, reproductive history, knowledge and practice of family planning, breast-feeding practices, marriage, fertility preferences etc., as well as on her husband's background characteristics. Third, a questionnaire for individual men aged 15-54 was administered and 3261 men were interviewed in 2004. The male questionnaire was similar to that of the individual women questionnaire but excluded the birth history and maternal and child health sections. The analyses in this paper will use data from the individual women questionnaire only. The sample for this study comprises of 7,218 women, who had at least one child, aged less than five years at the time of the survey.

Ethical consideration

The data utilized in this study was de-identified data obtained from MEASURE DHS. As such, the ethics committee exempted the study from full institutional review board.

Data analysis

Three statistical approaches were used in the analysis. First, descriptive univariate analyses were performed to inspect the frequency distributions of the variables. Second, bivariate analysis was employed to examine the relationships of the independent and dependent variables. Chi-square tests of independence were conducted for categorical variables. Third, multinomial logistic regression was used to examine the impact of social and economic factors on the place of delivery. The use of the multinomial logistic regression is based on the fact that the dependent variable has three categories: women who deliver at a health facility, women who deliver at home and women who deliver at the home of a Traditional Birth Attendant (TBA). Multinomial logistic regression is used when a categorical dependent variable has more than two categories. The multinomial regression model breaks the regression up into a series of binary regressions, comparing each group to a baseline group. In this study, delivery at a health facility (hospital) is set to be the reference group. Multinomial regression will assess the odds of delivery at home versus delivery at hospital, and delivery at TBA home versus delivery at hospital. Using multinomial regression model is like performing two binary logistic regressions where the first binary regression will treat delivery at home as 1 and delivery at hospital as 0; and the second binary regression will treat delivery at TBA home as 1 and delivery at hospital as 0. Analysis was conducted using Statistical Package for Social Sciences (SPSS) version 12.0.

Definition of variables

The primary goal of this study is to determine the characteristics of women who delivered at places other than the hospital. The question that was asked during the survey was "where did you give birth to (NAME of the child)". The possible answers were a) Home (respondent's home or other home) b), Public sector (hospital, health center, health post, other), c) Mission (hospital or health center), d) Private Medical sector (Hospital, d) TBA and e) other places. For the purpose of this analysis public sector, mission and private medical sector were combined to form one category named health facility. Women who reported that they delivered in other places were excluded from analysis. As such, the outcome variable was categorized into three: women who delivered at a health facility, women who delivered at home, and women who delivered at the home of TBAs.

To ascertain the interrelationships between place of delivery (in particular home deliveries) and social and economic factors and based on the review of the available literature and available data, the following eight (8) independent variables were used in the analyses: current age; education; region; type of residence (rural-urban), wealth status,

religion, number of children ever born and number of prenatal visits. The variables selected in this investigation are those that are frequently used for the analysis of place of delivery. All the independent variables with exception of wealth status were obtained from the various sections on the women questionnaire. In this study wealth index was constructed using the following household assets data: electricity, radio, TV, bicycle, motorbike and car. Each item was given a score and it was summed across items for each household. Individual wealth was ranked as poor; middle and rich based on the total score.

Results

The total sample for this analysis comprises of 7,218 women, who had at least one child, aged less than five years, at the time the survey, and of these, 2,121 women (representing 29.4%) delivered at home and 907 women (representing 12.4%) delivered at the home of the traditional birth attendants (TBAs). The characteristics of the study population with regard to key socio-demographic variables are given in Table 1. The mean age of the study population was 28.3 years. The majority of the women included in the study lived in rural areas (88.5%). Only 11.5% of the study population was urban. The majority of the women included in the study were in the Southern Region (50.5%), followed by Central Region (36.7%) and then Northern Region (12.8%). The regional population distribution is consistent with the results of the 1998 Malawi Population and Housing Census (Malawi Government, 2008). The majority of the study population had primary education (63.1%) and 25.4% had no education while only 11.4% of the study population had secondary and higher education. Nearly 82% of the study population was Christian, with Muslims accounting about 17% and the remaining 1% belonged to other religion (which included women practicing traditional religion). Almost all women in the study population had heard about family planning but only 63% have ever used contraception. The number of children ever born ranged from 1 to 18 with a median of 4 children. Nearly 40% of the study population had 1-2 children, 30% had 3-4 children and 31% had 5 children or more. Based on the wealth index computed for this study 58.8% of the women were poor, 39.2% could be categorized as medium and only 2.0% were rich.

Table 1: Socio-demographic characteristics of women, who had at least one child, aged less than five years and Place of Delivery, Malawi, 2004

Variables	Study Population		Place of Delivery		
	Number	%	Home	Hospital	TBA
Age of respondent					
15-24	2922	40.5	27.4	59.9	12.7
25-34	2931	40.6	29.0	58.4	12.6
35+	1365	18.9	34.4	53.3	12.3
Region					
Northern Region	923	12.8	23.2	67.8	9
Central Region	2651	36.7	33	51.1	15.9
Southern Region	3644	50.5	28.3	60.6	11.1
Type of residence					
Urban	829	11.5	10.6	86.9	2.5
Rural	6389	88.5	31.8	54.3	13.9
Religion					
Christian	5915	82	27.8	59.3	12.9
Muslim	1217	16.9	36.2	53.5	10.3
Other	84	1.2	41.7	38.1	20.2
Number of prenatal visits*					
0	300	4.2	59.7	26.3	14
1-3	2725	38	34.6	51.7	13.7
4 & over	4141	57.8	23.6	64.6	11.7
Children ever born*					
0	145	2	26.2	61.4	12.4
1-2	3339	46.3	26.3	61.6	12.1
3-4	2180	30.2	31.4	56	12.7
5 and over	1554	21.5	33.5	53.1	13.4
Education					
None	1833	25.4	43	43.5	13.5
Primary	4563	63.2	27.4	59.3	13.3
Secondary & over	822	11.4	10.3	83.5	6.2
Wealth Status*					
Poor	4169	58.8	41.4	45.7	13.0
Middle	2777	39.2	35.2	48.8	16.0
Rich	143	2.0	32.4	53.0	14.5
Total	7218	100	29.4	58.0	12.6

Note: The variables marked * do not add up to 7218 due to non-response.

Multivariate Analysis

The relationship between place of delivery and each of the independent variables was examined using chi-square. The results indicated that all the variables are significantly related to place of delivery. As such the independent variables were put in the multinomial logistic regression to assess individual variable effects on the place of delivery. The results of the multinomial logistic regression models are presented as relative odds in Table 2.

Determinants of Home Delivery

The results presented in Table 2 indicate that region, type of residence, educational level of the respondents, ever use of contraceptives, number of children ever born, number of visits and wealth have significant impact on home deliveries in Malawi. Compared to women residing in Southern Region, women in the Central Region were 1.08 times more likely to deliver at home. Women in the Northern Region were 1.38 times less likely to deliver at home as compare to women in the Southern Region. This confirms that home deliveries are highest in the Central Region, followed by Southern Region and lowest in The Northern Region. Women residing in urban areas were 3.99 times less likely to deliver at home than their rural counterparts. Home deliveries also varied by educational level of the women. Women who had no formal education were 3.82 times more likely to deliver at home compared to women who had attained secondary or higher level of education whereas women who had primary education were 2.27 times more likely to be delivered by TBAs compared to those who had attained secondary or higher level of education.

Home delivery varies by number of children ever born. Women who have fewer children ever born are less likely to deliver at home than women with more children ever born. Women with 1-2 children were 2.24 times less likely to deliver at home than women who had 5 and more children. Women with 3-4 children were 1.61 times less likely to deliver at home than women who had 5 and more children.

Delivery at home varies by the number of prenatal visits. Women who had more prenatal visits were less likely to deliver at home than women who had fewer prenatal visits. Women who had no prenatal visits were 4.73 times more likely to deliver at home than women who had four or more prenatal visits whereas women who had 1-3 prenatal visits were 1.70 times more likely to deliver at home than women who had four or more prenatal visits.

Delivery at home is also influenced by the wealth status of the women. Poor women are more likely to deliver at home than rich women are. In fact, women who are categorized as poor were 6.29 times more likely to deliver at home than rich women were whereas women in the middle category 4.68 times more likely to deliver at home than rich women. The decline in the odd ratios as wealth status of the women increase is probably a reflection of the fact that home delivery is associated with being poor.

Delivery at home is also influenced by ever use of contraception. Women who have never used contraception were 1.24 times more likely to deliver at home than women who have ever used contraception.

Determinants of Delivery at TBAs

Furthermore, Table 2 indicate that age, region, type of residence, educational level of the respondents, ever use of contraceptives, number of children ever born, number of visits and wealth were found to have significant impact on being assisted by a TBA during delivery in Malawi. Women aged 15-24 were 1.58 times more likely to be delivered by a TBA than women aged 35 years and over. The odd ratio decrease as age increases indicating that use of TBAs during delivery is higher among young women than older women.

Compared to women residing in Southern Region, women in the Central Region were 2.8 times more likely to be assisted by TBAs during delivery. On the other hand, women in the Northern Region were 1.74 times less likely to be assisted by TBAs during delivery. Women residing in urban areas were 3.13 times less likely to be assisted by TBAs than their rural counterparts. Women who had no formal education were 2.32 times more likely to be delivered by TBAs compared to those who had attained secondary or higher level of education whereas women who had primary education were 1.92 times more likely to be delivered by TBAs compared to those who had attained secondary or higher level of education.

Delivery assisted by TBA varied by the number of prenatal visits. Women who had more prenatal visits were less likely to delivery at a TBA's home than women who had fewer prenatal visits. Women who had no prenatal visits were 2.27 times more likely to deliver at a TBA's home than women who had four or more prenatal visits whereas women who had 1-3 prenatal visits were 1.33 more likely to deliver at a TBA's home than women who had four or more prenatal visits.

Delivery at TBA's home is also influenced by the wealth status of the women. Poor women are more likely to deliver at the TBAS's home than rich women. Tables 3 indicate that poor women are 3.55 more likely to deliver at a TBA's home than rich women. Women whose wealth status was middle were are 3.39 more likely to deliver at a TBA's home than rich women

Lastly, delivery at the home of a TBA is also influenced by the number of children ever born. Women with more children were more likely to deliver at the home of a TBA than women with few children. Women with 1-2 children ever born were 1.80 times less likely to deliver at the home of a TBA than women with 5 and more children ever born. Women with 3-4 children ever born were 1.43 times less likely to deliver at the home of a TBA than women with 5 and more children ever born.

Delivery at TBA home is also influenced by ever use of contraception. Women who have never used contraception were 1.39 times more likely to deliver at TBA home than women who have ever used contraception.

Table 3: Unadjusted odds ratios (OR) and standard errors of the association of socio-demographic variables and delivery assisted by traditional birth attendant in Malawi, 2004

Background variables	Home Deliveries		95 CI		TBA Deliveries		95 CI	
	B	Odds	LB	UP	B	Odds	LB	UP
Age								
15-24	0.198	1.219	0.964	1.541	0.456	1.577**	1.152	2.160
25-34	-0.007	0.993	0.832	1.186	0.203	1.225	0.965	1.554
35+®								
Region								
Northern Region	-0.047	0.954	0.791	1.151	-0.122	0.885	0.678	1.156
Central Region	0.266	1.305**	1.156	1.473	0.497	1.644**	1.405	1.925
Southern Region ®								
Type Of Residence								
Urban	-1.136	0.321**	0.252	0.408	-2.040	0.130**	0.080	0.213
Rural ®								
Wealth Status								
Poor	1.821	6.176**	2.463	15.488	1.336	3.805*	1.179	12.274
Middle	1.528	4.610**	1.836	11.577	1.295	3.652*	1.131	11.790
Rich ®								
Children ever born								
1-2	-0.313	0.731**	0.588	0.908	-0.457	0.633**	0.476	0.843
3-4	-0.123	0.884	0.745	1.048	-0.247	0.781**	0.624	0.979
5+ ®								
Education								
None	1.422	4.144**	3.153	5.446	0.839	2.314**	1.623	3.299
Primary	0.847	2.333**	1.815	2.999	0.672	1.957**	1.420	2.698
Secondary and over®								
Prenatal Visits								
0	1.532	4.630**	3.467	6.183	0.788	2.198**	1.472	3.283
1-3	0.525	1.691**	1.506	1.899	0.289	1.335**	1.144	1.558
4+ ®								
Ever Use of FP								
Never Used	0.240	1.271**	1.128	1.432	0.326	1.385**	1.184	1.622
Ever Used ®								

Discussion and conclusion

Findings from this study indicate that home deliveries were associated with age, region, type of residence, education, use of contraceptives, wealth status, number of children ever born and number of prenatal visits. These factors should be considered in the design of interventions aimed at reducing the proportion of deliveries at home and at the home of TBAs and increasing deliveries at health facilities.

The study found that women in Central Region were more likely to deliver at home or at the home of a TBA than women in Northern and Southern Regions. Regional disparities in terms of place of delivery have also been observed in other countries (Mrisho et. al, 2007; Owino, nd; Mekonnen and Mekonnen, 2003). For instance, in the case of Kenya 34% of the deliveries were assisted by a TBA in Western province as compared to 6% of the deliveries that were assisted by a TBA in Central Province (Owino, nd). The regional differentials in the non use of health facilities during delivery could be related to the differences in the availability and accessibility of maternal health care facilities including the distance to the health care centre and culture.

The study also found that rural residence was positively associated with delivery at home and at the home of a TBA. Similar findings are also observed in other countries (Mrisho, et. al, 2007; Mekonnen and Mekonnen, 2003). The rural-urban differentials in as far as place of delivery is concerned could be related to the differences in the availability of maternal health care facilities including the distance to the health care centre. Studies indicate that in most developing countries urban areas are well served with medical and health facilities (Mrisho, et. al, 2007; Mekonnen and Mekonnen, 2003). Moreover, rural women are more readily influenced by traditional beliefs and practices that are contrary to modern health care.

Women with low education were more likely to deliver at home or at the home of a TBA. Our findings are similar to those reported by other researchers (Mrisho, et. al, 2007; Mekonnen and Mekonnen, 2003). The higher likelihood of home deliveries by women with low education may be associated with limited appreciation by women with limited education to understand the need for professional supervision during delivery. It is sometimes claimed that the relationship between female education and health-seeking behaviour may not be due to education per se, but due to women's childhood background for which education may serve as a proxy (Mekonnen and Mekonnen, 2003). It is argued that analyses that do not control for childhood background may overstate the impact of education on health outcome. In our analysis, we have not controlled for childhood residence. Future studies may wish to control for childhood residence so as to remove the possible confounding effect of this variable on education.

Several reasons have been put forward why educated mothers are less likely to use the services of a TBA during delivery than uneducated mothers in the literature. Educated women may have a greater decision making power on health related matters and also attach a higher value to the welfare and their health. Further, educated mothers will have more confidence in handling the officials and have the ability and willingness to travel outside the home to seek services (Mekonnen and Mekonnen, 2003; Tann, et. al, 2007; Navaneetham and Dharmalingam, 2000). It was expected that among the educated women, the decision making power within the household, awareness, knowledge and acceptance of modern medical treatment and health care institutions varies by their level of education.

Women who have never used contraception were positively associated with delivery by traditional birth attendant. This may be because women who use contraceptives visit the antenatal clinics regularly for re-supply of contraception. It is possible that during these visits these women are exposed to health education and counseling which is likely to increase their utilization of maternal and child health services including delivery in a health facility and assisted by a skilled attendant.

Another important finding of the study is the observation that place of delivery is influenced by economic factors. In particular, this study has shown that poor women are more likely to deliver at home or at the home of a TBA than rich women. This result is contrary to the finding of a study in Nepal that suggested that economic factors were of little

importance in influencing place of delivery (Bolam, et. al, 1998). However, our results are consistent with findings from other studies in Africa that showed that poverty was a major factor for non-use of health facilities during delivery (Mrisho, et. al, 2007; Mekonnen and Mekonnen, 2003). It is often argued that availability for cash for transport is an important determinant of whether or not health facility delivery is sought (Mrisho, et. al, 2007).

This study has implications for policies and programs that seek to improve maternal health services in Malawi. First, in order to reduce the number of women that do not use modern health facilities during pregnancy and delivery, there is need to improve coverage of health facilities that provide skilled delivery care, especially in the rural areas and underserved regions. Second, there is need to raise the status of women in terms of education and socio-economic status. Third, there is need to strengthen the national family planning programme by improving the provision of health education to men and women on the need to use maternal health services during pregnancy and delivery. Lastly, more studies should be conducted to investigate the characteristics of women who use and do not use health facilities during pregnancy and delivery. Reasons behind their choices should also be investigated. Future studies should not only be multidisciplinary but also qualitative in nature.

The current study has several limitations. First, the study used secondary data that limited us from investigating such important variables as distance to the nearest health facility, attitude of service providers towards clients, waiting time to receive service and costs. These variables have been found to influence decision to use modern health facilities or not. Second, as expected with studies of this nature, the findings of this study are subject to the extent that the respondents intentionally or unconsciously misreported. Missing information in demographic surveys is of concern, and our findings may be biased to the extent that non-respondents differed from those that responded to the questionnaire items we considered in our analysis. Third, the definition of some of the concepts (for example, wealth status, rural-urban divisions, etc) is not standard and may affect the findings. As such, in comparing these results with similar studies, it is important to remember that the definitions of concepts may differ from country to country. Lastly, since the data collected were cross sectional in nature, we are not able to ascertain causation between any of the independent variables and the outcome.

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