Determinants of non-institutional deliveries in Malawi

Martin Palamuleni
North West University, Mafikeng Campus

Abstract

Malawi has one of the highest maternal mortality ratios in the world. One of the factors contributing to high maternal mortality is the non-use of health facilities during pregnancy and delivery. The aim of this study is to examine the factors associated with non-institutional deliveries in Malawi. Data from 2004 Malawi Demographic and Health Survey and multinomial logistic regression were used to assess the association between place of delivery and selected socio-economic factors. 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. Multivariate analysis indicate that 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 non-institutional deliveries. These factors should be considered in designing strategies to improve the maternal health care system in Malawi.

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[1,2,3]. 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[2,3,4]. 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[5,6].

The subject of maternal health was first brought to the international platform with the adoption of the Safe Motherhood Initiative in 1987[3]. In the past decade, the importance of maternal health was rekindled following its expected inclusion within the eight Millennium Development Goals (MDGs)[3,4,5]. This study is interested in MDG number 5 which aims at reducing between 1990 and 2015, maternal mortality by 75 per cent[5].

The major causes of maternal mortality in developing countries including Malawi are haemorrhage, eclempsia, malaria, infections, abortions and complications of obstructed labour[7,8,9,10]. A closer look at these factors indicates that these causes (of maternal mortality) are preventable if health facilities are used during pregnancy and delivery. Unfortunately, in developing countries, the use of health facilities is limited due to, among other factors, poor accessibility in terms of distance, inadequate transport infrastructure, poverty and culture[11,12].

Statement of the Problem

Maternal mortality continues to be a major health problem in Malawi, a country with one of the highest maternal mortality rates in the world[6]. The Maternal Mortality Ratio (MMR) almost doubled between 1992 (620 maternal deaths per 100000 live births) and 2000 (1120/100000) in 2000), declining to around 984 in 2004[13,14,15]. 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 and about 4717 nurses and midwives were reported to be practicing in the country[16,17]. With an estimated population of 10 million in 2003, these estimates implies a doctor-population ratio of 1:39682 and a nurse-population ratio of 1:2120, figures that are higher than the WHO global standard pegged at 1:5,000 for doctors and 1:1000 for nurses.

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, as well as discussing 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[15]. The survey was conducted by the National Statistical Office (NSO) as part of the 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. 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 household questionnaire that recorded information on all household members to identify men and women who are eligible to take part in the survey. Second, there was a women questionnaire to record detailed information on eligible women who were identified from the household questionnaires. The 2004 MDHS collected data for 11698 women aged 15-49. The women questionnaire collected information on the respondents' background characteristics, reproductive history, knowledge and practice of family planning, breast-feeding practices, marriage, fertility preferences etc., as well as providing information on her husband's background characteristics. Third, there was a men questionnaire administered to individual men aged 15-54 and 3261 men were interviewed. The male questionnaire was similar to that of the individual women questionnaire, excepting that it excluded the birth history and maternal and child health sections. The analyses in this paper will use the data from the individual women questionnaire only. The sample for this study comprises 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, a 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 the 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. An 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 had 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. To make analysis and interpretation simpler and more meaningful, some variables were regrouped from their original categories in the dataset. The following are some of the variables that were regrouped: Age regrouped into 15-24, 25-34 and 35 and over; Religion regrouped into Christian, Muslim and other; Number of prenatal visits regrouped into none, 1-3 visits and 4 visits and over. Number of children ever born which was originally a continuous variable was categorized into no children, 1-2 children, 3-4 children and 5 children and over. Education was also regrouped into no education, primary and Secondary and over. 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 of 1 if it available and 0 if it is not available and it was summed across items for each household. Individual wealth was ranked as poor; middle-class and rich, based on the total score. In other words, an individual was categorized as Poor if the total score was in the rage 0 to 2; middle, if the the total score was 3 to 4 and rich if the total score was 5 to 6. The only variables that were not regrouped were region (Northern Region, Central Region and Southern Region) and type of place of residence (rural, urban)

Results

The total sample for this analysis comprises 7,218 women who had at least one child, aged less than five years, at the time the survey. 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 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 for about 17%, and the remaining 1% belonging to other religions where the women were practicing traditional religion). Almost all the women in the study population had heard about family planning even though only 63% said they 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.

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, the use of contraceptives, the number of children ever born, the number of visits and wealth have a significant impact on home deliveries in Malawi. Compared to women residing in the 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 compared to women in the Southern Region. This confirms that home deliveries are highest in the Central Region, followed by the 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.

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

	Study Population		Place of Delivery		
Variables	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.

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 indicates that age, region, type of residence, educational level of the respondents, the use of contraceptives, the number of children ever born, the number of visits and wealth were found to have a 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 indicates that the use of TBAs during delivery is higher among young women than older women.

Compared to women residing in the 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 those 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 those 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 those 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 ones. Tables 3 indicates that poor women are 3.55 more likely to deliver at a TBA's home than rich ones. 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

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 B	Odds	95 CI LB	UP	TBA Deliveries B	Odds	95 CI 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 ®								

*= p<=0.05; ** = p<=0.001

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 the use of contraception. Women who have never used contraception were 1.39 times more likely to deliver at TBA home than those who have ever used contraception.

Discussion and conclusion

Findings from this study indicate that home deliveries were associated with age, region, type of residence, education, the use of contraceptives, wealth status, the number of children ever born and the 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 the Central Region were more likely to deliver at home or at the home of a TBA than their counterparts in the Northern and Southern Regions. Regional disparities in terms of place of delivery have also been observed in other countries[18,19]. 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[18,19]. 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[18,19]. Moreover, rural women are more readily influenced by traditional beliefs and practices that are contrary to modern health care.

Women with low education attainment were more likely to deliver at home or at the home of a TBA. Our findings are similar to those reported by other researchers[18,19]. The higher likelihood of home deliveries by women with low education achievement 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 rather due to women's childhood background for which education may serve as a proxy[19]. 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 as to 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 greater decision making power on health related matters and also attach 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[19,20,21]. It was expected that among the educated women, the decision making power within the household, awareness, knowledge and the acceptance of modern medical treatment and health care institutions vary according to their levels of education.

Women who have never used contraception were positively associated with delivery by traditional birth attendants. 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 the 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[22]. 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[18,19]. It is often argued that availability for cash for transport is an important determinant of whether or not health facility delivery is sought[18].

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 prenatal services 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. The reasons behind their choices together with their views and perceptions regarding various plausible places of delivery should also be investigated. Future studies should not only

be multidisciplinary but also qualitative in nature. Qualitative research is the most appropriate method to explore the wide range of views, attitudes, perceptions and experiences of individual's point of view and perspective[23]. Furthermore, Silverman(2005) noted that "some researchers believe that qualitative method can provide a deeper understanding of social phenomena than would be obtained from purely quantitative data".

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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