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Choice of Place for Childbirth: Prevalence and Determinants of Health Facility Delivery Among Women in Bahi District, Central Tanzania

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Abstract: Maternal and child mortalities are among major health problems facing developing countries such as Tanzania. Most of these deaths can be avoided by utilization of maternity health care services by women, including seeking delivery care services from health professionals in health facilities. This study was carried out in Bahi district in central Tanzania with the aim of evaluating the extent of utilization of health facility for delivery and correlates for its use. The study derives from data collected in a cross-sectional survey conducted in a district in June, 2008 which involved 3,124 randomly chosen households covering all villages of the district. The study involved all women from sampled households resident to the area that had ever given birth (delivered) within two years before the survey. A total of 984 women were involved in the study. Data were analyzed for descriptive statistics such as frequencies and percentages; as well as Multiple Logistic Regression for identification of factors associated with delivery in health facility using Statistical Package for Social Sciences (SPSS) version 12. Results from this study indicated that proportion of women in the study population that uses health facility for delivery and hence being attended by skilled birth attendants was still low when compared to the national target (54 vs 80%), indicating more efforts to increase use of health facility for delivery by women in a study population are required. Likelihood (Odds) for delivery in health facility in a most recent birth was significantly higher for women with secondary education and above relative those with primary of no formal education (Odds Ratio (OR) = 2.17; 95% CI, 1.30-3.60); The Odd was also significantly higher for women from high income group compared from those from low income group (OR = 2.3; 95% CI, 1.23-3.97), as well as for women who had at least four antenatal care visits during their last pregnancy relative to those never attended (OR = 1.96; 95% CI, 1.20-3.19). Likelihood for health facility delivery by women decreased significantly with being from other division (location) other than Bahi division (37 to 48% reduction in Odds); also decreased significantly with living more than 10 km from nearest health facility compared to those living within 5 km (OR = 0.62; 95% CI, 0.47-0.81) and being in at least third parity during most recent birth relative to those in first to second parity (OR = 0.74; 95% CI, 0.58-0.94 for 3^{rd}-4^{th} parity; OR = 0.54, 95% CI, 0.35-0.83 for 5^{th} parity and above). Age and marital status at most recent birth, ethnicity, religious affiliation and perceived quality of maternity health care services at nearest health facility by a woman had no effect on odds for reporting delivery in health facility ($p>0.05$). Based on these findings, recommendations to increase utilization of health facility for delivery by women in a study population have been indicated.

Keywords: Delivery care, maternal mortality, skilled birth attendant

INTRODUCTION

Worldwide, half a million of women dies each year from pregnancy and childbirth related complications, with over 90% of these deaths occurs in developing countries, including sub-Saharan Africa (Nigussie *et al*., 2004; UNFPA, 2008; Oguntunde *et al*., 2010; Munsur *et al*., 2010; Wanjira *et al*., 2011). Main causes of deaths have mainly been obstructed labour, sepsis, hemorrhage and hypertensive disorders (Kruk *et al*., 2010; Warren, 2010). In Tanzania, Maternal Mortality Ratio (MMR) is among the highest in sub-Saharan Africa. The figure for MMR for Tanzania in the year 2004/2005 was estimated to be 578 deaths per 100,000 live births (National Bureau of Statistics and ORC Macro, 2005). Similarly, of the 11 million deaths for children aged >5 years that occur worldwide, more than 90% of these deaths occurs in developing countries including Tanzania, with most of these deaths occurs during delivery and within 42 days post delivery (Sibley and Sipe, 2006; Rahman and Sakar, 2009; Munsur *et al*., 2010). Tanzania is one of the ten countries contributing 66% of the global total newborn deaths. According to Tanzania Demographic and Health Survey of 2004/2005 under-five child mortality rate in Tanzania was estimated to be 68 deaths per 1,000 live births (National Bureau of Statistics and ORC Macro, 2005). Millennium Development goals 4

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and 5 call for reduction of child (under-five) and maternal mortality by two-thirds and three-fourths, respectively between 1990-2015 (Barnett *et al*., 2006; Munsur *et al*., 2010) . Therefore, taking current figures for maternal and child mortality rates in Tanzania, deliberate efforts are required to achieve these goals. It is well acknowledged that most of these maternal and child mortalities can be avoided by utilization of Antenatal Care (ANC) services as well as skilled birth attendant (health professionals i.e., doctor, nurse, midwife) during delivery by women (Wagle *et al*., 2004; Koblinsky *et al*., 2006; Fotso *et al.*, 2009; Kamal, 2009; Some *et al*., 2011; Pardeshi *et al*., 2011). Skilled health workers are capable of handling birth complications and referring more complicated cases to appropriate referral health facility on time. In this regard, to reduce maternal and child mortality and hence achieving MDG 4 and 5 women have been advised to deliver in health facilities to get assistance of skilled birth attendant during delivery. In recognizing the importance of delivery in health facilities in reducing maternal and newborn deaths and hence achieving MDG 4 and 5, the government of Tanzania has improved its network for primary health facilities with maternity health care services, as well as health promotion campaigns targeting women and children via mass media. Furthermore, the government of Tanzania has also mandated that maternal and child health services including delivery, be exempted from fees at any government facility (Mosha *et al*., 2005; Mrisho *et al*., 2007; Mpembeni *et al*., 2007). However, despite government efforts, Significant number of studies in other parts of Tanzania have indicated less than 50% of women deliver in health facilities and hence attended by skilled health personnel (National Bureau of Statistics and ORC Macro, 2005; Mpembeni *et al*., 2007; Evjen-Olsen *et al*., 2009; Danforth *et al*., 2009; Kruk *et al*., 2010). To achieve Millennium Development Goals on reduction of child and maternal mortality it is required that at least 80% of deliveries to take place in health facilities (URT, 2008a; Wanjira *et al*., 2011). To enhance utilization of health facilities during delivery in the country, barriers/determinants for utilization of health facility during delivery among women need to be identified across all geographical regions. Little is known in the study area on extent of utilization of maternity services in health facilities including delivery care services and determinants for their utilization. Therefore, this study aimed at assessing extent of utilization of health facilities for delivery care services and identifying factors influencing use of this service among women in the study population. This information is important for informed decisions among stakeholders working with maternal and child health in the country.

METHODOLOGY

Study area: Bahi district, a study area is among the six district of Dodoma region located in Central Tanzania. The district is located 50 km from Dodoma Region Headquarters. It lies between Latitudes 4° and 8° South of the Equator and between Longitude 35° and 37° East of Greenwich. The District is predominantly rural covering a total area of 544,842 ha (13% of total area of Dodoma Region). There are 4 divisions, 20 wards and 56 villages in the district with number of villages per wards ranging from 4 to 6. The area is semi-arid receiving annual rainfall of between 500 to 800 mm. The dominant ethnic group is *Gogo* involved in both crop and livestock production. According to 2008 statistics, the district has 35 dispensaries and 3 health centers (URT, 2008b).

Data source: This study draw from data collected from a cross-sectional survey carried out in the district in June, 2008 by Institute of Rural Development Planning (IRDP), Dodoma, Tanzania for the purpose of preparing district profile. The survey involved 3,124 randomly chosen households out of 43,311 households living in the area (URT, 2003) covering all villages of the district. The current study involved all women from sampled households resident to the area that had ever given birth (delivered) within 2 years before the survey (i.e., a period of 2 years preceding the survey). A total of 984 women were involved in this study. Informed verbal consent was sought from respondents before interview.

Statistical analysis: Data collected were verified, coded and then analyzed for descriptive statistics such as percentages using Statistical Package for Social Sciences (SPSS) program version 12. The program was also used for Multivariate analysis (Multiple Logistic Regression Analysis) to determine the effect of socio-economic and demographic variables, parity, antenatal care visits, physical access to health facility and perceived quality of maternity service at nearest health facility by women (Independent variables) on choice of place of delivery in last childbirth/delivery i.e., most recent birth (Home vs Health facility) (A dependent variable). Multiple Logistic Regression Analysis was used to estimate the effect of individual risk factor adjusted for confounding effects of other variables (Bolam *et al*., 1998; Maria, 2007; Dibaba, 2008).

Socio-economic and demographic variables used in this study included age and marital status of respondent at a most recent birth/delivery, education level, ethnicity, place of residence (division of residence), religious affiliation and household socio-economic status proxied by annual household income. Physical access to health facility was proxied by distance to nearest health facility while perceived quality of maternity services at nearest health facility by women was captured by a question asking respondent on perceived quality of maternity services specifically ANC and delivery services provided by a nearest health facility (i.e., competencies of health personnels in handling births, communication between health personnel and a client, adequacy of services provided by the facility).

During analysis, a statistical model below as specified by Hosmer and Lemeshow (2000) and Agresti (2002) was assumed:

$$\ln\left(\frac{p}{1-p}\right) = \alpha + \sum_{i=1}^{n} \beta_i X_i$$

where, by p is a probability of delivering in health facility in last childbirth/delivery (i.e., in most recent birth), α and β are estimated regression coefficients and X_i are various explanatory variables.

Odds Ratio (OR) i.e., Exp (β) for each category of explanatory variables were also estimated along with their 95% Confidence Intervals (C.I) and the effect of a category on likelihood for delivery in health facility was considered significant ($p<0.05$) when estimated C.I does not contain 1 (Hosmer and Lemeshow, 2000).

Table 1: Distribution of respondents by socio-demographic and some other characteristics (N = 984)

Variable	Frequency	(%)
Age at a most recent birth (years)		
<20	197	20.0
20-35	551	56.0
>35	236	24.0
Marital status at a most recent birth		
Single	197	20.0
Married/in union	768	78.0
Others	19	2.0
Education level		
None	95	9.7
Primary	743	75.5
Secondary	128	13.0
College and above	18	1.8
Ethnicity/tribe		
Gogo	807	82.0
Others	177	18.0
Religious affiliation		
Catholic	197	20.0
Protestant	728	74.0
Moslem	59	6.0
Place/division of residence (location)		
Bahi	250	25.4
Mundemu	283	28.8
Chipanga	246	25.0
Mwitikira	205	20.8
Annual household income (Tsh.)		
<500,000	590	60.0
500,000-1,000,000	315	32.0
>1,000,000	79	8.0
Distance to the nearest health facility (km)		
<5	659	67.0
5-10	207	21.0
>10	118	12.0
Parity		
1-2	259	26.3
3-4	528	53.7
5+	197	20.0

RESULTS AND DISCUSSION

Characteristics of respondents: Results from Table 1 indicate more than half of total respondents (56%) were in the age range of between 20-35 years during their most recent birth/delivery and majority of them (78%) were married. Although majority of respondents were in that age range, however proportion of very young as well as old women also existed at substantial proportion accounting for one-fifths (20%) and nearly a quarter (24%) of total respondents, respectively. Evidence from previous studies has indicated risk for birth complications are high for very young and older mothers (Mekonnen and Mekonnen, 2002) and hence they need to use maternity health care services from skilled health personnels. Furthermore, variations in age and martial status among women may influence their health seeking behaviours and consequently utilization of maternity health care services (Mengistu and James, 1996; Mrisho *et al*., 2007; UNFPA, 2008; Rahman and Sakar, 2009). Results from Table 1 also indicate education level, ethnicity and religious affiliation varied considerably among study participants. Although majority of respondents had primary education, were coming from *Gogo* tribe and were Protestant by religion, however, proportions of respondents in other categories were also substantial. Nearly one-every ten women (9.7%) had no formal education and more than 10% had at least secondary education. Nearly 20%, that is one in every five women were coming from other tribe other than *Gogo* and similar proportion were Catholic by religion. Variations among individuals with respect to these variables may results into variation in knowledge and perception towards maternity services and hence variations in choice of place of delivery (Mpembeni *et al*., 2007; Mrisho *et al*., 2007;

Fotso *et al*., 2009; Kruger *et al*., 2011; Shah and Bélanger, 2011; Wanjira *et al*., 2011). Place of residence, household socio-economic status (i.e., household income), physical distance to the nearest health facility as well as parity are other factors that may influence health seeking behaviours for maternity health care services among women (Van Eijk *et al*., 2006; Danforth *et al*., 2009; Mpembeni *et al*., 2007; Mrisho *et al*., 2007; Rahman and Sarkar, 2009; Iyengar *et al*., 2009; Fotso *et al*., 2009). Results from Table 1 also indicate variations among study participants with regard to these variables, with substantial number of respondents distributed across various categories of these variables; again as with other variables, these variations may results into differences in preference/utilization of maternity services from skilled health workers among women. Results from the Table indicate each Division (location) accounted for at least 20% of total respondents. Furthermore, about 60% of total respondents were in low income category (i.e., household income less than Tsh. 500,000/-per year); around one in very ten women were living more than 10 km from nearest health facility; and 20% (i.e., one in every five women) were at least in their fifth parity during their most recent birth (delivery), i.e., most risky parities with regards to birth complications (Mekonnen and Mekonnen, 2002).

Antenatal care visits and place of delivery: Results from Table 2 indicate underutilization of antenatal care services by a considerable proportion of respondents with only 58% of women attained a recommended minimum of four antenatal care visits (URT, 2008a; Mrisho *et al*., 2009; Fotso *et al*., 2009; Munsur *et al*., 2010; Oguntunde *et al*., 2010; Kruk *et al*., 2010) during their last pregnancy. This result compare well with national average of 62% reported in Tanzania Demographic and Health Survey of 2004/2005 (National Bureau of Statistics and ORC Macro, 2005), but higher than the value of 45% reported by Kruk *et al*. (2010) in western parts of Tanzania**.** This poor trend in utilization of antenatal care services in the study area and in the country as whole undermines efforts to reduce maternal mortalities. Findings from Table 2 also indicate proportion of women that used health facilities for delivery and hence attended by skilled health personnels was not satisfactory. Only 54% of total respondents reported to use health facility for delivery during their most recent birth. Similar to results of the current study, previous studies in other parts of Tanzania indicated that although more than 90% of women had at least one antenatal care visits in their most recent pregnancy, however few women (less than 50%) delivered in health facility in their most recent childbirth (National Bureau of Statistics and ORC Macro, 2005; Mpembeni *et al*., 2007; Mrisho *et al*., 2007, 2009; Kruk *et al*., 2010). In some of these studies it was reported that some women prefers home delivery, however they go to clinic during pregnancy (usually few visits) to secure registration (clinic card) so as they can be acceptable at the facility in case birth complications occur during home delivery. This is based on the fact that health facility is treated as last resort during delivery (i.e., women are only referred to the facility in case of birth complications). Unfortunately, assistance of health professional in the health facility is usually sought very late, consequently resulting into maternal deaths. On the other hand, although current study showed some improvement in proportion of women delivered in health facility compared to the national average of 47% reported for the year 2004/2005 (National Bureau of Statistics and ORC Macro, 2005; Kruk *et al*., 2010), however the figure is still far too low when compared to the national target of 80% if MDG 4 and 5 are to be achieved (URT, 2008a). Therefore, more campaigns/interventions are required in the study area to increase proportion of women delivering in health facilities. For these interventions to be effective, identification of barriers for health facility delivery is important. In addition, on overall it can also be seen from Table 2 that substantial proportion of respondents (one-third) rated maternity health services at nearest health facility including delivery care services to be poor. This might be one of the hindrances for utilization of health facilities for delivery by women in a study population (Danforth *et al*., 2009; Kabir, 2007; Mrisho *et al*., 2007; Wanjira *et al*., 2011).

Table 2: Distribution of respondents by frequency of antenatal care visits, place of delivery in a most recent birth (last childbirth) and perceived quality of ANC and delivery services (N = 984)

Variable	Frequency	(%)
Frequency of Antenatal Care (ANC) visits		
0	67	6.8
1-3	346	35.2
4+	571	58.0
Place of delivery		
Health facility	535	54.4
Home	449	45.6
Perceived quality of ANC and delivery services at nearest health facility		
Good	659	67.0
Poor	325	33.0

Table 3: Results for multiple logistic regression analysis for odds for reporting delivery in health facility in a most recent birth against various predictor variables

Predictor	β	SE	Odds Ratio (OR)	95% Confidence Interval (CI) for OR
Age (years)				
<20 (Ref).			1	1
20-35	-0.04	0.03	0.96	(0.90-1.02)
>35	-0.16	0.09	1.17	(0.71-1.02)
Marital status				
Married (Ref.)			1	1
Others	-0.11	0.08	0.90	(0.76-1.05)
Education level				
None/primary (Ref.)			1	1
Secondary and above	0.77	0.26	2.17	(1.30-3.60)*
Ethnicity/tribe				
Gogo (Ref.)			1	1
Others	0.08	0.06	1.08	(0.96-1.22)
Religious affiliation				
Catholic (Ref.)			1	1
Protestant	0.09	0.07	1.09	(0.95-1.26)
Moslem	-0.01	0.02	0.99	(0.95-1.03)
Place/division of residence (location)				
Bahi (Ref.)			1	1
Mundemu	-0.46	0.13	0.63	(0.49-0.81)*
Chipanga	-0.65	0.17	0.52	(0.38-0.73)*
Mwitikira	-0.50	0.21	0.61	(0.40-0.91)*
Annual household income (Tsh.)				
<500,000 (low) (Ref.)			1	1
500,000-1,000,000 (medium)	0.17	0.11	1.18	(0.95-1.48)
>1,000,000 (high)	0.83	0.28	2.30	(1.23-3.97)*
Distance to the nearest health facility (km)				
<5 (Ref.)			1	1
5-10	-0.14	0.09	0.87	(0.73-1.04)
>10	-0.48	0.14	0.62	(0.47-0.81)*
Parity				
1-2 (Ref.)			1	1
3-4	-0.30	0.12	0.74	(0.58-0.94)*
5+	-0.62	0.22	0.54	(0.35-0.83)*
Frequency of Antenatal Care (ANC) visits				
0 (Ref.)			1	1
1-3	0.51	0.31	1.16	(0.90-3.07)
4+	0.67	0.25	1.96	(1.20-3.19)*
Perceived quality of maternity services				
Good			1	1
Poor	0.07	0.06	1.07	(0.95-1.2)

Nagelkerke R square: 0.61; Ref: Reference category; *: Significant ($p<0.05$)

Correlates of health facility delivery: Results from Table 3 indicate health facility delivery was significantly associated with education level, place of residence, household socio-economic status proxied by annual household income, distance to the nearest health facility, number antenatal care visits and parity during most recent birth ($p<0.05$). Effects of other variables considered in a logistic regression model were not significant ($p>0.05$). These variables include age and marital status at most recent birth/delivery, ethnicity, religious affiliation and perceived quality of maternity health care services at nearest health facility.

Women with secondary education and above were two times more likely to deliver in health facility compared to those with primary or no formal education (OR = 2.17; 95% CI, 1.30-3.60) (Table 3). Increased chance of delivery in health facility with increase in education level is consistent with results of most of previous studies conducted in African and Asian countries (Nigussie *et al*., 2004; Mrisho *et al*., 2007; Rahman and Sarkar, 2009; Wanjira *et al*., 2011; Oguntunde *et al*., 2010; Munsur *et al*., 2010). Increased likelihood for health facility delivery with increase in education level could be related to increase in level of exposure (i.e., access to right information with regard to delivery) as well as increased women autonomy in decisions making including decisions with regard to where to seek for maternity care services.

It can also be seen from Table 3 that women coming from other Divisions (locations) other than

Bahi were associated with 37 to 48% reduction in odds for delivery in health facility relative to those coming from Bahi division. Increased chance of health facility for women that were coming from Bahi division could be attributed to its geographical location. The division is close to Dodoma urban district (Headquarters of Dodoma region) (URT, 2008b) where health facilities are relatively well established and it is connected to the area by tarmac road with reliable transport.

A number of studies have indicated long distance to health facility and poverty could be among the barriers for utilization of maternity health care services from health professionals (Nigussie *et al*., 2004; Danforth *et al*., 2009; Mpembeni *et al*., 2007; Mrisho *et al*., 2007, 2009; Rahman and Sarkar, 2009; Iyengar *et al*., 2009; Warren *et al*., 2010; Awoyemi *et al*., 2011; Shah and Bélanger, 2011). In agreement with results of these previous studies, chance of delivery in health facility decreased with increasing distance to the nearest health facility and coming from low income group (i.e., low socio-economic status). Women in which their households were located more than 10 km from nearest health facility were 38% less likely to deliver in health facility compared to those living within 5 km from nearest health facility (OR = 0.62; 95% CI, 0.47-0.81). Likewise, women from high income group were two times more likely to deliver in health facility compared to those from low income group (OR = 2.3; 95% CI, 1.23-3.97). Women from poor families may fail to use health facilities for delivery due to lack of money for transport (fare) when the facility is located at a distant place and lack of money to pay for delivery kit as well as food while at health facility (Mrisho *et al*., 2007, 2009; Iyengar *et al*., 2009; Warren *et al*., 2010).

Results from Table 3 also indicate that women in higher parity were less likely to deliver in health facility compared those in first to second parity despite the fact that risk for birth complications and maternal mortality is also high for women in higher parities i.e., grand multipara (5^{th} parity and above) as with those in first parity (Mekonnen and Mekonnen, 2002). Women in third to fourth parity were 26% less likely to deliver in health facility compared to those in first to second parity (OR = 0.74; 95% CI, 0.58-0.94). Women in fifth parity and above were 46% less likely to deliver in health facility compared to those in first to second parity (OR = 0.54; 95% CI, 0.35-0.83). Inverse relationship between parity and delivery in health facility was also noted in some previous studies (Bolam *et al*., 1998; Mekonnen and Mekonnen, 2002; Mwaniki *et al*., 2002; Danforth *et al*., 2009; Van Eijk *et al*., 2006; Fotso *et al*., 2009; Wanjira *et al*., 2011). Mekonnen and Mekonnen (2002) argued that women in higher parity (multiparous) are usually more confident on childbirth compared to those in their early parities, specifically first parity due to the experience accumulated during past deliveries. Therefore, they may prefer to take birth at home and a tendency for preference for home delivery is usually high when someone had never experienced birth complications in previous deliveries.

Frequency of attendance to antenatal care services was also a significant predictor of place of delivery. Women who had at least four antenatal care visits during their last pregnancy were nearly two times more likely to deliver in health facility in their most recent birth compare to those never attended (OR = 1.96; 95% CI, 1.20-3.19). Increased likelihood for health facility delivery with increased frequency for antenatal health care visits observed in this study concur with results by Nigussie *et al*. (2004), Wagle *et al*. (2004), Mpembeni *et al*. (2007), Fotso *et al*.(2009) and Kruk *et al*. (2010). The observed trend could be attributed to advice given to women by health personnels during antenatal care visits which include among others advice on delivery in health facility. This trend stressed the need for encouraging women to attend to antenatal care services and the use of this opportunity to educate women on the importance of delivery in health facility for their health as well as health of newborn.

CONCLUSION

Proportion of women in the study population that uses health facility for delivery, that is 54% and hence being attended by skilled birth attendants was still low when compared to the national target of 80%, though there was some improvement when compared to the past national average of 47%. Likelihood for delivery in health facility increased with increase in education level, being from high income group (high socio-economic status) by woman and increased frequency of antenatal care visits. Likelihood decreased with being from other division (location) other than Bahi division; also decreased with increasing distance from nearest health facility and increase in parity. Age and marital status at most recent birth, ethnicity, religious affiliation and perceived quality of maternity health care services at nearest health facility by a woman had no effect on odds for reporting delivery in health facility in a study population.

RECCOMENDATIONS

To increase utilization of health facility during delivery by women in a study population, emphasis on women education should be given due weight. Furthermore, efforts to improve accessibility of health facilities by rural communities by increasing number of health facilities, road networks as well transport services in rural areas should be intensified. In addition, campaigns to sensitize women to utilize antenatal and delivery health care services should be expanded with special focus on women in high risk groups such as women in higher parities and women from poor families. Since poverty (low income) and hence lack of money to cater for health services was also a barrier for seeking assistance of health professional during delivery, advancing affordable credits to women and encouraging them to engage in small scale businesses for income generation could be of much help.

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