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Association between Labour Outcomes and Level of Healthcare System at Which Initial Delivery Assessment is done before Referral in South Western Uganda

Mayanja Ronald ,MD[1*]and Chakura Andrew, MD[1], Masembe Sezalio, MD[1], Njagi Joseph, MD[1], Wasswa Ssalongo,MD[1], Joseph Ngonzi [1]

Affiliations: [1]Department of Obstetrics and Gynecology, Mbarara University of Science and Technology, Uganda

Abstract

Background: In 2013, an estimated 289,000 women died due to complications in pregnancy and childbirth. In the same year, almost 1 million newborns died on the day they were born. Access to appropriate maternity care including prompt referrals for emergency obstetric care (EmOC) services and skilled birth attendance could significantly reduce both perinatal and maternal mortality and/or morbidity. **Objective*:*** To determine theassociation between labour outcomes and the level of healthcare system at which delivery is first attempted before referral to Mbarara hospital (MRRH). **Methods:** Retrospective review of 644 records was done over a period of five months for referrals that delivered at MRRH. The data was analyzed using SPSS and cross tabulations were done and frequencies, percentages and Pearson Chi-square statistics obtained. Bivariate and multivariate logistic regression models were used to test association. Significance level was set at p value < or = 0.05. **Results:** First attempt of delivery from a hospital was protective against poor fetal and maternal outcomes OR= 0.43 [0.27-0.69, 95%CI] p<0.001, and OR= 0.49, [0.27-0.92, 95%CI], p=0.024 respectively.A distance of more than 5km from the health facility was associated with poor maternal outcomes OR= 2.38, [1.16-4.86, 95%CI] p=0.015 and urban residence was protective against poor fetal outcomes OR= 0.29, [0.18-0.46, 95%CI], p<0.001. **Conclusion/Recommendations:** Initial labour assessment and management in lower health facilities is associated with poor delivery outcomes. Lower health facilities should be support supervised and mentored as pertains management of mothers in labour.

 Keywords: *Referral, delivery, outcomes, attempt.*

BACKGROUND

In 2013, an estimated 289,000 women died due to complications in pregnancy and childbirth, down from 523,000 in 1990.Sub-Saharan Africa has the highest MMR (510 maternal deaths per 100,000 live births), accounting for 62% (179,000) of global maternal deaths. The MMR in developing regions was 14 times higher than in developed regions (WHO 2014).In the same year, almost 1 million newborns died on the day they were born, 2 million newborns died within the first seven days after birth, representing 73 per cent of all neonatal deaths (UNICEF, 2014) One third of nearly one million stillbirths occur during labour, and approximately 280,000 babies die of birth asphyxia soon after birth. Maternal and perinatal mortality rates are still high, especially in sub-Saharan Africa, where little progress has been made over recent decades (M. V. Kinney *et al.*, 2010).

In sub-Saharan Africa, women continue to have restricted access to skilled birth attendants yet skilled care at birth and immediately thereafter would save the lives of many mothers and babies and prevent countless complications (WHO 2008). While more than half of all births in sub-Saharan Africa occur without the presence of a skilled attendant, nearly all births in developed nations take place with the assistance of a skilled attendant (WHO 2008). In Uganda 58% of the deliveries occur in the presence of a skilled attendant at birth (UDHS 2011). In south western Uganda where Mbarara regional referral hospital (MRRH) is located is located, only 41.5% of the deliveries are assisted by a skilled attendant at birth which is below the national average (UDHS 2011).

The Ugandan health system is divided into the public and the private sector. The public sector includes government facilities. The public health care facilities are grouped into Health Centres (II, III and IV), General Hospitals (GH), Regional Referral Hospitals (RRH) and National Referral Hospitals (NRH). Health Centre I is occupied by 3-4 volunteers called Village Health Team (VHT) members. Comprehensive emergency obstetric services (blood transfusion and caesarean sections) are expected to be provided by HC IVs and hospitals so as to reduce maternal/neonatal morbidity and mortality. According to the Ministry annual health sector performance report for the year 2010/11 only 24% and 26% of HC IVs were able to offer blood transfusion and caesarean sections services respectively (MOH 2011).

In a study conducted in south-western Uganda, it was found that the cultural desire for Ugandan women to 'protect their own integrity.' prevented women from seeking emergency obstetric care. These beliefs often lead to delay in seeking assistance, which puts the life of the fetus at risk of adverse perinatal outcomes. When

women realize labour is not progressing normally they first seek female friends or traditional birth attendants. This can result in a further delay in seeking medical attention from someone who is trained to handle such complications (Kabakyenga *et al.,* 2011).

At the primary health facilities, women are referred when there is a prediction for her developing an obstetric complication (risk approach) or when she has already developed a complication that cannot be treated at the primary level care facility **(**Jahn and De Brouwere., 2001**)**. Access to appropriate maternity care including prompt referrals for emergency obstetric care (EmOC) services and skilled birth attendance could significantly reduce both perinatal and maternal mortality and/or morbidity (C. Ronsmans *et al*., 2006, A. Paxton et al 2005). This is because pregnancy complications are unpredictable and have potential to progress rapidly and become life-threatening. For example a serious haemorrhage can lead to death of a woman or the unborn fetus within minutes or hours. For example, a serious haemorrhage can lead to death of a woman and the unborn fetus within minutes or hours (AbouZahr C., 1998, Khan RU *et al.*, 2006).

The aim of this study was to determine the association between labour outcomes and the level of healthcare system at which delivery is first attempted before referral to Mbarara Regional Referral hospital (MRRH).

Methods

Study design: This was a retrospective study involving review of MRRH records.

Study site: The study was done in Maternity Mbarara Regional Referral Hospital (MRRH) in south western Uganda. MRRH is a teaching hospital for Mbarara University of science and technology and a regional referral hospital for south western Uganda. MRRH is located in Mbarara municipality, Mbarara district, South Western Uganda, located 286 kilometers from the capital, Kampala. The hospital is owned and financed by the Government of Uganda through Ministry Of Health and serves 5 million people and 10 districts including the neighboring countries of Tanzania, Rwanda and Democratic Republic of Congo. The hospital delivers about 10,000 mothers annually.

Sampling method: Consecutive sampling method was employed.

Study population: Referrals who delivered from MRRH during the study period.

The independent variables: Socio-demographics (age, distance from home to health facility), obstetric and health facility factors like parity, mode of delivery, facility where delivery was first attempted).

The Outcome study variables: Poor or good feto-maternal outcomes.

Sample size calculation:

The sample size included 644 facility referrals that delivered between 1st October and 31st February 2016.

Statistical analysis: The data was entered in an EXCEL spreadsheet and analyzed using SPSS statistical software, version 20 (SPSS, Chicago, IL, USA). Cross tabulations was conducted to obtain descriptive statistics which were presented as frequencies, percentages and Pearson Chi-square statistics. Bivariable logistic regression models were used to test the association of the independent variables with the dependent (outcome) variable. Variables with p-value <0.05 at bivariable analysis were included in multivariable logistic regression analysis. Results were presented with odds ratios and the corresponding 95% Confidence Intervals and significance was accepted at $p < 0.05$.

Ethical approval: Ethical approval to carry out the study was obtained from Mbarara University of Science and Technology Institutional Review Board (MUST IRB).Permission to use Hospital records was obtained from the Hospital Director.

RESULTS

Participant Characteristics

Records of 644 referrals were reviewed over a period of five months from October 2015 to February 2016.

Table 1. Participant characteristics

Characteristics	Frequency	Percentage
Age		
<20	101	15.7
20+	541	84.0
Missing	2	0.3
Parity		
Prime para	224	34.8
Multiparous	417	64.7
Missing	3	0.5
Residence		
Rural	126	19.6
Urban	288	46.7
Missing	230	35.7
Distance to Mbarara hosp(km)		
0-5	171	26.6
>5	231	35.9
Missing	242	37.6
Mode of delivery		
VD	292	45.3
CS	302	46.9
Laparotomy	14	2.2
Vacuum	24	3.8
Missing	12	1.9

The age of respondents ages ranged from 14years and 45years. Majority of respondents were between 20 years and above (84%, n=541). Majority of clients were multiparas (64.7%, n=417). Majority of respondents were residents of Mbarara district (56.8%, n=366).Three hundred and two referrals (46.9%) delivered by caesarean section while 292 (45.3%) had vaginal delivery

Labour outcomes of referrals at MRRH.
Table 2. Maternal and fetal outcomes

Fetal outcome	N (%)	Maternal outcome	N (%)
Normal	505(78.4)	Normal	558(86.6)
Asphyxia	58(9.0)	Ruptured uterus	16 (2.5)
Early neonatal death	21(3.2)	Obstructed labour	19(3.2)
Fresh still birth	34 (5.3)	Sepsis	13(2.0)
Macerated still birth	18(2.8)	Post-partum haemorrhage	21(3.4)
Neonatal sepsis	1(0.2)	Depression	12 (1.9)
Missing	7(1.1)	Eclampsia	2(0.2)
		Missing	3(0.5)
Overall fetal outcome		Overall Maternal outcome	
Good	505 (78.4)	Good	558 (86.6)
Poor	132 (20.5)	Poor	82 (12.9)
Missing	7 (1.1)	Missing	3 (0.5)

Maternal outcomes
Majority of the mothers had no complications (86.6% n=558) while 12.9% had complications like ruptured uterus (2.5% n=16),obstructed labour (3.2% n=19),postpartum hemorrhage (3.4% n=21),sepsis (2% n=13) and retained placenta (0.5% n=3).

Fetal outcomes:
Overall 78.4% (n=505) of the referrals had good fetal outcomes while 20.5(n=132) had poor fetal outcomes. The poor fetal outcomes included; asphyxia 9% (n=58), fresh still births 5.3% (n=34), macerated still births 2.8 (n=18), early neonatal deaths (3.2% n=21) while only one baby (0.2%) had neonatal sepsis.

Table 3. Association between maternal outcomes and the level of healthcare system at which delivery was first attempted before referral to Mbarara hospital:

Table 3.Bivariate analysis- level of health unit vs maternal outcome

Variable	Maternal outcome		Odd's ratio(95% CI)	P-value
	Good	Poor		
Age				0.806
<20	88	12		
20+	478	60	0.92(0.48-1.78)	
Parity				
Prime	200	23	Reference	
Multiparous	366	48	1.14(0.67-1.93)	0.624
Distance from MRRH				
0-5km	160	11	Reference	
>5km	196	32	2.38(1.16-4.86)	0.015
Type of residence				
Rural	99	22	Reference	
Urban	267	23	0.39(0.21-0.73)	**0.002**
Level at first attempt				
HC	123	18	Reference	
Hospital	401	29	0.49(0.27-0.92)	**0.024**

First attempt of delivery from a Hospital before referral to MRRH was protective against poor maternal outcomes (p=0.024). A distance of more than 5km from the health facility was associated with poor maternal outcomes (p=0.015).

Association between fetal outcomes and the level of healthcare system at which delivery is first attempted before referral to Mbarara hospital:

Table 4. Bivariate analysis – level of health unit vs fetal outcome

Variable	Fetal outcome		Odd's ratio(95% CI)	P-Value
	Good	Poor		
Age group				
<20	73	27	Reference	
20+	436	99	0.614(0.375-1.005)	0.051
Parity				
Prime	175	50	Reference	
multiparous	333	76	0.799(0.535-1.193)	0.799
Residence Setting				
Rural	73	49	Reference	
Urban	239	36	0.287(0.177-0.463)	0.000
Distance from MRRH				
0-5km	146	24	Reference	
>5km	161	64	2.418(1.438-4.067)	0.001
Level at first attempt				
HC	105	37	Reference	
Hospital	369	56	0.431(0.270-0.688)	0.000

First attempt of delivery from a Hospital before referral to MRRH was protective against poor fetal outcomes (p<0.001). Urban residence was protective against poor fetal outcomes among referrals to MRRH (p<0.001).

DISCUSSION

Our study revealed that referrals who attempted delivery from a hospital before referral to Mbarara Regional Referral Hospital were more likely to have good fetal and maternal outcomes compared to those whose first point of attempt of delivery was a health centre. This could be due to delay in recognizing danger signs of pregnancy or delay in accessing emergency obstetric care from the primary healthcare facility This is explained by the three delay model i.e. care delay in decision making to seek care when a complication arises, delay in reaching a facility that can provide emergency obstetric care and delay in initiating care (Thaddeus *et al*. ,1994).A hospital-based study in Nigeria found that referrals to the hospital for appropriate management were made only after prolonged delay and onset of complication, and health centres often misdiagnosed cases

(Onwudiegwu et *al.*, 2001). Likewise, in Assin North, deficits were noted in recognizing danger signs, stabilizing patients, and handing over to receiving staff (Afari H et *al*., 2014).Also most Health centre IVs do not provide comprehensive emergency obstetric care. According to the Uganda Ministry annual health sector performance report for the year 2010/11 only 24% and 26% of HC IVs were able to offer blood transfusion and caesarean sections services respectively (MOH 2011).

Conclusions and recommendations:
Initial labour assessment and management in health centres is associated with poor delivery outcomes. Mothers should be encouraged to deliver from hospitals as delivery in lower centres is associated poor delivery outcomes. Strengthening the capacity of the local health system to provide effective basic and comprehensive health services remains critical to avert poor maternal and fetal outcomes in remote resource constrained settings in the developing countries. Health workers in lower health centres should be regularly updated on labour assessment and decision making as part of their continuous professional development.
Competing interests Authors did not have any conflict of interest.

Authors' contributions:
1: Mayanja Ronald.MD, Principal investigator, conceived the idea, developed the concept, involved in data collection, entry, analysis and manuscript writing.
2: Chakura Andrew, MD, involved in data collection, entry, analysis and manuscript writing.
3: Njagi Joseph. MD, manuscript writing.
4: Masembe Sezalio.MD,. MD, manuscript writing.
5: Ngonzi Joseph. MD, developed the concept, manuscript writing and submission.

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