Rain Intensity and Place of Delivery in Rufiji District of Tanzania

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Abstract

Background

The annual incidence of maternal deaths is estimated to be 289,000 of which over 99% occur in developing countries, particularly Africa and Asia (WHO, 2014). Most of these deaths are preventable and occurring during childbirth, implying that presence of skilled and equipped medical staff during childbirth could substantially reduce risk if deliveries occur at health facilities. However, facility–based delivery remains low in most of the developing countries. Less than half of all deliveries in Sub-Saharan Africa (47%), and 50% of all deliveries in Tanzania are facility–based. If progress in reducing maternal risk is to be achieved, the proportion of deliveries that are facility–based must be substantially increased.

Methods

Data compiled by the Rufiji Health and Demographic Surveillance System (HDSS) over the 2007 to 2010 record all births with complete information on where they occurred, as well as their corresponding maternal and household characteristics were selected to answer the current research question. With respect to rain intensity, the study area experiences heavy rains during the months of February to May, and less rains during October to December. A dry season is experienced during January, and then June to October (Mrema, 2012). Data analyses involved tabulation of frequency distributions, descriptive bivariate analysis of differentials, and, multivariate analysis with logistic regression.

Results

Over the 2007 to 2010 period, a total of 7,244 births occurred to 6,405 women in the Rufiji HDSS, of which 74.5% occurred in health facilities. While facility delivery was 72.7% during heavy rains, so was 75.7% during dry or less rains. Multivariate analysis showed that the odds of facility delivery was significantly 35% higher during dry or less rains compared to that of heavy rains (odds ratio (OR)=1.35, 95% confidence interval (CI) 1.08–1.68). The intra-class correlation (ICC) was 38.7% and 16.2% for mothers and the villages respectively. This observation was adjusted for household socioeconomic status, distance to the nearest health facility, maternal age,

marital status of the mother, maternal education, parity, maternal occupation, and calendar year (Table 1).

Conclusion

Institutional delivery in Rufiji district is seasonal, with a small but significant better access during dry or less rains. The Tanzanian health system needs improvements to adequately respond to all barriers that limit access to institutional delivery care during heavy rains.

Keywords

Place of delivery, prevalence, predictors, Rufiji, Tanzania

References

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Tables

Table 1. A multivariate multilevel mixed-effects logistic regression model of institutional delivery among women in Rufiji district of Tanzania (n = 7,244)

Covariate	Odds Ratio	95% Confidence Interval	
		Lower lim.	Upper lim.
FIXED PARTS OF THE MODEL			
Socioeconomic status			
Q1 (Poorest)	1.00	–	–
Q2	2.07***	1.48	2.90
Q3	2.10***	1.50	2.95
Q4	3.26***	2.24	4.74
Q5 (Least poor)	6.13***	3.86	9.74
Distance from home to nearest health facility (km)			
<1	1.00	–	–
1-5	0.51***	0.31	0.83
>5	0.10***	0.05	0.18
Maternal age at childbirth (Years)			
<20	1.00	–	–
20-34	0.51***	0.36	0.73
>34	0.67*	0.43	1.06
Marital status			
Currently married	1.00	–	–
Ever Married	0.97	0.67	1.42
Single	0.95	0.65	1.37
Education			
Never been to school	1.00	–	–
Primary	1.22	0.96	1.56
Secondary+	2.45***	1.25	4.77
Parity			
1	1.00	–	–
2	0.65**	0.47	0.90
3	0.59***	0.41	0.85
4+	0.45***	0.31	0.65
Birth seasonality			
Heavy rains	1.00	–	–
Less rains/dry	1.35***	1.08	1.68
Maternal occupation			
Self employed (e.g. farming, petty trade etc)	1.00	–	–
Formal employment	5.64**	1.16	27.42
No job	0.97	0.60	1.57
Calendar year			
2007	1.00	–	–
2008	1.23	0.91	1.65
2009	0.92	0.68	1.23
2010	1.60***	1.19	2.16
RANDOM-EFFECTS PARAMETERS			
Community: sd(_cons) = 1.37	–	1.02	1.83
Mother: sd(_cons) = 2.53	–	2.16	2.96
LR test vs logistic regression: $x^2(2) = 693.25$, P=<0.001			
Group variables			
1. Community: Number of groups = 33; Observations per group: Min = 26, Max = 752			
2. Mothers: Number of groups = 6,405; Observations per group: Min = 1, Max = 3			
***P<0.01, **P<0.05, *P<0.10; $ICC_{community}$ = 16.2%, ICC_{mother} = 38.7%			