THE ROLE OF BIRTH ORDER IN INFANT MORTALITY IN IFAKARA DSS AREA IN RURAL TANZANIA

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INTRODUCTION AND BACKGROUND

- In 2006, close to 9.7 million children died before their fifth birthday

- The MDG-4 calls for a reduction in child mortality by two-third between 1990 and 2015 (UNICEF 2008)

- Compared with some countries in Sub-Saharan Africa, infant mortality rate is relatively high in Tanzania (68 per 1000 live births) according to the Tanzania Demographic Health Survey (2004-5)

- Studies of factors affecting infant mortality have rarely considered the role of birth order

PROBLEM STATEMENT

- In developing countries, one child in 12 dies before its fifth birthday, compared with 1 in 152 in high-income countries (The World Bank Group: MDGs 2004)

- At current rates of progress, only a few countries are likely to achieve the MDG-4 of reducing child mortality to one-third of their 1990 levels (The World Bank Group: MDGs, 2004)

- A recent analysis of Tanzania DHS datasets has shown that Tanzania is likely to achieve MDG-4 (Masanja et al 2008)

- However, literature on the role of birth order in infant mortality in rural Tanzania which may assist to inform policy makers is generally inadequate. This study aims to contribute to fill this research gap

RESEARCH QUESTION

- Is birth order associated with infant mortality in rural Tanzania from 2005 to 2007?

- GENERAL OBJECTIVE:

  To determine the risk factors associated with infant mortality in Ifakara in rural Tanzania from January 2005 to December 2007

- SPECIFIC OBJECTIVES:

  i). To describe the distribution of infant mortality by birth order
  ii). To examine the association between birth order and infant mortality
  iii). To identify other risk factors associated with infant mortality
  Iv) To describe the causes of infant death from 2005 to 2007

INFORMATION ABOUT THE STUDY AREA
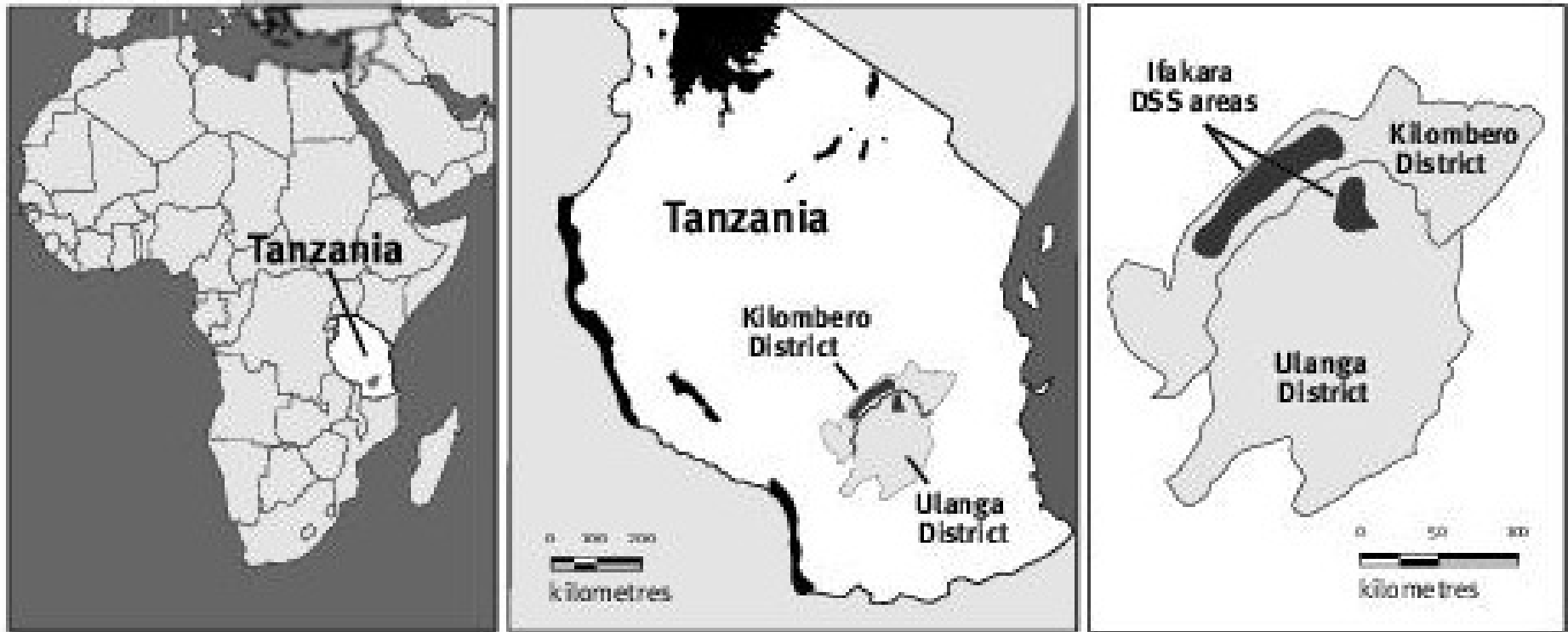
- The DSS includes 25 villages of Kilombero and Ulanga districts, in the Morogoro region of southwest Tanzania
- The area covers 80 km ×18 km in Kilombero District and 40 km ×25 km in Ulanga District, making a total of 2400 km2 (Schellenberg J.A, et al 2002)

METHODOLOGY

- The study was a prospective cohort involving secondary analysis of data from the Ifakara Health and Demographic Surveillance System (IHDSS)

- Data for 8,916 live births born from 1st January 2005 to 31st December 2007 were extracted for analysis

- Followed-up until they turned 1 year

- Cases, and causes of death (VA) were recorded

- Total person-years was calculated from individual person-years observed

- All children <1yr and born between 01/01/2005 and 31/12/2007 were included

STUDY VARIABLES

Outcome	Vital status	alive, dead
Explanatory	Birth order (main)	1, 2 - 5, 6+
	Maternal age	
	Sex	male, female
	Place of delivery	health facility, home
	ANC	yes, no
	Maternal education	beyond primary, primary, incomplete, none
	Maternal SES	least poor, less poor, poor, poorer, poorest
	Delivery Assistance	Skilled professional, TBA, neighbour, none, other
	Twins	yes, no
	Head occupation	employed, farmer, mason, driver, business, fisherman

DATA ANALYSIS

I. DESCRIPTIVE

- Summary of demographic data to describe the study population
- Chi-square ($\chi 2$) at 5% significant level was performed to compare birth order and other maternal characteristics

II. INFERENTIAL

- Poisson Regression was used to estimate RR of death to assess the relationship between infant mortality and each of the explanatory variables
  - Univariate (unadjusted)
  - Multivariate, to adjust for potential confounding factors

RESULTS
A. SUMMARY OF MATERNAL DEMOGRAPHIC AND STUDY POPULATION HARACTERISTICS

YEAR	LIVE BIRTHS	DEAD
2005	2977	218
2006	2967	171
2007	2972	173
TOTAL	**8916**	**562**

- There were a total of 8,916 live births born in the Ifakara Health and Demographic Surveillance Site between Jan 2005 and Dec 2007 with 562 cases of death

- The average maternal age at birth of index child was 26.5 years

Distribution of live births by explanatory factors

Variable	Category	Frequency	Percentage (%)	p-value
Birth Order				
	1	1,679	19	
	2-5	5,647	63	0.15
	6+	1,590	18	
Sex				
	Female	4,364	49	
	Male	4,552	51	0.07
Birth place				
	Health facility	5,342	60	
	Home	3,574	40	0.49
Maternal age (yrs)				
	<20	1,551	17	
	20 – 34	6,053	68	0.17
	35+	1,312	15	
Antenatal Care (ANC)				
	Yes	7,552	98	
	No	128	2	0.99

Distribution of live births by explanatory factors (Cont'd)

Variable	Category	Frequency	Percentage (%)	p-value
Twins				
	Yes	323	4	**<0.001**
	No	8,589	96	
Delivery assistance				
	Skilled professional	5,512	62	
	TBA	2,181	24	
	Neighbour	416	5	0.80
	No one	205	2	
	Other	602	7	
Household Head Occupation				
	Employed (salary)	192	2	
	Farmer	7,200	81	
	Fisherman	333	3	
	Business	937	11	**0.02**
	Driver	21	<1	
	Mason	130	1	

Distribution of live births by explanatory factors (Cont'd)

Variable	Category	Frequency	Percentage (%)	p-value
Wealth index				
	Least poor	1,497	20	
	Less poor	1,728	21	
	Poor	2,034	23	0.27
	Poorer	1,852	19	
	Poorest	1,805	17	
Maternal education				
	Beyond primary	168	2	
	Complete primary	5,106	57	
	Incomplete primary	2,213	25	0.13
	No formal education	1,429	16	

B. MORTALITY ANALYSES

Infant Mortality Rates by Year in IHDSS, Tanzania (2005 – 2007)

(IMR: 68 per 1000 live births - TDHS 2004/5)

YEAR	No.	P-Yrs	Infant	
			Deaths	Rate
2005	2977	2661.66	218	**81.9**
2006	2967	2685.80	171	**63.7**
2007	2972	2666.99	173	**64.9**
TOTAL	**8916**	**8014.45**	**562**	**70.1**

Infant Mortality Rates by Birth Order in IHDSS, Tanzania (2005 – 2007)

			Infant	
Birth Other	No.	P-Yrs	Deaths	Rate
1	1679	1446.26	122	**84.4**
2 - 5	5647	5109.66	337	**66.0**
6+	1590	1458.54	103	**70.6**
TOTAL	**8916**	**8014.45**	**562**	**70.1**

C. SURVIVAL ANALYSES
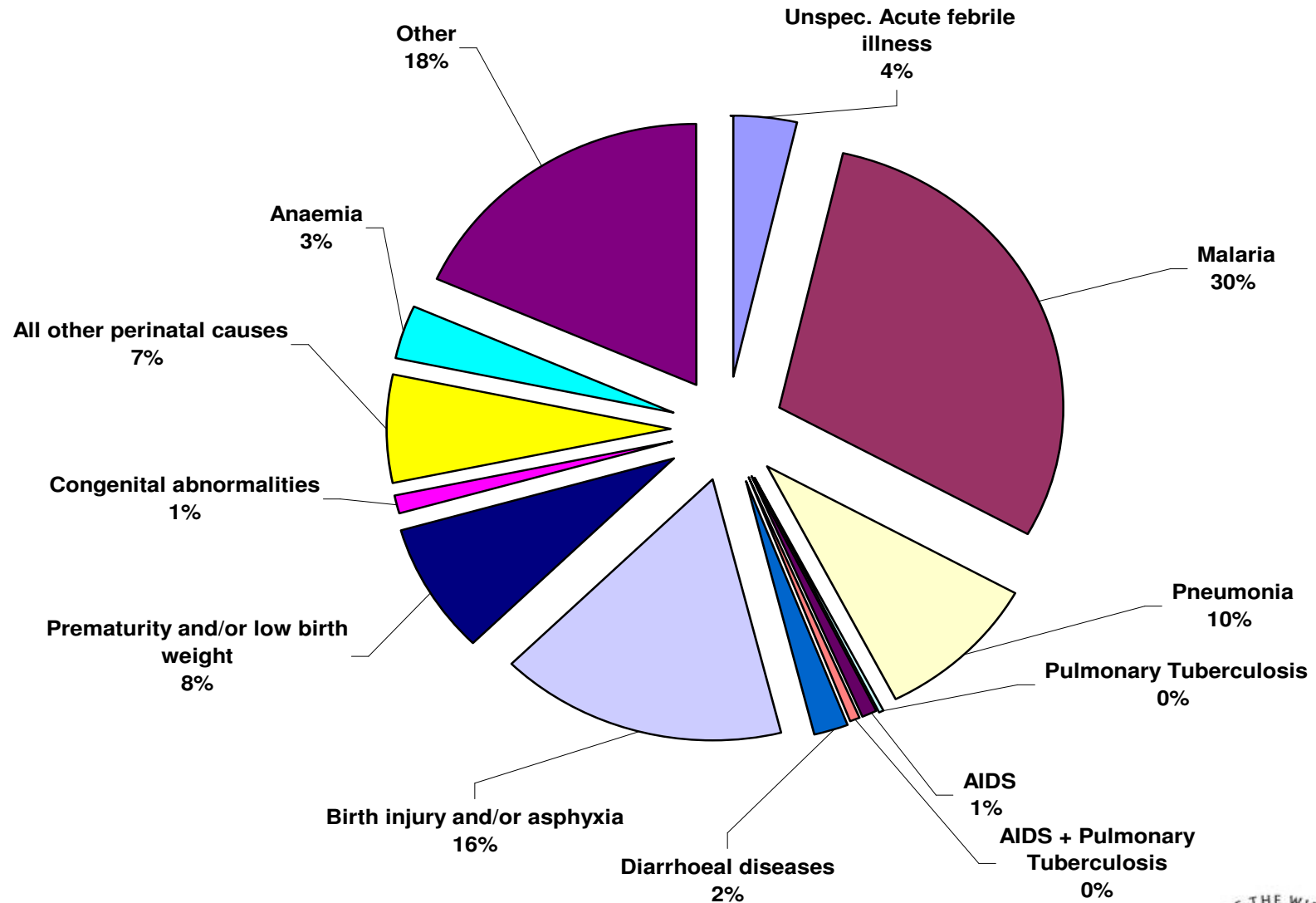

Kaplan-Meier survival estimates
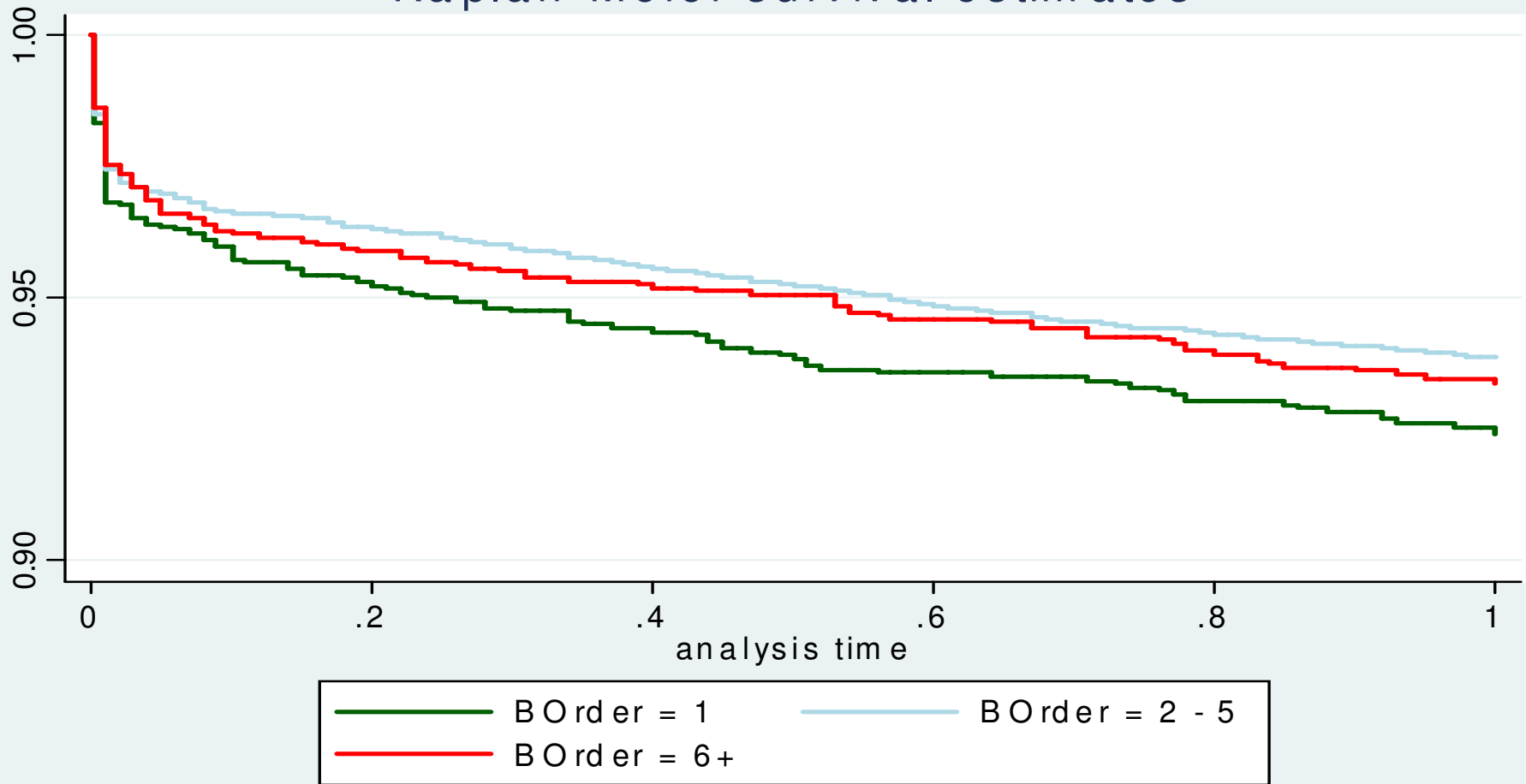
D. RISK ANALYSES

Univariate and Multivariate Poisson Regression Analysis for Infant Mortality

Variable	Univariate (Unadjusted)			Multivariate (Adjusted)		
	IRR	95% CI	P-value	IRR	95% CI	P-value
Twins						
Yes	1	-	-	1	-	-
No	0.29	(0.2172 0.3741)	**<0.001**	0.28	(0.2118 0.3678)	**<0.001**
Household Head Occupation						
Employed	1	-	-	1	-	-
Farmer	0.80	(0.4782 1.3378)	0.40	0.77	(0.4617 1.2923)	0.33
Fisherman	1.02	(0.5430 1.9191)	0.95	1.02	(0.5446 1.9257)	0.94
Business	0.95	(0.3004 0.9805)	**0.04**	0.54	(0.2997 0.9789)	**0.04**
Driver		(No deaths)				
Mason	1.07	(0.4926 2.3353)	0.86	1.05	(0.4829 2.2912)	0.90

CAUSES OF INFANT DEATH

Unspec. Acute febrile illness
4%

Other
18%

Anaemia
3%

All other perinatal causes
7%

Congenital abnormalities
1%

Prematurity and/or low birth weight
8%

Birth injury and/or asphyxia
16%

Diarrhoeal diseases
2%

AIDS
1%

AIDS + Pulmonary Tuberculosis
0%

Pulmonary Tuberculosis
0%

Pneumonia
10%

Malaria
30%

CONCLUSION / DISCUSSION

- We found that first and higher birth orders had highest infant

- Maternal age of <20 years had the highest infant mortality

- From 2005 – 2007, Malaria remained the leading cause of infant death

- Giving birth at the hospital was perceived by women to be associated with severe delivery complications
                                                    (Hassan Mshinda et al,2009).

CONCLUSION / DISCUSSION (CONT'D)

- The major barriers reported for home delivery as opposed to facility-based birth include

    * lack of money

    * distance to the health facility

    * fear of caesarean section at the health facility,

    * lack of privacy or a dedicated labor room at the health facility.

                        (Hassan Mshinda et al,2009).

Limitations

- Substantial misreported of age at death may include or exclude some deaths within the one-year period
- Recall bias may affect determination of cause of death using VA
- IHDSS has no data on HIV/AIDS status of mothers and religion (2005 – 2007 dataset)
- Data on birth weight is not available

Strengths

- Provision of high quality longitudinal data on population dynamics
- Data collection is every 4 mths per year
- Key informants involved live in communities

RECOMMENDATIONS

- The health systems should be strengthened, and efforts made to communicate the benefits of health facility deliveries more effectively

- VHWs and TBAs are good resource persons for obtaining accurate numerical data at the grass-roots level, as such they need to be trained adequately to recognise factors that put infants at risk

- Re-assessment of preventive strategies already implemented for reducing infant mortality may be required in order to further reduce the infant mortality rate in IHDSS

- Special care should be provided for women aged under 20 years or over 35 years of age

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THANK YOU!!

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