Do short birth intervals increase the risk of perinatal deaths in sub-Saharan Africa?

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Abstract

Despite recent estimates of approximately 2.64 million stillbirths annually, three fourths of which are in South Asia and Sub-Saharan Africa, stillbirths have been neglected by the global public health community. Neonatal mortality, especially early newborn deaths also continue to constitute a significant public health burden. Building on studies on the relationship between the duration of preceding birth interval and stillbirths in Bangladesh, this paper examines the pattern in Sub-Saharan Africa. Analyzing DHS data using event history methods, this paper examines the risk of stillbirths and early neonatal deaths in the first seven days following a live birth among women who gave birth in the five years preceding the survey in Ethiopia, Kenya, Malawi, Rwanda, and Tanzania, based on the length of the preceding birth interval. Programs can then be effectively designed to provide services to women most at risk for experiencing stillbirths and early fetal death.

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Do short birth intervals increase the risk of perinatal deaths in sub-Saharan Africa?

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Background

Recent estimates indicate that approximately 2.64 million stillbirths occur each year, three fourths of which are in South Asia and Sub-Saharan Africa (Cousens et al. 2011). However, stillbirths have been neglected by the global public health community, a key reason being the lack of data and under-reporting which are the key challenges in estimating these deaths (Stanton et al. 2006). Recent publications on the problem of stillbirths however advocate for increased attention and further study (Yakoob et al. 2009 for example). The Lancet published a series of papers on stillbirths in April 2011. Neonatal mortality, especially early newborn deaths also continue to constitute a significant public health burden.

To date, only a few studies have explored the factors that are responsible for these deaths. One causal factor that has been identified is preceding birth intervals. Preceding birth intervals have a significant effect on child mortality as well as on stillbirths and miscarriages (DeVanzo et. Al. 2008, DeVanzo et al. 2007). Analysis of Matlab data in Bangladesh show that there was a higher rate of stillbirths among women with a preceding birth interval of less than 24 months. However, no study has examined the relationship between the duration of preceding birth interval and stillbirths in sub-Saharan Africa while controlling for maternal and socio-economic characteristics. In sub-Saharan Africa, fertility rates continue to remain high and the majority of births are spaced less than the recommended 36 months. As policy makers begin to explore which health system package provides the best opportunity to reduce the risk of stillbirths and early neonatal death, evidence on which populations are most affected will be important for decision-making.

Research Question

Perinatal deaths include pregnancy losses of at least seven months' gestation (stillbirths) and deaths to live births within the first seven days of life (early neonatal deaths). This paper examines the risk of stillbirths and fetal deaths in the first seven days following a live birth among women who gave birth in the five years preceding the survey. This risk is examined by length of preceding birth interval in five sub-Saharan African countries (Ethiopia, Kenya, Malawi, Tanzania, and Rwanda). We expect that an increase in the preceding birth interval will have implications for stillbirths and early neonatal deaths in these countries.

Data & Methodology

This analysis uses the most recent wave of Demographic and Health Surveys (DHS) data for Ethiopia (2005), Kenya (2008), Malawi (2004), Tanzania (2010) and Rwanda (2005)[1]. The DHS are

[1] The analysis will be updated with more recent data as they become available.

a key source of comparative quantitative data on reproductive health and contraceptive use across developing countries. They are nationally representative household surveys with large sample sizes that provide detailed information on the contraceptive and maternal histories of women. In all countries, the data cover information on women of reproductive age 15-49 selected through a two-stage random sampling process representative of each country. Sample sizes for these five countries range from approximately 8,000 to 14,000 women.

Defining a stillbirth or perinatal death

The DHS ask women to report on any pregnancy loss that occurred in the five years preceding the survey. For each pregnancy that did not end in a live birth, the duration of pregnancy was recorded. Perinatal deaths include pregnancy losses of at least seven months' gestation (stillbirths) and deaths to live births within the first seven days of life (early neonatal deaths). The perinatal mortality rate is the sum of stillbirths and early neonatal deaths divided by the sum of all stillbirths and live births. Information on stillbirths and deaths to infants within the first week of life are highly susceptible to omission and misreporting. Nevertheless, retrospective surveys in developing countries provide more representative and accurate perinatal death rates than the vital registration systems and hospital-based studies in developing countries.

Sample

The analysis focuses on the five years preceding the survey and is restricted to women who had a birth in the five years prior to the survey. As a result, a woman could have more than one birth or termination during this five year period. Although all births in the five year period are considered, twin and multiple births are excluded. Births that took place less than six months from the survey are also excluded. The sample for this analysis is all women who meet the above mentioned criteria over the period covered by their reproductive calendar.

Analysis method

The analysis uses event history techniques using Stata 11 to determine a hazard model estimating the probability of a stillbirth or early neonatal death occurring among women with a preceding birth. The model will also examine the determinants of women who have experienced a stillbirth or early neonatal death. The unit of analysis is the five years preceding the survey, where the event is measured by the occurrence of a termination at month 7 or later in pregnancy or within seven days of a live birth. Using the reproductive calendar, a spell is calculated as the number of months between the preceding birth and the current birth/termination. In instances where a woman has had multiple late stage terminations in a row, all terminations will be considered in the analysis. In each case, if the event does not occur within the five year period, the observation is censored.

The analyses use data at each timepoint (month) for a range of time varying covariates such as the woman's age, her marital status, residence, parity, breastfeeding, access to any health workers during the pregnancy, and information on any past child deaths. Other variables included in the analysis are socio-economic characteristics such as religion, education, partner's education, and economic status as measured by the wealth quintile.

Preliminary Findings

Preliminary analysis of perinatal data shows that the perinatal mortality rate ranged from 34 per 1,000 stillbirths and live births in Malawi to 44 per 1,000 stillbirths and live births according to the 2005 Rwanda DHS (see Table 1). Perinatal mortality is significantly higher among young women whose age at birth was under 20 years or older women aged 40-49 years. First pregnancies and pregnancies that occur after an interval of less than 15 months are much more likely than pregnancies that occur after longer intervals to end in a stillbirth or early neonatal death. There is no clear trend by residence to indicate a higher perinatal loss. Educated mothers are less likely to experience pregnancy losses than uneducated mothers. The analysis will examine these relationships in greater detail for every pregnancy using event history methods.

Table 1: Perinatal mortality[2] rate for the five-year period preceding the survey, by background characteristics

Background Characteristic	Ethiopia 2005	Rwanda 2005	Kenya 2008	Tanzania 2010	Malawi 2004
Mother's age at birth					
<20	64	52	31	41	48
20-29	33	42	32	32	28
30-39	26	39	43	38	35
40-49	63	64	*	54	(43)
Previous pregnancy interval in months					
First pregnancy	62	59	37	56	46
<15	62	79	(83)	60	(47)
15-26	40	36	36	28	45
27-38	26	34	18	21	24
39+	25	40	42	39	25
Residence					
Urban	45	30	37	49	15
Rural	37	46	37	33	37
Mother's Education					
No education	38	48	49	36	32
Primary	34	43	39	32-36	39
Secondary+	29	32	25	47	26-34
Total	37	44	41	36	34

*Figures in parentheses are based on 250-499 unweighted pregnancies; fewer than 250 unweighted pregnancies, therefore data were suppressed.

Policy Implications

Identifying factors affecting the risk of perinatal deaths is important to defining successful programs to reduce the number of global stillbirths and early neonatal deaths. This analysis will demonstrate factors that have a significant impact on the risks. Programs can then be effectively designed to provide services to women most at risk for experiencing these events. Moreover,

there may also be a need for programs to focus to a greater extent in rural and other underserved areas as well as to target women from little education.

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