Effect of unmet need for contraception on child survival: evidence from Nigeria

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Abstract

Globally, about 10 million under-five children die every year. Meanwhile, family planning is recognized as the pillar of safe motherhood and improved child health outcomes. Evidence showed that promotion of family planning has the potential of averting 32% of all maternal deaths and 10% of childhood deaths. Thus, the relevant question would seem to suggest whether unmet needs for contraception could lead to increased risk of under-five mortality. The objective of this paper is to examine whether unmet needs for contraception could result in increased risk of under-five mortality in Nigeria. The study draws on 2008 Nigeria Demographic and Health Survey. Cox regression analysis was performed on a nationally representative sample of 28,647 children to examine the effect of contraceptive use and unmet need on child survival; while adjusting for the effects of other important covariates. Findings indicate a significantly lower risk of death for children whose mothers were using contraceptives (hazard ratio: 0.54,$p<0.001$); and for children whose mothers had no unmet need for contraception (hazard ratio 0.89,$p<0.05$) compared with those in the reference category. The findings of this study suggest the importance of contraceptive use in the pursuit of the Millennium Development Goal four in Nigeria.

Extended Abstract

Significance/background

Globally, about 10 million children under the age of five die every year (Rutherford et al, 2010). With 41% of these deaths occurring in the sub-Saharan Africa, the region is the largest contributor to statistics on childhood mortality (Black et al, 2003). Specifically, about 1 in 6 children die before age five in Nigeria (NPC & ICF macro, 2009). This statistics shows that the country is not on course to attain Millennium Development Goal 4 (reducing childhood mortality). Also, despite the progress made in increasing access to modern contraceptive methods in the recent time, women have continued to report an unmet need for family planning in the developing countries (Townsend et al, 2011). To date, Nigeria has 20% unmet need for contraceptives and 10% contraceptive prevalence rate (CPR) NPC & ICF macro, 2009). Meanwhile, family planning has been recognized as the pillar of safe motherhood and improved child health outcomes. For instance, Cleland et al (2006) established that increasing contraceptive use in countries with high fertility rates has the potential of averting about 32% of all maternal deaths and 10% of childhood deaths. Thus, the relevant question would seem to suggest whether unmet needs for family planning could lead to increased risk of under-five mortality. The objective of this paper is to examine whether unmet needs for family planning could result in increased risk of under-five mortality in Nigeria.

Hypothesis
Unmet need for family planning is significantly associated with increased risk of under-five mortality in Nigeria.

Data and method
This study draws on 2008 Nigeria Demographic and Health Survey (NDHS). The survey was conducted in 2008 to elicit information on demographic and health indicators at the national, regional and states levels. Sample for the survey was selected using stratified two-stage cluster design consisting of 888 clusters (NPC and ICF, 2009). Data were gathered from 33,385 women age 15-49 women and 15,486 men age 15-59.
Analysis was restricted to women who had at least one live birth within the five years preceding the survey. We utilized the birth recode dataset of the 2008 NDHS. The outcome variable is defined in this study as risk of dying before the fifth birthday. The main explanatory variables were contraceptive use and unmet needs for family planning. Using chi-square test, we examined the relationship between unmet needs for family planning and risk of under-five mortality. At multivariate level of analysis, we employed Cox proportional hazard model to examine the effect of contraceptive use and unmet need for family planning on child survival; while adjusting for the effects of important covariates like: maternal education, maternal age, ethnicity, religion, and region of residence.
Using Cox-proportional hazards regression analysis, both the occurrence of childhood mortality and the time when the child died were combined to generate the outcome variable. The probability of childhood death is regarded as the hazard. The hazard was modelled using the following equations:

$$H(t) = H_0(t) \times \exp.(b_1X_1 + b_2X_2 + b_3X_3 + \ldots + b_KX_k \quad (1)$$

Where $X_1 \ldots X_k$ are a collection of explanatory variables and $H_0(t)$ is the baseline hazard at time t, representing the hazard for a person with the value 0 for all the explanatory variables. However, by dividing both sides of equation 1 by $H_0(t)$ and taking logarithms, the equation 1 becomes:

$$\ln\left(\frac{H(t)}{H(0)}\right) = b_1X_1 + b_2X_2 + b_3X_3 + \ldots + b_KX_k \quad (2)$$

Results/key findings

Bivariate results established that contraceptive use was low and unmet needs were high in Nigeria. Multivariate results from the proportional hazards regression analysis are presented in Table 1 below. Five models were fitted in all. Univariate hazard ratios are presented in the first model. Model 2 was fitted to examine the effect of contraceptive use on the risk of under-five mortality after adjusting for the effect of selected important covariates. Model 3 examines the relationship between unmet need for contraceptive use after adjustments had been made for the effect of other characteristics. While Model 4 is the full model that incorporates all the selected explanatory variables, stepwise regression was employed in Model five to determine the key variables that influence unmet need and child survival in Nigeria.
As shown in Model 1, the results revealed that hazards of dying before age five were 46% significantly lower for children whose mothers were using contraceptives compared to children whose mothers were using no method (HR=0.54, $p<0.001$). Results of univariate hazard ratios presented in Model 1 indicated insignificant relationship between unmet need and under-five mortality. While adjusted hazard ratio in Model 2 still indicated a

significantly lower risk of death for children whose mothers were using contraceptives relative to their counterparts whose mothers were using no method (HR: 0.67, $p<0.001$); adjusted hazard ratio presented in Model 4 indicated a significant relationship between unmet need and under-five mortality. For instance, results in Model 4 revealed that risks of dying before age 5 were 11% significantly lower for children whose mothers had no unmet need compared to those whose mothers had unmet need for contraceptives (HR: 0.89, $p<0.05$). These results were found to be consistent even after adjusting for the effects of important covariates known to influence contraceptive use and childhood mortality (in Model 5).

Knowledge contribution

The findings of this study suggest the importance of contraceptive use in the pursuit of realization of the Millennium Development Goal four in Nigeria (MDG 4). The study concludes that without a concerted effort to address the present level of unmet need for family planning in Nigeria, realization of MDG 4 may be a mirage in the country. This study suggests that Nigeria can still be placed back on track towards the attainment of MDG 4 if the present levels of unmet needs for contraceptives are adequately addressed in the country.

References

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Appendix 1

Keys to the Table 1 below

UAH – unadjusted hazard ratio, **AHA** – adjusted hazard ratio, **a –** model specification for unmet needs, b – model specification for contraceptive use, **c –** full model, **d -** model with stepwise regression, *p<0.05, **p<0.01, ***p<0.001

Table 1: Hazard ratios showing the effects of unmet need for contraceptive use and other selected characteristics on under-five mortality, Nigeria 2008

Variables/ Categories	Model 1 (UHA)	Model 2[a] (AHR)	Model 3[b] (AHR)	Model 4[c] (AHR)	Model 5[d] (AHR)
Unmet need status					
Have unmet need	1	--	1	1	1
Have no unmet need	0.96	--	0.95	0.89**	0.89**
Contraceptive Use					
Not using	1	1	--	1	1
Currently using	0.54***	0.68***	--	0.64***	0.64***
Educational level					
No formal education	1	1	1	1	1
Primary	0.85***	0.94	0.94	0.97	0.99
Secondary/ Higher	0.61***	0.81**	0.78***	0.80**	0.81**
Mother's occupation					
Not working	1	1	1	1	Ns
Prof/tech/managerial	0.62***	1.03	1.02	1.06	Ns
Sales/clerical/service	1.00	1.11*	1.11*	1.12*	Ns
Manual labour	1.02	1.07	1.08	1.06	Ns
Wealth index					
Poorest	1	1	1	1	1
Poorer	0.98	1.00	1.03	1.02	1.03
Middle	0.85**	0.98	0.99	1.00	1.00
Richer	0.69***	0.90	0.89*	0.91	0.92
Richest	0.48***	0.77**	0.74**	0.80*	0.80*
Religious affiliation					
Catholic	1	1	1	1	Ns
Other Christians	0.90	0.97	0.97	0.97	Ns
Islam	1.15*	0.96	0.98	0.97	Ns
Traditional	1.19	0.85	0.90	0.89	Ns
Mother's current age					
15-24	1	1	1	1	1
25-34	0.84***	1.00	0.99	0.99	1.01
35+	1.05	1.24**	1.22**	1.24**	1.26**
Mother's marital status					
Never married	1	1	1	1	1
Currently married	1.35	1.26	0.87	0.76	0.77
Previously married	2.15***	1.99***	2.00***	2.02*	2.06*
Mother's age at birth of the child					
<18	1	1	1	1	1
18-34	0.64***	0.69***	0.67***	0.67***	0.68***
35+	0.77***	0.65***	0.63***	0.64***	0.64***
Place of residence					
Urban	1	1	1	1	1
Rural	1.49***	1.15**	1.15*	1.14*	1.14*
Region of residence					
South-west	1	1	1	1	1
North-central	1.53***	1.23*	1.22*	1.18	1.16
North-east	1.93***	1.41***	1.46***	1.39***	1.36***
North-west	2.03***	1.47***	1.51***	1.43***	1.40***
South-east	1.74***	1.61***	1.61***	1.58***	1.56***
South-south	1.52***	1.44***	1.43***	1.43***	1.42***