# Effective Integration of Child Survival Interventions with Family Planning Programs Can Accelerate Fertility Reduction in sub-Saharan Africa

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## Abstract

In many sub-Saharan African countries, demand for children or desired family size is high, demand for and use of contraception is low, and thus fertility high. The persistent high child mortality is a cause of high demand for children, low demand for contraceptives, and thus high fertility. We use DHS data from 23 countries to examine the associations between child mortality, wanted and achieved fertility, demand for and use of contraceptives, and childhood vaccination. We find that child mortality is extremely high; and because of high child mortality women could not even achieve their desired fertility in 10 (43%) of the 23 countries. Child mortality is positively and significantly associated with wanted and actual fertility and negatively associated with demand for and use of contraception. Child mortality is negatively associated with child immunization. Child survival interventions should be priority of the family planning programs for an effective reduction of fertility.

## Introduction

Family planning programs in sub-Saharan African countries have not been able to create enough demand for contraception. By and large, demand for contraception is strongly associated with economic development but demand can be created through programming. It is generally observed that demand for contraception is low in traditional societies, especially among the poor, less educated, conservative religious groups, and other disadvantageous sections. But one root cause of low demand for contraception is closely linked with very basic economics of fertility. In traditional peasant societies, parents have demand for large number of children (usually skills are not required for their work in the farms and parents do not have to invest in children) with an expectation that they will work in the farm. The value of children is high and the cost of children is low. One demographic factor makes this relationship more complicated. In those societies, both childhood and adult mortality remains high. In the environment of high mortality, women are encouraged to begin childbearing at an early age and have repeated children so that there are enough children to grow adult before the death of the father which may be at relatively early age. Early marriage is favorable to this family-building strategy. And, because of high childhood mortality parents end up with smaller number of surviving children than they bear, and as an insurance strategy they are likely to aim for even a larger number as some of them may die. Ironically, early and repeated childbearing is a strong risk factor of child mortality and therefore the fertility-mortality link is a vicious cycle which keeps demand for contraception at a low level. In Northern regions of Nigerian a woman on an average want to have about 7 children and bear 7 children. In the same regions, more than one in four children dies before their fifth birthday, and thus parents have only less than five surviving children. This is a reason for low demand for

contraception. Qualitative research in these regions finds a number of myths and misconceptions surrounding the use of contraceptive methods which people attempt to link with religion, culture, and related factors.

One way of creating sustainable demand for contraception in societies with high mortality and high fertility will be to integrate child survival interventions with family planning and reproductive health programs. Research shows that addition of child health services to the family planning project significantly increases contraceptive use. There are affordable, relatively easy-to-implement, and highly effective child survival interventions available that can be integral part of family planning programs.

The central theme of this paper is to show that mortality level is very high in sub-Saharan Africa, and this high level of mortality remains a strong barrier to family planning use by parents. By examining national-level data from 23 countries, it is found that child mortality is strongly associated with fertility regulation behavior. It is recommended that child survival interventions should be integrated with family planning programs for an effective reduction of fertility in sub-Saharan Africa.

**Data**

The Demographic and Health Survey (DHS) is an excellent source of health and family planning data in developing countries, and so is in sub-Saharan African countries. Such data were available for 23 countries (see the list of the countries in Figure 1) for last 10 years or so. For this paper we consider the following indicators: Total fertility rate (TFR), total wanted fertility rate (TWFR), under-five mortality or child mortality (probability of dying before the age of 5 years per 1,000 live births), and full immunization of children (% of 12-23 month children who received at least BCG, measles, and three doses each of DPT and polio vaccine [excluding polio vaccine given at birth]). We also consider demand for contraceptives (% of women wanted to wait to have a child at least for two years or did not want to have any more children) and contraceptive use rate (% of women aged 15-49 using a contraceptive method). These indicators are obtained from the DHS reports. We constructed two more indicators—achieved fertility rate and "excess/deficit" fertility rate. The achieved fertility equals to the average number of births a woman bear in her lifetime minus the number of children died. The number of children that died was obtained by an oversimplified procedure of estimation. The TFR was multiplied by the probability of survival of a child beyond the age of 5 years. The survival rate was again computed based on under-five mortality just mentioned above. The "excess/deficit" fertility rate is the difference between the achieved fertility and wanted fertility. The value of this indicator is positive when women have achieved more children than they wanted to have, which we call an "excess" fertility. It will be negative if women could not achieve the number of children that they wanted to have, which, we call a "deficit" fertility.

In the current version of the paper we plot various indicators to show the association between them. We calculate the $R^2$ to determine the strength of association. An $R^2$ of zero indicates that there is no association between two variables under consideration and that of one indicates a perfect correlation. There is one important interpretation of the $R^2$ value. For example, we find

an $R^2$ of 0.726 for the association between under-five mortality and wanted fertility, which indicates that 72.6% of the variation of wanted fertility is explained by the variation of under-five mortality in these 23 countries under study.

In the final paper we will use multiple regression analysis to estimate the net effect of child mortality on the fertility regulation behavior of women after adjusting for the effects of socioeconomic and programmatic factors.

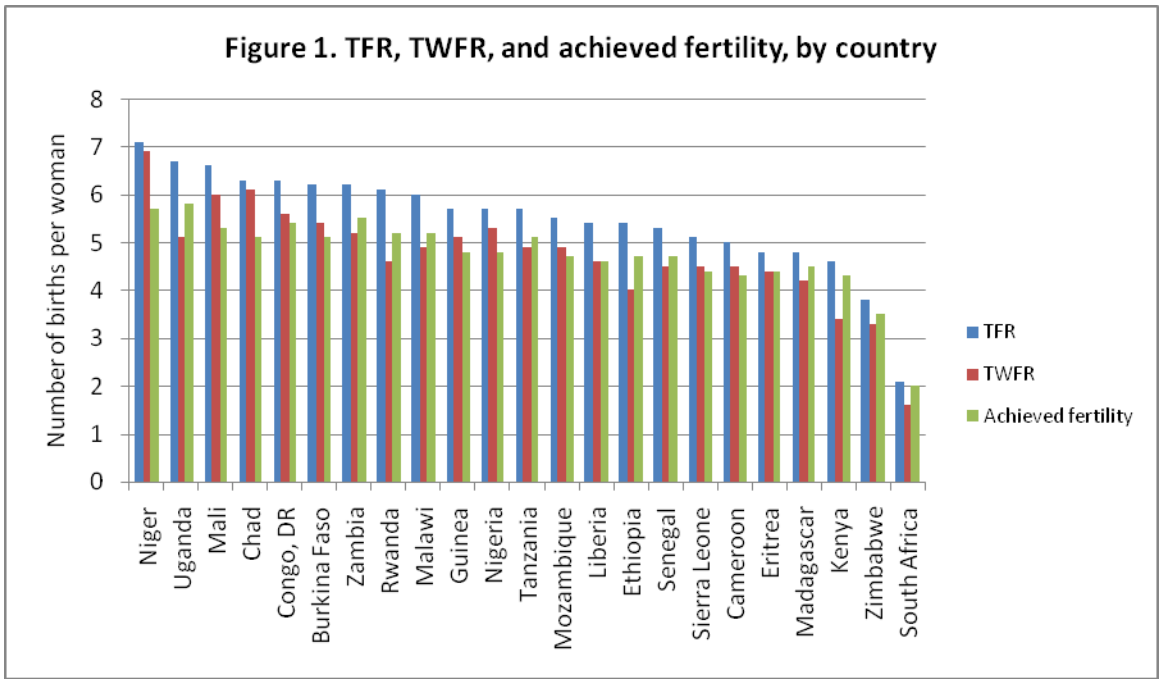
**Results**

The average lifetime fertility or TFR for the 23 countries was 5.5 births per woman, highest TFR being 7.1 in Niger and lowest 2.1 in South Africa (Table 1 and Figure 1). Similarly, the average wanted fertility or TWFR was 4.7, with a range from 1.6 in South Africa to 6.9 in Niger. These averages indicate that women in these 23 countries bear about one birth (0.8) which is excess of what they want to have. The average of achieved number of children was also 4.7 (Lowest in South Africa=2.0 and highest in Uganda=5.8). Overall, the TFR and achieved number of children (adjusted for child mortality) is the same but at the individual country level there is great variation of "excess/deficit" fertility.

Table 1. Average fertility and mortality rates

| Indicators | Average for 23 countries | Range |
|---|---|---|
| Total fertility rate (TFR) | 5.5 | 2.1 – 7.1 |
| Total wanted fertility (TWFR) | 4.7 | 1.6 – 6.9 |
| Achieved fertility (TFR after adjusted for mortality) | 4.7 | 2.0 – 5.8 |
| "Excess/deficit" of fertility (Achieved fertility – TWFR) | 0.0 | -1.2 – 0.9 |
| Under-five or child mortality per 1,000 live births | 133 | 58 – 191 |
| % of 12-23 month children fully immunized | 50 | 11 – 77 |
| % of women (15-49) with demand for contraceptives | 48 | 23 – 74 |
| % women (15-49) using a contraceptive method | 23 | 3 – 60 |

Figure 1 shows that women in 10 countries (Niger, Mali, Chad, Congo-- DR, Burkina Faso, Guinea, Nigeria, Mozambique, Sierra Leone, and Cameroon) had achieved fewer numbers of children than they wanted to have in their lifetime. These countries experience "deficit" in fertility. Women in Niger had 1.2, Chad had 1.0, Mali had 0.7, and Nigeria had 0.5 *fewer* than their wanted number of children. The wanted fertility and achieved fertility equaled for two countries-- Eritrea and Liberia. The other 11 countries have excess fertility, that is, women achieved more children than they wanted to have. They experience "excess" fertility. Women in Kenya had 0.9, Ethiopia and Uganda had 0.7, and Rwanda had 0.6 excess children.




On an average, under-five mortality (probability of dying before the age of 5 years per 1,000 live births) was 133 per 1,000 live births. Under-five mortality was very high in the 23 countries with a wide range of variation between 58 in South Africa and 191 in Chad, Mali, and Niger. Burkina Faso, Guinea, Mozambique, Nigeria, and Rwanda had their under-five mortality between over 152 and 184. Such high mortality rates indicate that about one in five births born are likely to die before their fifth birthday.

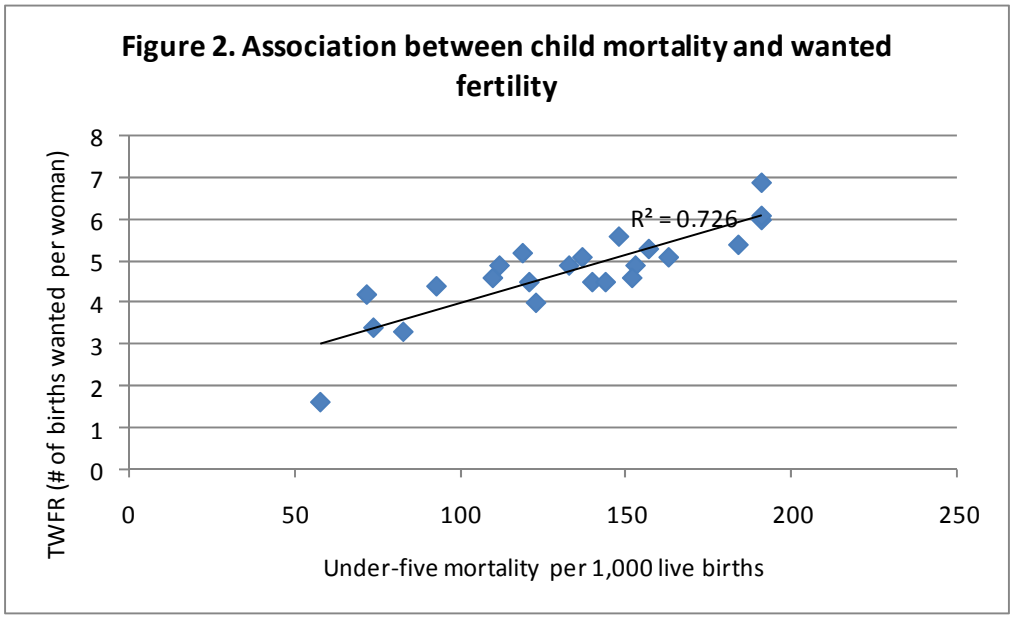
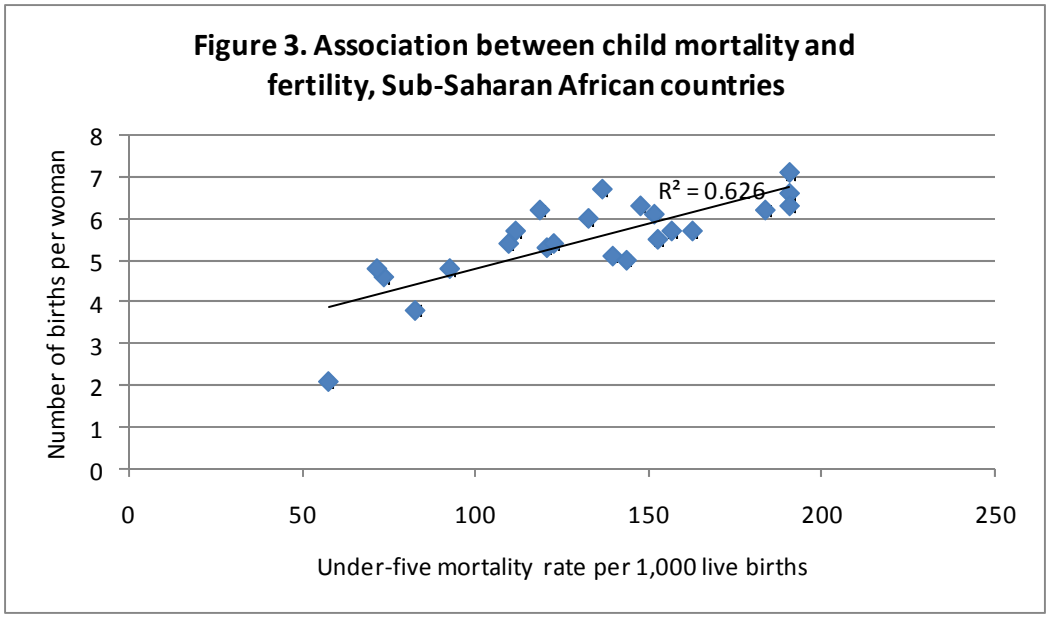
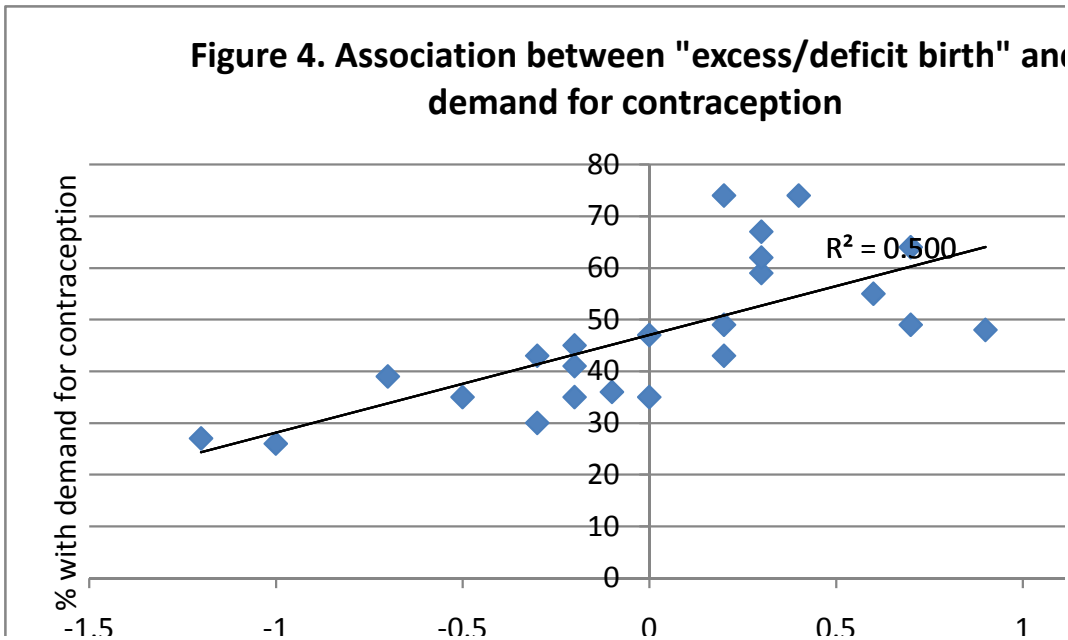


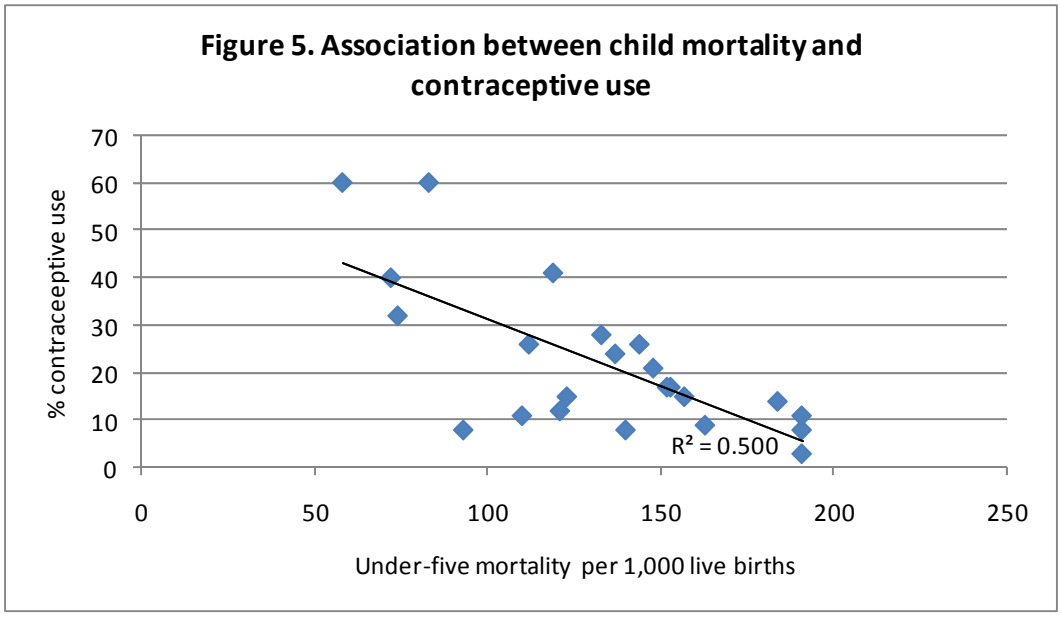
Figure 2 shows that under-five mortality is highly correlated and TWFR (wanted fertility), meaning that women in the environment of high mortality would like to have large number of children and in the environment with low mortality would like to have fewer children. Therefore, mortality reduction can be a way of reducing the demand for children and thus reducing fertility. The $R^2$ (0.726; $p<0.001$) value indicates that about three quarters of variation of wanted fertility is explained by the variation of child mortality in these countries. Figure 3 shows similar positive and strong correlation between under-five mortality and fertility rate (TFR). Here also, results ($R^2$ of 0.626; $p<0.001$) show that about two-thirds of the variation in TFR is explained by the variation of child mortality.



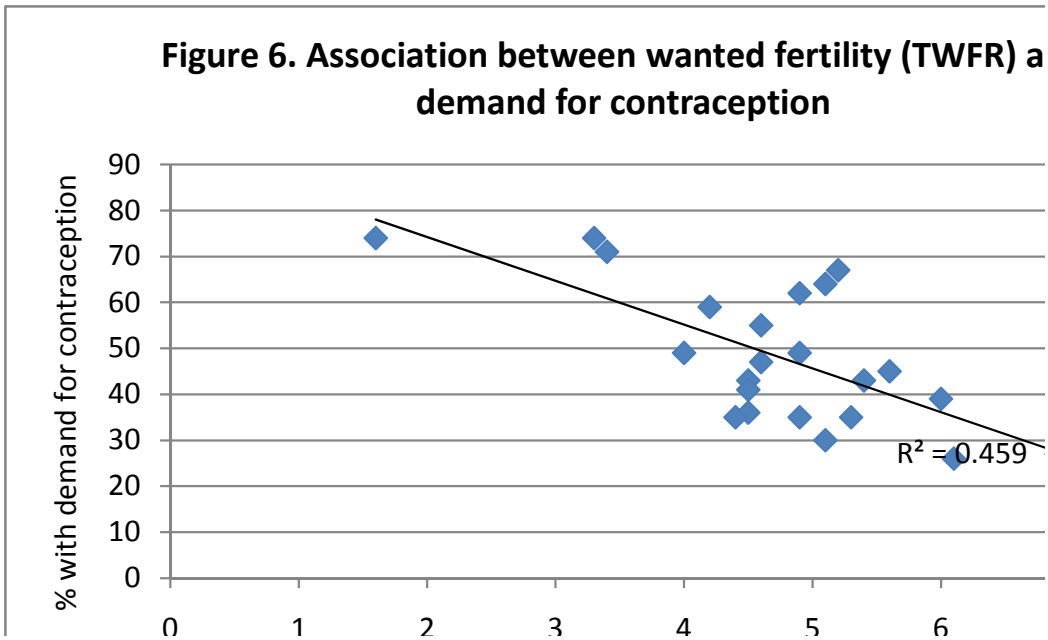

In Figure 4, demand for contraception is plotted against "excess/deficit" fertility rate. Achieved fertility is in deficit or negative when women have fewer children than they wanted to have and it is in excess or positive when women really have an excess number of births than they want have. The figure shows that demand for contraception is positively associated with excess fertility; and the $R^2$ value of 0.50 ($p<0.001$) indicates that one half of the variation in demand for contraception is explained by the variation of "excess" fertility. Women feel the need for using contraceptive methods when they find that they have larger number of children than the ones they wanted to have.

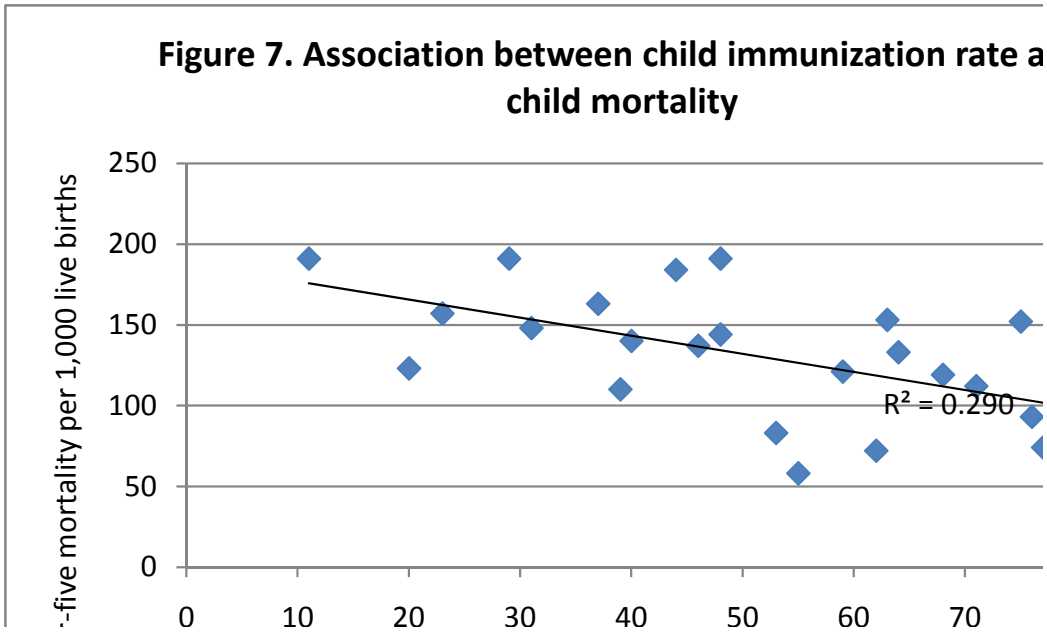
Demand for contraception is negatively associated with wanted fertility ($R^2=0.459$; $p<0.001$) (Figure 5). In order to increase the demand for contraception it is important to reduce the demand for children or the wanted fertility. And we find that the improvement in child mortality can reduce wanted fertility. Figure 6 shows that contraceptive use is negatively and strongly associated child mortality ($R^2=0.500$; $p<0.001$). It becomes clear that child mortality is a strong barrier to increasing contraceptive use in the countries under study.




Child survival interventions have been extremely successful in reducing infant and child mortality in resource-scarce developing countries even with less developed health infrastructure. Low cost, affordable, and effective community-based approaches have been developed to implement child survival packages. The package consists of three major health care products: child immunization, oral rehydration saline (ORS), and antibiotics for acute respiratory infections (ARI). A good coverage of child immunization can eliminate measles death, a common killer in sub-Saharan Africa; widespread use of ORS can minimize diarrheal deaths, another common killer of children; and availability of antibiotics through health delivery system can reduce ARI deaths.




We have data on child immunization for the countries under study. An average of full immunization rates was 50 percent for these countries. The lowest immunization rates were between 11 and 30 percent for countries like Chad, Congo—DR, Ethiopia, Nigeria, and Niger. The highest immunization rates were between 68 and 77 percent for Eritrea, Kenya, Rwanda, Tanzania, and Rwanda. We show in Figure 7 that child mortality declines with immunization coverage in sub-Saharan African countries. About 30% ($R^2$=0.29; $p<0.01$) of child mortality variation is associated with the variation in child immunization.

**Discussion**

One limitation of the current analysis is its ecological correlation, that is, we deal countries as unit of analysis. One may argue that such a study of associations between family planning and health indicators may not hold true at women's individual level. But there is clear evidence that child mortality can lead to high fertility through biological and behavioral mechanisms (Rahman 1998). First, through the biological mechanism -- early infant/child death leads to early truncation of breastfeeding and thus early conception. This is true in societies where contraceptive use is almost absent or low. And, the countries under study almost fit in this category. Second, through the replacement effect -- the mother will simply want to replace the child that has died and therefore would not use contraception in case of child death. Third, through the insurance effect -- in the environment of high infant and child mortality, parents would attempt to have some more children than they actually want to have in order to compensate for a potential loss of children due to death. Under such scenario, women will have higher wanted fertility and lower demand for contraception. All these mechanisms are important in the context of the countries we consider for this study.

There is enough theoretical justification that high child mortality in the sub-Saharan African countries remains a significant barrier to family planning movement and fertility reduction. It is pity that millions of women in these countries cannot even achieve their desired fertility because of high child mortality. The governments should strengthen their child health programs and integrate them with family planning programs. Effective integration of child health care with family planning programs can have synergistic effects. It is well known that fertility reduction through family planning can lead to reduction in infant and child mortality. It works through the healthy timing and spacing of pregnancies (HTSP). Through appropriate planning women can avoid childbearing at young ages and old ages and practice sufficient amount of space between pregnancies. Family planning thus helps reduce infant and child mortality. Therefore, widespread use of contraception leads to both reduced fertility and infant and child mortality.

In conservative societies of sub-Saharan Africa where child mortality is very high people commonly perceive family planning interventions as "population control" approach and tend to reject the family planning services. There are so much of myths, misconceptions, and rumors against the family planning movement in rural and remote communities that an external force comes to their community to reduce their strengths of population size or even wants to eliminate them. Our data show that women cannot achieve their desired fertility because of high level of mortality. Community rejection of family planning seems to be justified.

Under these circumstances, the healthy timing and spacing of pregnancy (HTSP) approach of family planning seems to be the best strategy offered to women because women will find it as a health intervention. This means that the family planning programs should exercise serious efforts to cut child mortality and that can be done through integration of child health services.

The family planning programs should carefully design their contraceptive method mix in sub-Saharan countries. Contraceptive method choice is associated with this HTSP approach as certain short-acting (SA) methods, such as condoms, pills, and injectables, are more appropriate for this purpose. SA methods will be more appealing to women as a method of spacing and

timing mainly because they will have a feeling that once a SA method is in use, its continuation or discontinuation is within their control. This is especially more applicable in high mortality situations because women want to replace a child if dies, which is common in these societies. And, it is easier to suspend the use of a short-acting method than a long-acting method. Women in high mortality environment have a short-term family-building strategy and thus short-acting methods are compatible with such strategy.

Short-acting (SA) methods can be made accessible to the sub-Saharan African communities easily because delivery or supplies of these methods do not need much investment in health infrastructure. In contrast, huge investment is required to build health infrastructure to provide long-acting (LA) methods, such as IUD, implants, and permanent methods, with a minimal level of quality. Many countries where demand for contraception is low are at nascent stage of overall development, and health infrastructure in particular. Moreover, it takes some years to build a minimally acceptable health infrastructure that can support long-acting methods delivery. SA methods in contrast can be delivered through community-based health workers, pharmacies or drug stores, and retailers and kiosks. Even, there are churches that facilitate distribution of pills in the communities of Africa. Public, NGO, and private sectors can act together to make SA methods delivery system functional and sustainable within a relatively short time span.