

**When is a good time to begin?
Dynamics of contraceptive use in the extended postpartum period in Africa**

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Abstract

This paper analyzes retrospective information on contraceptive use to examine patterns of initiation of methods among women in the extended postpartum period ranging from childbirth to 12 months. Using data from the most recent DHS in Ethiopia, Kenya, Malawi, Tanzania and Zimbabwe, sub-Saharan countries with high fertility, a demonstrated unmet need, yet varying rates of modern contraceptive use, we examine the influence of access to information on contraceptives at birth and in the postpartum period on women's uptake of contraceptive methods. Results show that provision of maternal and child health services including immunization present a unique opportunity to deliver the necessary information on contraceptive use and are associated with increased uptake. This research will help frame policies to target the delivery of family planning services more effectively possibly through integration with maternal and child health services to prevent unintended pregnancy, particularly with short birth intervals.

Introduction

In recent years, there has been increasing interest in the large number of women who had a recent birth, yet report an unmet need for contraception. This group of women was largely ignored in the past with the assumption that women who had recently had a birth would not be interested in family planning.

Moreover, the expectation was that they were “protected” because of their breastfeeding status or post partum abstinence. However, this is not necessarily true. Post partum women who are breastfeeding are not always infecund. Depending on the pattern and extent of breastfeeding, women are at risk of getting pregnant and it is not unusual for women to get pregnant. Moreover, it is agreed that by six weeks the woman’s body has largely returned to its pre-pregnancy state. However, beyond this period, providers of health and family planning services face a missed opportunity to provide essential services. As a result, more recently, family planning programs have now slowly begun to focus on this group, as one not sufficiently tapped for the provision of health services, and especially contraceptives and other family planning services (Stephenson and Macdonald).

Table 1 here

This paper analyzes data from five Sub-Saharan African countries of Ethiopia, Kenya, Malawi, Tanzania and Zimbabwe situated along the Eastern half of the continent, with fertility levels well above 4 children per woman in 4 of these countries and under five mortality levels above 100 children per 1000 live births.¹ Characteristics of fertility and reproductive health indicators for women of reproductive age in these five countries are presented in Table 1. The high TFR is matched by low levels of modern contraceptive use in all of these countries except Zimbabwe where MCPR ranges at 58 percent. The key reason for the high level of contraceptive use in Zimbabwe is the use of the pill. 43 percent of currently married women used the pill in Zimbabwe in 2006. Among the five countries, use of modern

¹ Zimbabwe is an exception with a TFR of 3.8 children per woman and under five mortality rate of 82.5 per 1000 live births in 2006.

contraception is particularly low in Ethiopia at 14 percent. Among those who use contraception, the pill and injectables are the most popular methods. While the pill is preferred in Zimbabwe, the percentage using injectables is highest in the other four countries.

This analysis focuses on the dynamics of contraceptive use among post partum women including the timing and nature of the use of contraceptives. These are examined in relation to women's access to other health services during and after child birth as well as their breastfeeding and abstinence practices. Such an analysis is useful to evaluate the role of family planning services in maternal and child health programs to observe whether their effect has trickled down to women who have recently had a birth by influencing their early uptake of contraceptives to space or limit births. Furthermore, it is useful to help frame policies to target the delivery of family planning services more effectively to this group of interest in order to prevent unintended pregnancy, particularly with short birth intervals.

Targeting this group of women is key for various reasons. In the long term, preventing short birth intervals has important consequences for reducing the lifetime risk of maternal mortality by preventing their exposure to pregnancy, and decreasing infant and child mortality (Rutstein 2008). Moreover, other research also shows that postpartum women in these countries are at greater risk for HIV and sexually transmitted diseases (McIntyre, 2005).

Conceptual Framework and Research Questions

A vast body of literature has examined issues related to contraceptive failure, discontinuation and method switching among women based on the contraceptive histories provided by data from the DHS (Ali and Cleland 1995; Ali and Cleland 1999; Curtis and Blanc 1997; Liete and Gupta 2007; Parr 2003 for example). Others for example have focused on the contraceptive method mix among women in developing countries (Bongaarts and Johansson 2002; Johnson and Macke 2006; Seiber, Bertrand and Sullivan 2007; Steele and Curtis 2003 for example).

There is also a growing interest in research on women's use of contraception in the extended post partum period, ranging from childbirth to twelve months. Several studies examine the number of women with an unmet need for contraception after a birth. Ross and Winfrey (2001) clearly demonstrate in their study of 27 countries, that there is much unsatisfied interest in, and unmet need for, contraception among this group of women. They show that two-thirds of women who had a birth in the last 12 months have an unmet need for contraception, and nearly 40 percent express their interest in using a contraceptive method but are not currently using one. Other research using DHS data also demonstrate that a significant number of postpartum women are exposed to the risk of pregnancy within two years of childbirth. Many of these women who are not amenorrheic or abstaining from intercourse are also current users of contraceptives. However, one-fifth of exposed women were not found to be using a contraceptive method (Thapa et al. 1992).

Other studies have focused on postpartum women using the month-to-month contraceptive calendar to examine the overlap between contraceptive use and breastfeeding patterns and abstinence (Becker and Ahmed 2001, Brown, 2006; Gebreselassie, Rutstein and Mishra, 2008; Hight-Laukaran et al. 1996; Sambisa and Curtis, 1997). An extension of this research links the patterns of post partum uptake of contraception to contraceptive discontinuation and switching across developing countries (Ali and Shah; 2004).

Building on this body of work, this paper analyzes retrospective information on 5 year contraceptive use and birth histories from the reproductive calendar collected through the most recent wave of DHS in Ethiopia, Kenya, Malawi, Tanzania and Zimbabwe in Sub-Saharan Africa. In particular, we build on research by Brown (2006), Gebreselassie, Rutstein and Mishra (2008) and Sambisa and Curtis (1997) that describe patterns of postpartum contraceptive use. The focus of this paper is on the point and timing of

access to information on family planning that women have during birth and the post partum period that could act as facilitators for their initiation of contraceptive use.

The guidelines prescribed by the World Health Organization (WHO, 1998) play a key role in determining policies on postpartum care in developing countries and the level of care women receive after a birth.

According to the WHO, the aims and timing of postpartum care are:

- to support of the mother and her family in the transition to a new family constellation, and response to their needs
- prevention, early diagnosis and treatment of complications of mother and infant, including the prevention of vertical transmission of diseases from mother to infant
- referral of mother and infant for specialist care when necessary
- counseling on baby care
- support of breastfeeding
- counseling on maternal nutrition, and supplementation if necessary
- counseling and service provision for contraception and the resumption of sexual activity
- immunization of the infant

The guide to postpartum care especially with regard to family planning is also related to the WHO recommendation that a woman wait at least two years after childbirth before trying to get pregnant again (WHO, 2007). Caregivers are encouraged to provide counseling to women and men on sexual issues related to the postpartum period, including fertility regulation and provision of contraceptives within the first week². Further advice on breastfeeding and family planning to both the mother and her husband or partner is advised during the six week checkup.

² Initial caregivers are birth attendants at delivery: the midwife or physician, a nurse or nursing aide, possibly others, such as TBAs when birth takes place at home. The check-up consultation of the woman 6 weeks after delivery is best done by the midwife or physician who attended the delivery.

For maximum protection, the WHO recommends that a woman not wait until the return of monthly bleeding to start a contraceptive method but instead she should start as soon as guidance suggests based on breastfeeding status and the method selected. While the Lactational Amenorrhea method (LAM) and male sterilization may be used immediately, most methods require that a woman wait a minimum of six weeks after childbirth before initiating a contraceptive method. More specifics on these guidelines and the recommended family planning methods for postpartum women are presented in Appendices 1 and 2. Based on this guidance, providers suggest that women return within six weeks of delivery for postpartum follow-up care and family planning counseling. Subsequent visits are encouraged for immunization and ensuring the wellbeing of the child.

Figure 1 about here

As Figure 1 illustrates, a woman is exposed to the health system at multiple timepoints between her pregnancy and postpartum period. These are all potential opportunities for transfer of information regarding postpartum contraceptive use. During pregnancy, family planning messages could be conveyed by health staff during antenatal care visits or when tetanus toxoid immunization takes place. Delivery by skilled birth attendants or at a health facility provides yet another opportunity for conveying these messages. Research has however shown limited association between antenatal care visits and postpartum contraceptive use (Rivero-Fuentes and Birungi 2008; Rivero-Fuentes et al. 2008). During childbirth as well, the woman may not necessarily be receptive to following information on contraceptive use. As Vernon (2008) has shown, the most suitable period for providing information on contraceptives is the postpartum period, either during the first postpartum visit or during successive visits for maternal and child health outpatient services.

Based on this framework, this paper examines contraceptive use patterns among women in the extended post partum period including

- 1) the probability of women initiating the use of any contraceptive method after childbirth, with specific emphasis on a modern method
- 2) the timing of any/modern contraceptive method uptake after childbirth
- 3) the association between access to maternal and child health services at birth and subsequent use of all/modern contraceptives in the first twelve months

The expectation is that access to the health care system particularly in the postpartum period encourages earlier uptake of contraceptive methods. Exposure to maternal and child health services could include the use of skilled birth attendants at birth, or at subsequent postpartum visits at six weeks or for child immunization.

Data and Methods

Sample

This analysis uses the most recent wave of Demographic and Health Surveys (DHS) data for Ethiopia (2005), Kenya (2003), Malawi (2004), Tanzania (2004) and Zimbabwe (2006). The DHS are 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. The analysis focuses on the extended postpartum period defined as the first 12 months after a child's birth 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 during this five year period. Although all births in the

five year period are considered, twin and multiple births are excluded. Furthermore, births that took place less than three months from the survey are also excluded.

The analysis uses the monthly calendar history in the five years prior to the survey from the calendar module of reproductive events such as births, terminations, pregnancies and use of specific contraceptive methods. Calendar data on marital status at each of these timepoints are also used. These data are available monthly over the preceding five calendar years before the date of the interview. Although there is a potential for bias in self-reporting of information from past years, recall is assisted by providing references to other events. Research shows that data from the DHS calendar in general are of good quality and are reliable (Curtis and Blanc 1997; Goldman, Moreno, and Westoff 1989; Westoff, Goldman, and Moreno 1990).

Statistical Method and Key Dependent Variables

The analysis is based on a discrete time event history model using a logit-link function in Stata 10.0 to determine the conditional probability of initiating contraceptive use in the first 12 months after the birth of a child. Using this framework, a series of hazard models are run for each country, each with one of the following outcomes a) first use of any contraception, both modern and traditional methods, and b) first use of modern contraception to determine the timing and occurrence of these events. In both cases, the models also examine the determinants of initiating contraceptive use among women in the extended postpartum period.

The unit of analysis is the 12 month period from the birth of a child in the past five years, where the two events are measured by the first use of any contraception after childbirth, and the first use of modern contraception respectively in each of the two sets of analyses. Therefore, the analysis for each of the outcome variables comprises of multiple records for every woman – a maximum of twelve records for each of the first 12 months from the birth of each child in the last 5 years covered in the calendar. As a

result, a woman has multiple sets of records for each of her births in the 5 year period. In each case, if the event does not occur within the 12 month period, the observation is censored. Furthermore, censoring also takes place if the woman becomes pregnant in the 12 month period following a birth. The mother's weight is taken into account when performing the statistical analysis which uses survey regression techniques to account for the sampling design of the surveys. Separate analyses are run for each of the five datasets. Descriptive analyses presented in Table 2 (where is table 2? Table 1 is based on woman sample) are based on the final regression sample.

Independent Variables

The key independent variables used in the analysis include measures of exposure to the maternal and child health system including delivery by skilled birth attendants in a health facility and immunization of children in the first year. A good measure of access to the health care system would be data on postnatal care and postpartum visits, this information is not consistently available in the DHS. Even if available, these data are not provided for all births in the last five years.

The regression models control for other characteristics of the mother such as her urban/rural residence, education, and household socioeconomic status. These variables are not time varying and are held constant across all births of the mother. Other variables include birth related characteristics which vary for each birth such as the mother's age at birth, the number of previous births, the length of the previous birth interval, and whether the birth was wanted as measure of unmet need. Other time varying characteristics in each of the first 12 months of a birth which also affect the use of contraception include the following characteristics – whether the child died or is female, breastfeeding status, postpartum amenorrhea and abstinence. We also include the mother's marital status at each month. Specific details of all dependent and independent variables are provided in Appendix 2.

The Timing of Postpartum Contraceptive Use, Breastfeeding, Amenorrhea and Abstinence

The patterns of general use of contraception by married women presented in Table 1 are reflected in the patterns of contraceptive uptake as well. The use of contraception is minimal in the first twelve months in Ethiopia and highest in Zimbabwe (Figures 2a-6b). Within the twelve month period, a little over 10 percent of births were followed by the use of any contraception in Ethiopia. In Zimbabwe, the use of any method was close to 80 percent within the first year with the use of modern methods being slightly lower. The patterns are somewhat similar in Kenya and Malawi, although the initiation of contraceptive use begins slightly earlier in Kenya. By the third month, almost 20 percent of women had begun using a method in Kenya whereas in Malawi only about 10 percent had done so. Overall, slightly less than 40 percent of births were followed by contraceptive use in both countries.

Figures 2a-6b here

The use of a modern method of contraception follows the same pattern but at a slightly slower pace. Although the general pattern is the same, contraceptive use is a little lower in Tanzania reaching a maximum of 28 percent at the end of a year and less than 20 percent use of a modern method within that time frame. The pattern of contraceptive use in Zimbabwe is very different from the other countries (Figure 6a). Within the first month, 40 percent of births were followed by use of a contraceptive method. This percentage jumps considerably to almost 55 percent by the second month, somewhat flattening after the fourth month. The first use of a modern method closely follows the same pattern.

As with the general population, in all countries, the first use of a modern method is primarily associated with the use of injectables, which is the most popular modern method, or the pill (Figure 4a). Unlike the other four countries, the pill is the preferred method among postpartum women in Zimbabwe, while the use of injectables is considerably less (Figure 6a). The use of the pill starts very early. Over 30 percent of women use the pill in the first month reaching almost fifty percent by the twelfth month.

The use of these methods needs to be examined in the context of reported breastfeeding, abstinence and amenorrhea in the postpartum period (Figures 2b-6b). Though not necessarily exclusive breastfeeding, the extent of breastfeeding is considerably high in all five countries and continues to remain so through the end of the first year. Levels of abstinence also remain considerably high. At six months, over 60 percent of women were still abstaining. The exception is Zimbabwe where the decline in abstinence is considerable from the first month onwards (Figure 6b). It is therefore not surprising that contraceptive uptake and the use of the pill is so much faster in Zimbabwe than in the other four countries. This is despite considerably high levels of reported amenorrhea. At four months, almost 70 percent of women used a contraceptive method despite 45 percent reporting amenorrhea.

Regression Results

To better understand the driving factors behind the use of contraceptive methods in the postpartum period, Tables 2 and 3 present the likelihood of adopting any and modern contraceptive methods during the first 12 months postpartum in the five countries. Two models are presented. Model 1 includes examines the role of access to the health system measured by the use of birth attendants at a health facility, also controlling for household, mother and birth characteristics, and the role of access to media. The role of time-varying characteristics such as the effect of breastfeeding, postpartum abstinence and amenorrhea are also included. The second model (Model 2) examines the added effect of immunization on the timing of contraceptive use.³

Tables 2 and 3 here

A particular focus of this paper is on the role of exposure to the health system at birth measured in terms of delivery through skilled birth attendants at a health facility or in the post-birth period at the time of

³ One problem with the addition of the timing of immunization into the model is that it results in a considerable decline in the size of the regression sample mainly because of missing information on the month and year of any immunization for a large number of cases.

immunization. While data on postnatal care are limited and not always available for all types of births, at a facility and at home, these variables fit with WHO postpartum policy guidelines as points of contact with the health system that could provide information on future use of contraception and therefore influence its use.⁴

Controlling for other characteristics, we find that the use of a birth attendant at a health facility has a positive effect on contraceptive use in all countries (Model 1 in Tables 2 and 3). This is true even in Ethiopia where only 6.3 percent of births are attended by a skilled birth attendant. This effect diminishes in Ethiopia when the role of immunization is taken into account (Model 2 in Tables 2 and 3). In the other four countries, skilled birth attendance continues to be associated with greater contraceptive use. As both tables indicate, immunization of the child in the first year is also associated with subsequent use of contraception. Particularly in Ethiopia, the odds of contraceptive use are almost three times higher when a child is immunized. This pattern is all the more true when we take modern contraceptive use into account. The only exception is in Tanzania where immunization is associated with the use of a modern method but not with other contraceptive methods. In fact the positive role played by immunization on modern contraceptive use is particularly high in Ethiopia, Kenya and Tanzania; the odds of modern contraceptive use are almost three times greater than if there was no opportunity for immunization.

Time varying characteristics

The regression analyses also take into account the role of breastfeeding, amenorrhea and postpartum abstinence in determining postpartum contraceptive use. It is interesting to note that in several of the countries, breastfeeding has a positive impact on contraceptive use. The odds of contraceptive use, after particularly of modern methods, are especially high in Kenya and Malawi when women are breastfeeding (Table 4). While the findings on breastfeeding are surprising, the results for postpartum abstinence and

⁴ We do not consider the role of antenatal care visits in this analysis primarily because it is too early for a woman to consider postpartum contraceptive use even before the child is born. Furthermore, data on antenatal care is available only for the last birth.

amenorrhea are not unusual. Contraceptive uptake is lower among women when they are abstaining or are amenorrheic. One could argue that postpartum women in these countries do initiate contraceptive use even when they are breastfeeding, given that breastfeeding may not be exclusive and the decline in amenorrhea is rapid even in the first few postpartum months.

Discussion and Policy Implications

This paper analyzes contraceptive uptake in the extended postpartum period after a birth. For the same countries, we also examined the factors determining the initiation of contraceptive methods. Of particular focus was the access to the health system either at a health facility when she has the child or in the subsequent months. Fitting with WHO guidelines, these are opportunities for dissemination of information on postpartum use of contraception. Although the countries in this analysis all fall within the same region, patterns of contraceptive use are very different. The use of family planning is very low in Ethiopia while it is highest in Zimbabwe particularly because of the popularity of the pill. Furthermore, a sizeable portion of women in Zimbabwe start using contraception in the early months after a birth. By the 12 month period, almost 80 percent of births in Zimbabwe were followed by the use of a contraceptive method. In fact, a considerable proportion of women start using contraception in the first couple of months after a birth even when women are amenorrheic or abstaining from sexual intercourse. This finding is very similar to other research by Sambisa and Curtis (1997) and Brown (2007).

Although the initiation of contraception after childbirth is important given the need to space births and other positive effects of delaying childbirth, such an early increase is not particularly useful especially when women are also amenorrheic during the early months. This is all the more key in Zimbabwe when the timing of uptake of postpartum contraception has advanced even further in recent years (Brown, 2007). At the same time, the apparent stagnation in the low level of contraceptive use in the extended postpartum period in the other countries, particularly in Ethiopia calls for the need to find appropriate methods to

reach this group of women. Although the overlap between amenorrhea and contraceptive use is of less concern in these countries as compared to Zimbabwe, the low overall use of contraception in this period is.

This paper also focused on the role of exposure and access to the maternal and child health system during and after a birth to examine its effect in influencing contraceptive use. These results confirm findings from other research by Gebreselassie, Rutstein and Mishra (2008) that call for the need for information from health staff, particularly at the birthplace to influence breastfeeding and contraceptive use practices. We extend this to examine the influence of any postpartum access to the health system and its possible impact on contraceptive use. While data on postpartum visits and postnatal care are limited in the DHS, particularly for all births in the last five years, focus on the immunization of the child in the first few months as an opportunity for family planning counseling. Our findings indicate that access to health workers at both these points are important avenues for the transfer of such information supporting recent research by Vernon (2008) on offering family planning services to women attending maternal and child health services.

Our results call for a greater integration of maternal and child health and family planning services in countries to cater to postpartum women. Programs may need to be effectively designed to provide family planning services in health centers and other areas where women avail of health services including immunization for their child. This is particularly important when targeting poor women and those living in rural areas, where contraceptive use is particularly low. The information and counseling on family planning that women receive soon after birth and especially within the six week period from birth needs to be supplemented by additional opportunity to provide services in health centers even beyond this point. The immunization of children offers an excellent opportunity to do so. At the same time, a regular supply of contraceptives also needs to be maintained offering method choices to women. In countries such as Ethiopia where the number of births at a facility outside the home or delivered by a skilled birth attendant

is very low, there is also a greater need to encourage non-home births so that women get better access to maternal and child health services.

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Figure 1: Timing of Access to Maternal and Health Care Services during Pregnancy, Birth and post-partum period

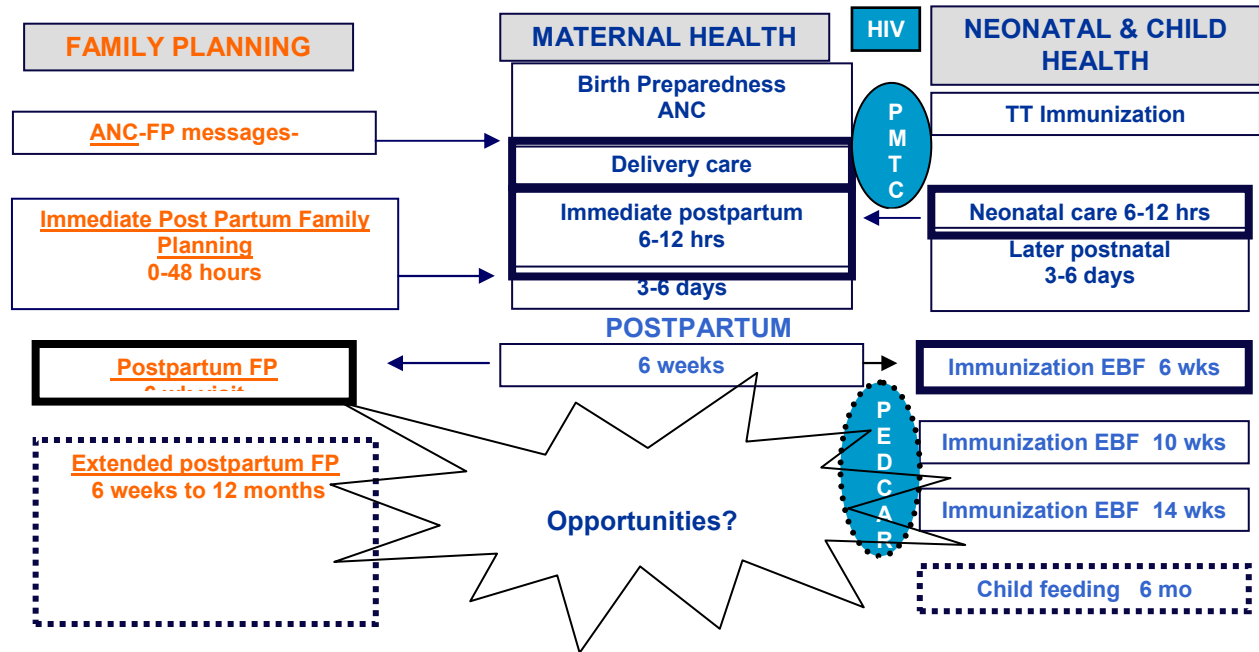


Figure 2a: Cumulative Probability of Postpartum Contraceptive Uptake in Ethiopia (2005)

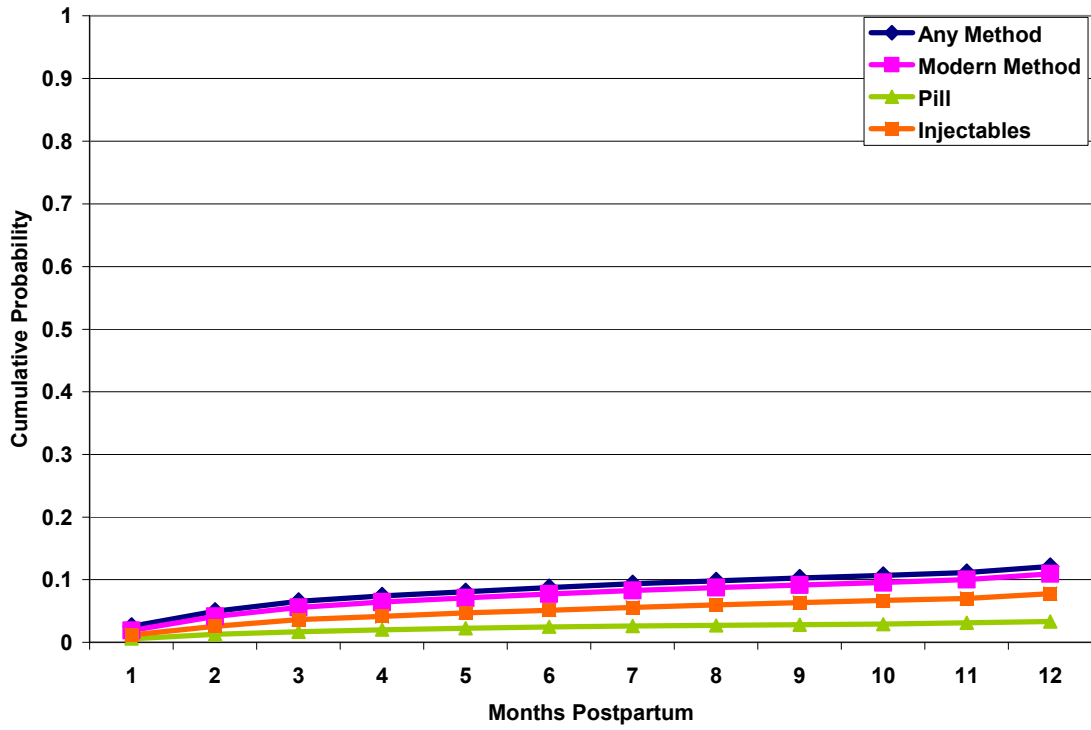


Figure 2b: Postpartum Breastfeeding, Abstinence and Amenhorrea in Ethiopia (2005)

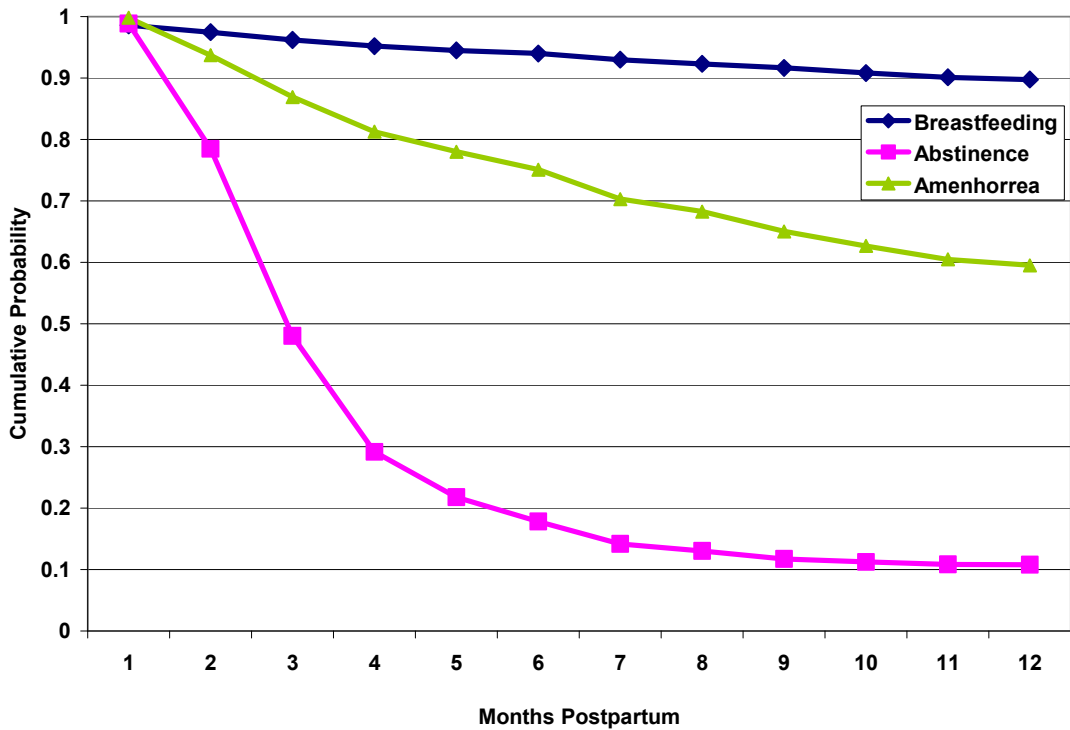


Figure 3a: Cumulative Probability of Postpartum Contraceptive Uptake in Kenya (2003)

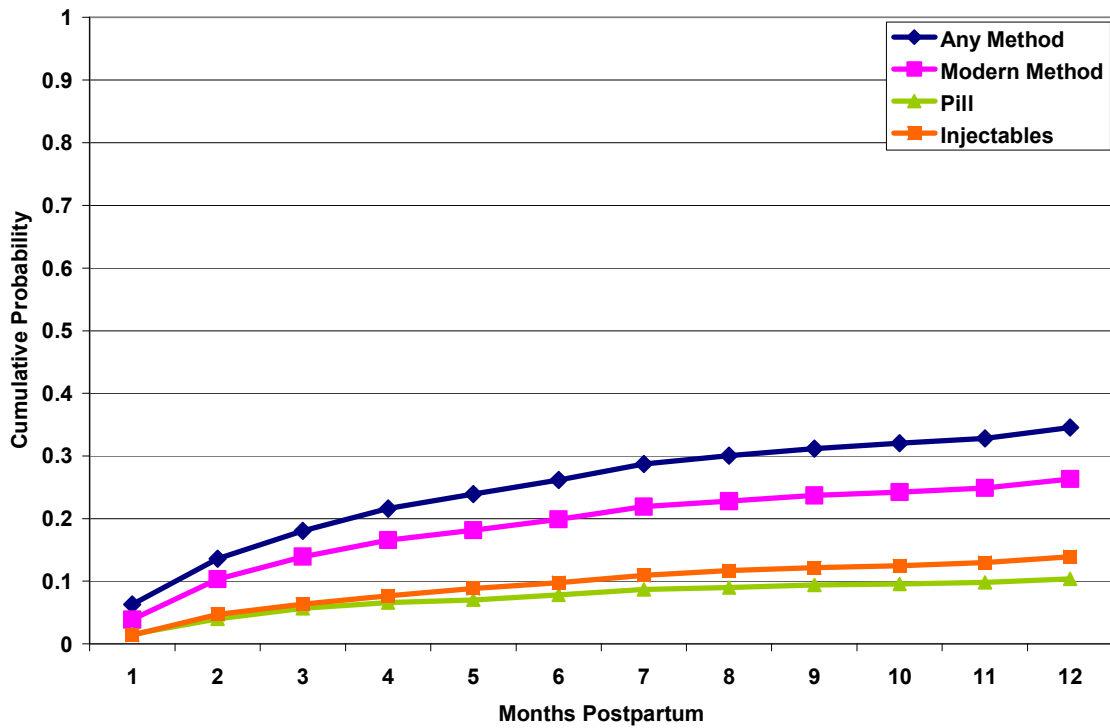


Figure 3b: Postpartum Breastfeeding, Abstinence and Amenhorrea in Kenya (2003)

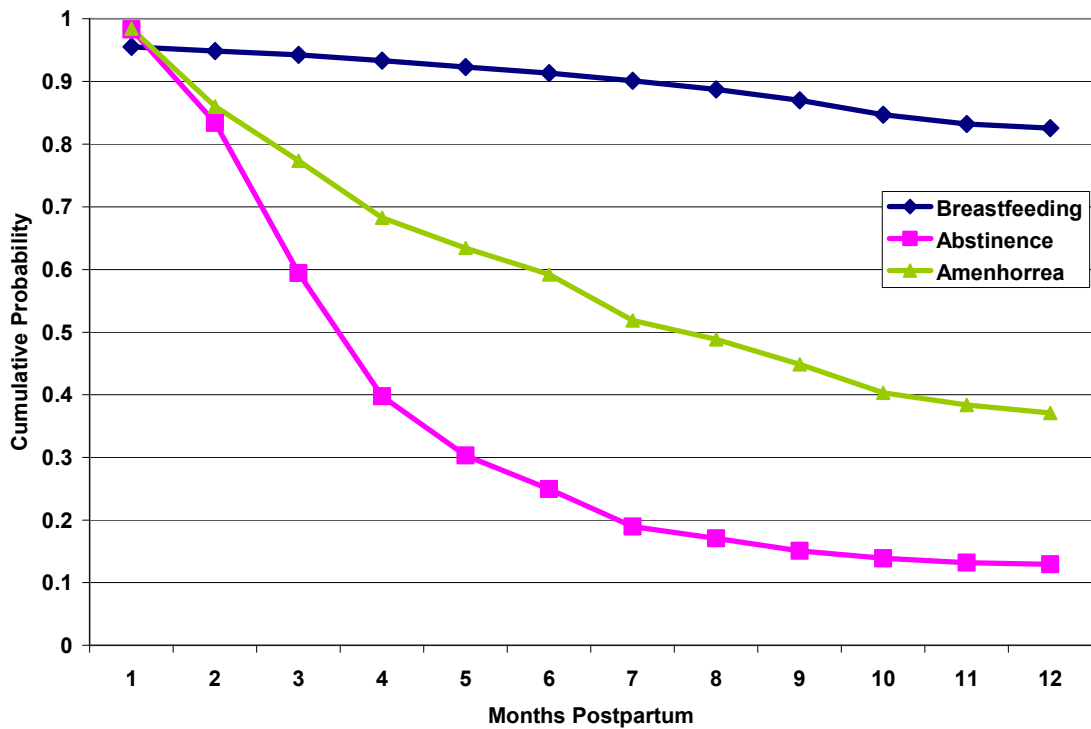


Figure 4a: Cumulative Probability of Postpartum Contraceptive Uptake in Malawi (2004)

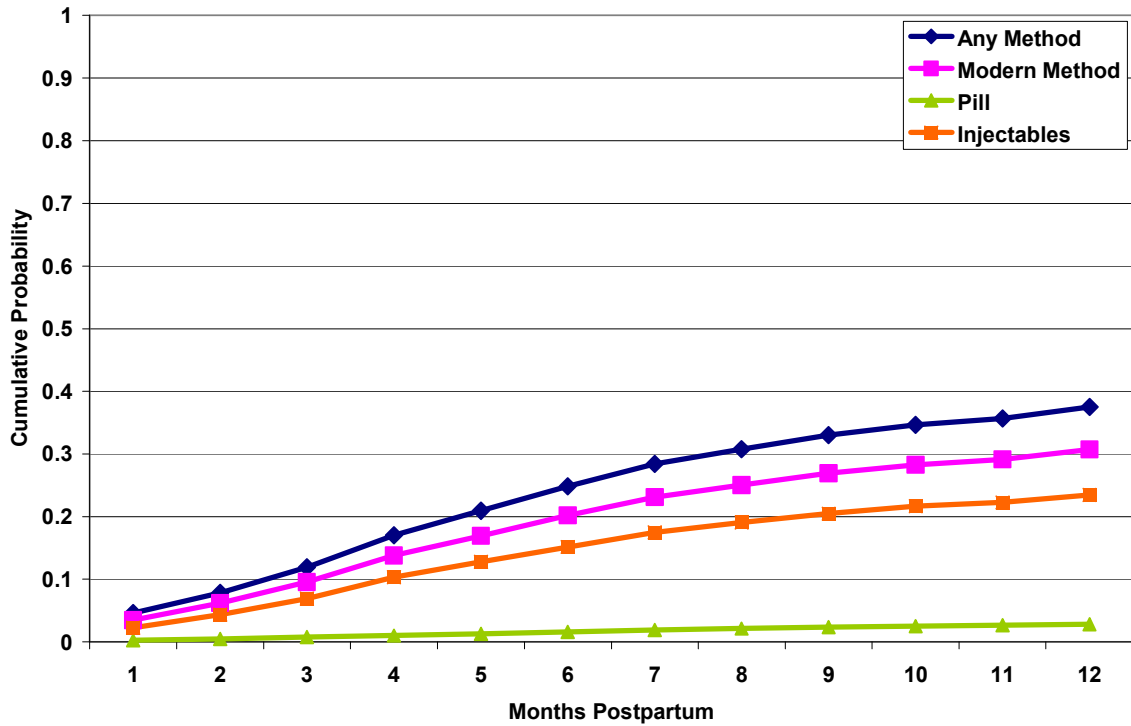


Figure 4b: Postpartum Breastfeeding, Abstinence and Amenhorrea in Malawi (2004)

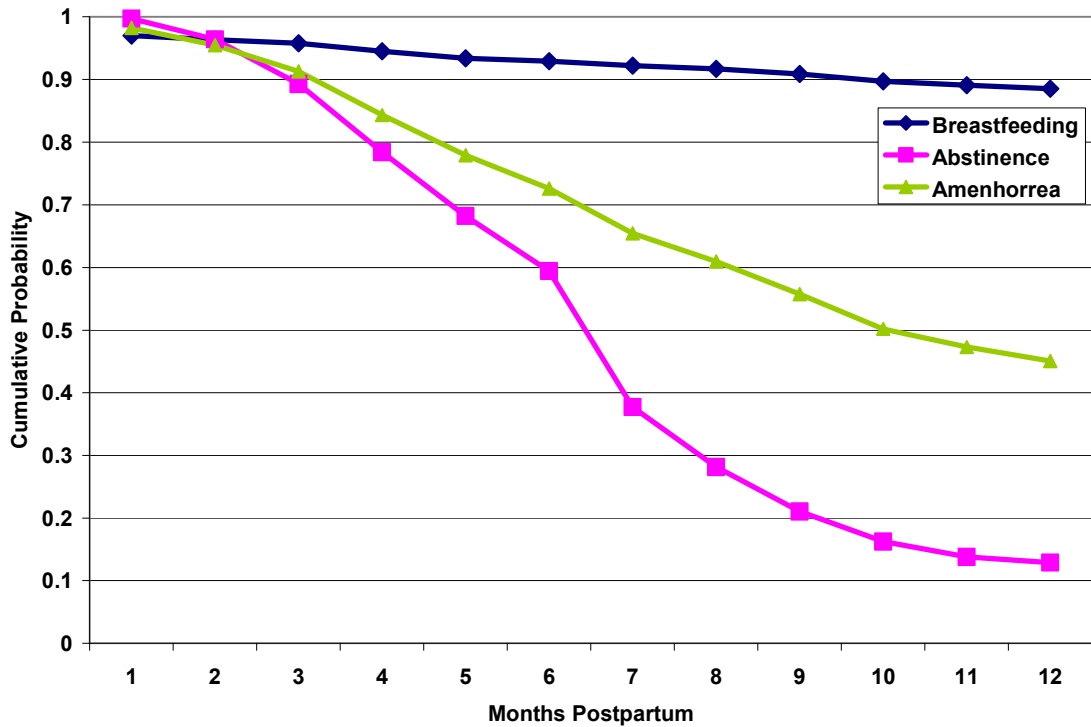


Figure 5a: Cumulative Probability of Postpartum Contraceptive Uptake in Tanzania (2004)

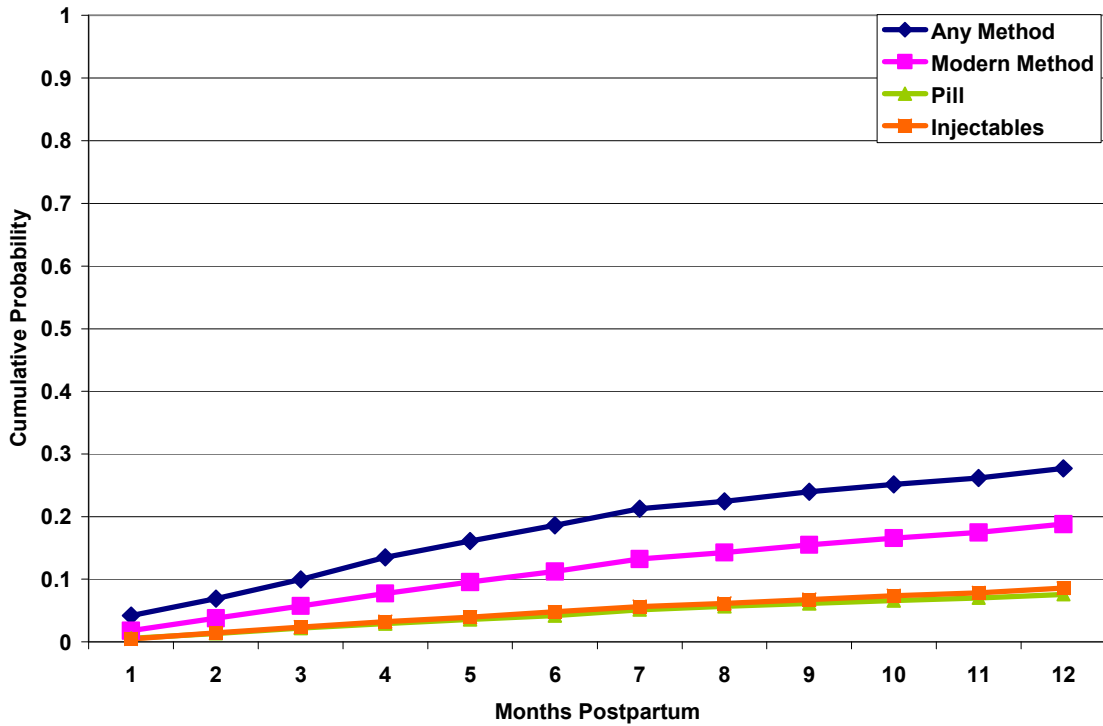


Figure 5b: Postpartum Breastfeeding, Abstinence and Amenhorrea in Tanzania (2004)

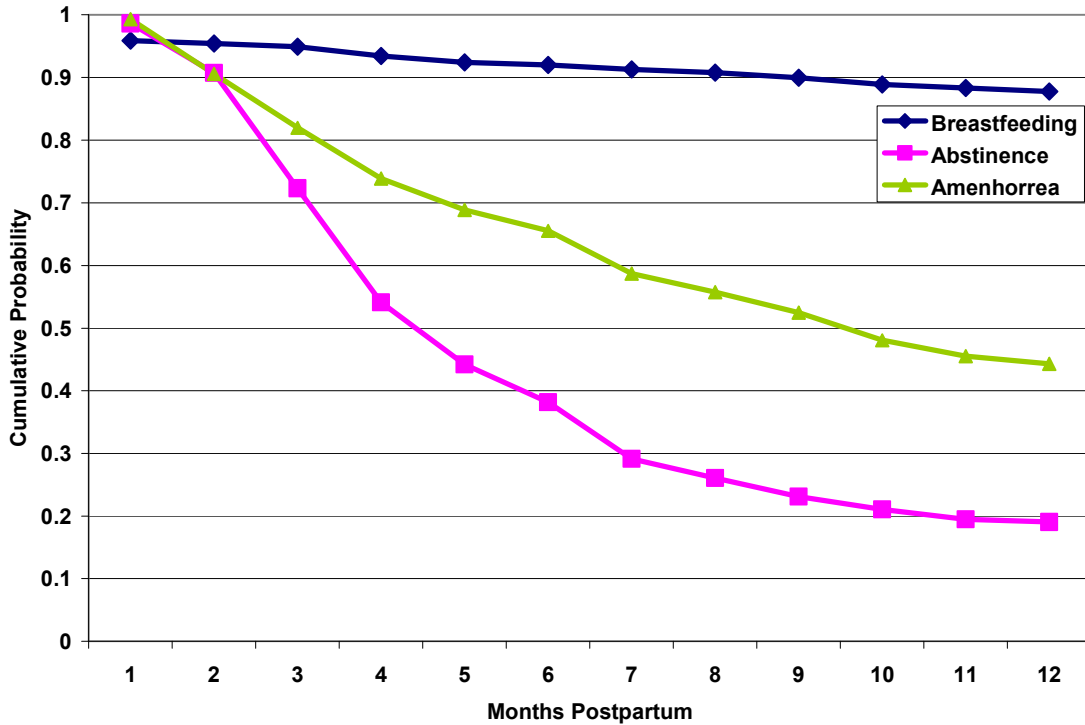


Figure 6a: Cumulative Probability of Postpartum Contraceptive Uptake in Zimbabwe (2006)

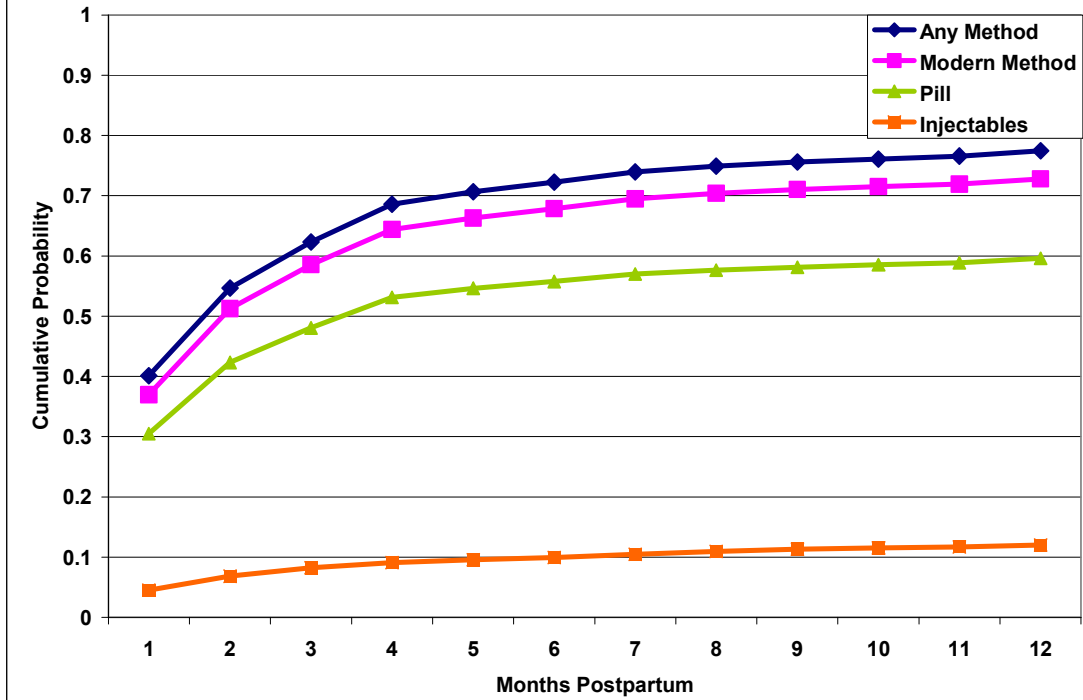


Figure 6b: Postpartum Breastfeeding, Abstinence and Amenhorrea in Zimbabwe (2006)

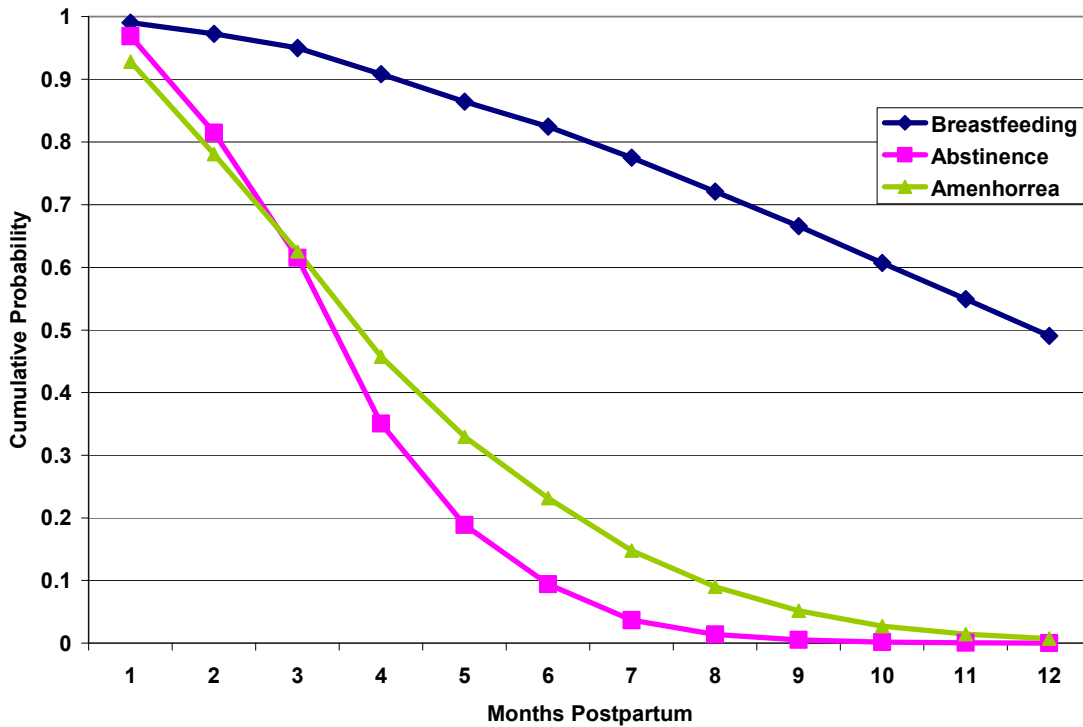


Table 1: Fertility and Reproductive Health Indicators (%)

	Ethiopia 2005	Kenya 2003	Malawi 2004	Tanzania 2004	Zimbabwe 2006
TFR	5.4	4.9	6	5.7	3.8
Births spaced less than 24 months	21.3	22.9	15.0	16.1	11.3
Unmet need	33.8	24.5	27.6	21.8	12.8
M CPR	13.9	31.5	28.1	20.0	58.4
Modern Method Used					
Pill	3.1	7.5	2.0	5.9	43.0
IUD	0.2	2.4	0.1	0.2	0.3
Injectables	9.9	14.3	18	8.3	9.9
Male Condom	0.2	1.2	1.8	2.0	1.4
Female Sterilization	0.2	4.3	5.8	2.6	2
Male Sterilization	na	na	0	0	0.1
Implant	0.2	1.7	0.5	0.5	1.2
LAM	0.2	na	na	0	na

Source: Demographic and Health Surveys

Data on birthspacing, unmet need, M CPR and choice of method are presented for currently married women

Table 2: Odds of initiating use of any method of contraception in the extended postpartum period

	Ethiopia 2005		Kenya 2003		Malawi 2004		Tanzania 2004		Zimbabwe 2006	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Access to health system										
SBA at health facility	1.51**	1.34	1.73**	1.70**	1.29***	1.31**	1.44***	1.39***	1.25***	1.19**
Immunization took place	2.77***		1.85***			1.48***	1.16			1.23***
Household characteristics										
Urban residence	2.75***	2.86***	1.07	1.13	0.94	0.86	1.55***	1.54***	1.23**	1.30***
Poorest 2 quintiles	0.41***	0.36***	0.62**	0.68***	0.77***	0.77***	0.80**	0.77**	0.75***	0.75***
Mother/birth characteristics										
<u>Mother's education (no educ. omitted)</u>										
Primary education	1.71***	1.44*	2.74***	3.34***	1.46***	1.40***	1.48***	1.50***	1.41	1.28
Secondary or higher education	2.72***	1.78**	3.60***	4.42***	2.18***	1.96***	2.22***	1.99***	1.70**	1.60**
<u>Mother's age at birth (15-24 omitted)</u>										
Mother's age at birth 25-34	0.98	0.9	1.22**	1.38***	0.85**	0.82**	0.9	0.98	0.99	0.99
Mother's age at birth 35-49	1.02	0.65	1.39**	1.68**	0.81**	0.72***	0.94	1.15	0.68***	0.67***
Whether currently married	3.37***	22.57***	1.85***	1.84***	2.31***	2.59***	2.15***	2.76***	3.58***	3.83***
Female child	1.05	1.02	1.01	0.97	1.03	1.03	0.98	1.02	1.04	1.04
Whether child is dead	0.76		0.61*		0.77		1.37		0.44***	
<u>Preceding birth interval (< 24 mths omitted)</u>										
First birth	0.94	1.14	0.86	0.9	0.85*	0.78**	1.1	1.03	1.47***	1.49***
Birth interval 24-47 mths	1.05	0.86	0.97	1.01	1.02	0.92	1.1	1.08	1.32***	1.31**
Birth interval 48+mths	0.91	0.91	1.22**	0.97	1.08	0.97	1.36***	1.33**	1.56***	1.58***
<u>Birth wanted (wanted then omitted)</u>										
Wanted birth later	1.44***	1.51**	1.01	1.03	1.29***	1.26***	1.26***	1.24***	1.14**	1.16**
Wanted no more births	1.81***	1.84***	1.42***	1.51***	1.04	1.06	1.29*	1.22	0.91	0.93
<u>Number of births (0-1 omitted)</u>										
3rd birth - 2 previous births	0.96	1.07	1.04	0.91	1.14**	1.11	1.03	1	1.17	1.15
4th birth - 3 previous births	0.97	1.29	0.98	0.96	1.24**	1.24**	1.03	0.95	1	0.96
5th birth - 4 or more previous births	0.87	1.37	0.60**	0.53***	1.21**	1.20*	0.9	0.75**	0.96	0.91
Access to media										
Newspaper/TV/radio atleast once a week	1.27*	1.35*	1.14	1.1	1.06	1.07	1.06	1.15*	0.99	0.94
Time varying characteristics										
Whether breastfeeding	0.76	0.95	1.60**	1.76*	2.00***	2.33***	1.76**	1.43	1.54**	1.46
Whether amenorrhic	0.33***	0.28***	0.32***	0.31***	0.55***	0.50***	0.48***	0.45***	0.70***	0.73***
When abstaining	0.53***	0.59***	0.51***	0.45***	0.45***	0.48***	0.40***	0.39***	0.40***	0.40***
Observations	80080	38233	42152	24624	82212	49554	69418	48315	19493	16008
F	197.59	124.02	216.87	131.96	573.67	391.20	299.27	228.25	105.82	90.80

Note: Odds for time variable not presented.

Table 3: Odds of initiating use of a modern method of contraception in the extended postpartum period

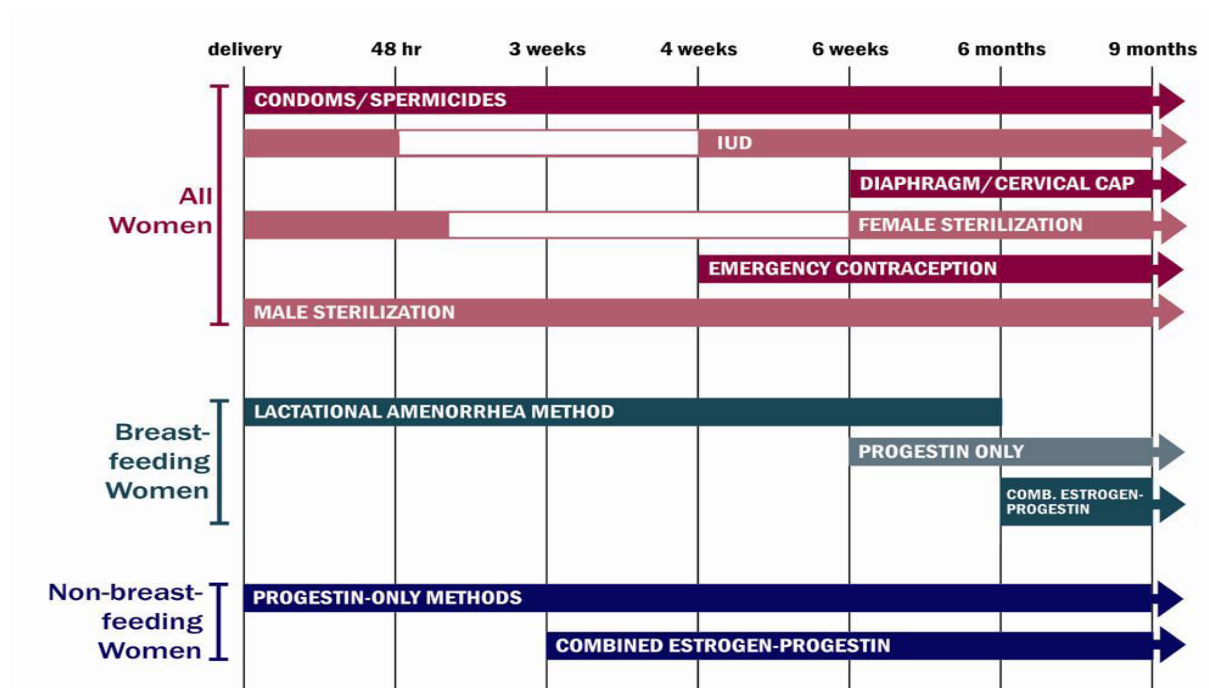
	Ethiopia 2005		Kenya 2003		Malawi 2004		Tanzania 2004		Zimbabwe 2006	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Access to health system										
SBA at health facility	1.39		1.98***	1.92***	1.37***	1.32***	1.65***	1.75***	1.36***	1.25***
Immunization took place	2.88***		2.13***		1.66***			2.65***		1.30***
Household characteristics										
Urban residence	3.19***		1.24**	1.26*	1.07	0.97	1.47***	1.38***	1.17*	1.23**
Poorest 2 quintiles	0.41***		0.54***	0.62***	0.83***	0.83***	0.73***	0.70***	0.72***	0.72***
Mother/birth characteristics										
<u>Mother's education (no educ. omitted)</u>										
Primary education	1.62***		3.21***	3.62***	1.39***	1.36***	2.09***	1.79***	1.46*	1.29
Secondary or higher education	2.35***		3.78***	4.64***	2.13***	1.97***	2.71***	1.96***	1.80**	1.65**
<u>Mother's age at birth (15-24 omitted)</u>										
Mother's age at birth 25-34	0.9		1.09	1.26	0.85**	0.81***	0.81**	0.87	0.94	0.95
Mother's age at birth 35-49	1		1.24	1.70**	0.66***	0.63***	0.74*	0.68*	0.62***	0.64***
Whether currently married	2.94***		1.89***	1.79***	2.13***	2.39***	1.70***	2.27***	3.39***	3.60***
Female child	1.08		1.03	0.94	1.05	1.05	1.09	1.15*	1.04	1.02
Whether child is dead	0.72		0.69	0.99			1.34		0.45***	
<u>Preceding birth interval (< 24 mths omitted)</u>										
First birth	0.95		1.22	0.81	0.78**	0.71***	1.06	0.98	1.54***	1.52***
Birth interval 24-47 mths	1.04		0.87	0.92	0.95	0.87*	1	0.93	1.32***	1.31**
Birth interval 48+mths	0.89		1.25*	0.89	1.11	1	1.46***	1.38**	1.72***	1.70***
Birth wanted (wanted then omitted)										
Wanted birth later	1.50***		1.48*	0.98	1.24***	1.18**	1.29***	1.35***	1.16**	1.19***
Wanted no more births	1.93***		1.92***	1.35***	1.13*	1.11	1.49***	1.54**	0.92	0.93
<u>Number of births (0-1 omitted)</u>										
3rd birth - 2 previous births	0.99		1.09	1.04	1.1	1.09	1.11	1.07	1.13	1.1
4th birth - 3 previous births	1.05		1.34	1.05	1.19*	1.22*	1.14	1.06	0.98	0.92
5th birth - 4 or more previous births	0.92		1.4	0.58***	1.16	1.13	0.80*	0.76*	0.9	0.81
Access to media										
Newspaper/TV/radio atleast once a week	1.16		1.24	1.2	1.06	1.12	1.16*	1.17	0.98	0.92
Time varying characteristics										
Whether breastfeeding	0.95		1.16	1.90***	2.20***	2.88***	1.63**	1.24	1.4	1.33
Whether amenorrhic	0.31***		0.27***	0.35***	0.51***	0.45***	0.44***	0.42***	0.65***	0.66***
When abstaining	0.49***		0.57***	0.61***	0.58***	0.62***	0.51***	0.49***	0.45***	0.46***
Observations	80865	38634	45014	26267	85961	51997	74088	51593	21392	17627
F	197.20	123.94	169.89	117.19	546.03	356.14	274.60	218.10	117.61	97.80

Note: Odds for time variable not presented.

Appendix 1: WHO Guidelines on Contraceptive Use as part of Postpartum care (2007)

- Informing all pregnant and postpartum women about all contraceptive choices in the postpartum period (7.1).
- Reinforcing that non-hormonal methods (LAM, barrier methods and IUDs) are the best options for lactating mothers (7.2, 7.3, 7.4, 7.5).
- Initiating progestogen-only methods after 6 weeks postpartum to breastfeeding women, if this is the woman's choice (7.3, 7.5).
- Advising against the use of combined oral contraceptives in breastfeeding women in the first 6 months after birth, or until weaning, whichever comes first (7.3, 7.5).
- Introduction of an IUD either in the immediate (<2 days) postpartum or after 4-6 weeks, if this is the method chosen (7.4, 7.5).
- Performing a surgical sterilization in the postpartum period (female and male) is a medically appropriate option, if this is the free informed choice of the woman/couple (7.4).

Appendix 2: Appropriate family planning methods in the postpartum period



Appendix 3: Description of Variables

Dependent variables	
First use of any contraception after birth	If using any contraception modern or traditional, 1 = yes, 0 otherwise
First use of modern contraception after birth	If using modern contraception (pill, IUD, injections, diaphragm, foam, jelly, male/female condom, male/female sterilization, abstinence, withdrawal, Norplant, other traditional methods, 1 = yes, 0 otherwise
Independent variables	
Urban area	If the residence is in an urban area; 1= yes, 0 otherwise
Poorest 2 wealth quintiles	If the household is in bottom two wealth quintiles; 1= yes, 0 otherwise
Mother's education	Mother's highest educational attainment; no education, primary school, secondary or higher education (no education is omitted group)
Mother's age at birth	Categorized as 15-24 years, 25-34 years, 35-49 years, (15-24 years is omitted group)
Female child	If child is a female, 1=yes, 0 otherwise
Length of preceding birth interval	Categorized as first birth, < 24 months, 24-47 months, 48+ months (<24 months is omitted group)
Whether child was wanted	If child was wanted then, later or not any more (birth wanted then is omitted group)
Number of previous births	0-1 births, 2 births, 3 births, 4 or more births (0-1 births is omitted group)
Child's birth in a health facility with a skilled birth attendant	If the birth was at a public or private health care facility and mother had skilled assistance at delivery of her child's birth; 1= yes, 0 otherwise
<u>Time varying characteristics for each of the 12 months after birth of child in the last 5 years</u>	
Whether child immunized	If immunized for any of the following [BCG, DPT (1-3), Polio (4 doses), Measles, 1=yes, 0 otherwise. In Tanzania, pentavalent vaccines also taken into account.
Whether married	If married, 1=yes, 0 otherwise. Obtained from calendar
Whether child is dead	If child died 1=yes, 0 otherwise
Whether abstaining	If abstaining 1= yes, 0 otherwise
Whether amenorrheic	If amenorrheic 1= yes, 0 otherwise
Whether breastfeeding	If breastfeeding 1= yes, 0 otherwise