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# Missed opportunities for family planning: an analysis of pregnancy risk and contraceptive method use among postpartum women in 21 low- and middle-income countries☆,☆☆

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## Abstract

**Objectives:** To analyze data from recent Demographic and Health Surveys (DHS) conducted in 21 low- and middle-income countries (LMICs) to examine patterns of interpregnancy intervals, unmet need, pregnancy risk and family planning method use and method mix among women 0–23 months postpartum.
**Study design:** Secondary analysis of postpartum women aged 15–49 years in 22 DHS surveys from 21 LMICs conducted between 2005 and 2012. We applied an adapted unmet need definition for postpartum women to look at prospective fertility preferences. We also constructed a new composite pregnancy risk indicator for postpartum women who have been sexually active since their last birth.
**Results:** In 9 of 22 surveys, 50% or more of nonfirst births occur at interpregnancy intervals that are too short. Overall prospective unmet need for family planning by postpartum women has not changed demonstrably since a 2001 analysis and is universally high: 61% of all postpartum women across the 21 countries have an unmet need for family planning. In 10 of 22 surveys, pregnancy risk rises steadily throughout the 2 years after birth. In the remaining 12 surveys, the risk of pregnancy peaks at 6–11 months after birth. Even when postpartum women are using family planning, they rely overwhelmingly on short-acting methods (51–96% in 21 of 22 surveys).
**Conclusion:** Our approach of estimating pregnancy risk by postpartum timing confirms a high probability for pregnancies to be less than optimally spaced within 2 years of a prior birth and suggests that special consideration is needed to effectively reach this population with the right messages and services.
**Implications:** Using recent, multicountry data for women within 2 years postpartum in LMICs, this paper updates existing estimates of high prospective unmet need for family planning and presents a new composite pregnancy risk analysis based on postpartum women's actual practices to demonstrate the magnitude of missed opportunities for programmatic intervention for the postpartum population.
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*Keywords:* Demographic and Health Surveys; Interpregnancy intervals; Pregnancy risk; Unmet need; Postpartum contraception; Family planning

## 1. Introduction

The advent of the 2012 London Summit on Family Planning brought welcome attention to women's unmet need for contraception in low- and middle-income countries (LMICs) [1–3]. The need for universal access to reproductive health has been recognized as essential to achieve the Millennium Development Goals [4]. The benefits of family planning accrue to women themselves [5], their offspring [6–8] and society [9]. Some of those benefits result from increasing the proportion of births that are optimally spaced [10,11]. International experts have united around recommendations for the "birth-to-pregnancy

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interval" or "interpregnancy interval," which is the interval between the date of a live birth and the start of a subsequent pregnancy [11,12], to be at least 24 months, given the increase in maternal, newborn and child morbidity and in early childhood mortality rates associated with short intervals, particularly those less than 18 months [13].

In 2001, a seminal study on contraceptive use and prospective unmet need among postpartum women within a year after birth, which analyzed data from Demographic and Health Surveys (DHS) for 27 countries, found that 95% of postpartum women did not wish to become pregnant within 2 years of a birth, yet 65% had a prospective unmet need for family planning [14]. While the clinical definition of the "postpartum" period remains 42 days after birth, family planning programmers have since adopted the term "postpartum family planning" to mean the initiation of family planning within the first 42 days after birth followed by the continuation of the chosen method, or a switch to alternative methods, for the first 2 years after birth, also known as the "extended postpartum period." This extension of the postpartum period frequently implies integration of family planning with other services accessed during pregnancy and the postpartum period, such as maternal and child healthcare.

For postpartum women, family planning use alone does not accurately reflect pregnancy risk because the exact timing of a woman's return to fecundity after birth differs based on her breastfeeding practices [15,16]. Breastfeeding does offer protection against pregnancy but most effectively if the criteria for the lactational amenorrhea method, or LAM, are met; that is, if breastfeeding is practiced (1) exclusively, (2) during amenorrhea and (3) for 6 months after birth [15]. Postpartum women are also often perceived as having less need for contraception based on the belief that they are protected by postpartum abstinence. However, several studies [17–19] have found rapid resumption of sexual activity after birth, and cross-sectional DHS data further illustrate sexual activity during distinct intervals after birth. Consolidating available data on the unique reproductive health needs of postpartum women in LMICs has a strong bearing on the public health interest in longer birth intervals.

Because there has been increased attention to postpartum women since publication of the 2001 study [20,21] but sparse new data about their family planning use except for a 2010 report [22], our paper effectively repeats the prospective unmet need approach of the 2001 study and 2010 report and adds a new composite pregnancy risk analysis for multicountry data from DHS surveys conducted in 21 countries between 2005 and 2012, exploring recent patterns among postpartum women and, in some instances, making comparisons with non-postpartum women. Examining recent household survey data, such as DHS surveys, to understand variations in interpregnancy intervals as well as in practices and behaviors affecting fertility, contraceptive use and intentions among postpartum women is essential to determine both the missed and the optimal opportunities to intervene and promote more evidence-based public health strategies. In the context of new global initiatives such as FP2020, A Promise Renewed, and the United Nations Secretary General's strategy for maternal, newborn and child health, called *Every Woman Every Child*, we need the most current evidence and precise, meaningful indicators to make the most effective case for our programmatic choices.

## 2. Material and methods

We extracted data for secondary analysis from 22 DHS surveys in 21 developing countries (Table 1). All surveys were national except for two surveys from India, covering the states of Bihar and Uttarakhand. We purposively selected surveys conducted between 2005 and 2012 in countries that the United States Agency for International Development has had high priorities for maternal and child health or family planning. In each survey, we analyzed the subsample of women aged 15–49 years who had a birth in the last 0–23 months, i.e., women in the extended postpartum period. In some analyses, we further divided the extended postpartum period into three subperiods: 0–5 months, 6–11 months and 12–23 months. Web Annex Table 1 shows key demographic characteristics for this subsample of postpartum women for all DHS surveys included in our analysis.

We first examined interpregnancy intervals of all reported nonfirst births in the last 5 years to analyze the effect of interpregnancy spacing on child survival in each country. We created a new interpregnancy variable from the standard DHS birth-to-birth interval by deducting a conventional pregnancy duration of 9 months. Only live births were included in the analysis; stillbirths, miscarriages and abortions were excluded.

Second, we applied a *prospective* definition of unmet need for family planning for postpartum women that is based on women's fertility preferences in the future, and we made new calculations of unmet need for postpartum women using this prospective definition. The standard DHS definition of unmet need continues to be *retrospective* for pregnant and postpartum amenorrheic women, that is, based on women's "wantedness" of their current pregnancy or last birth despite the fact that it has been shown to underestimate family planning needs for postpartum women because it does not capture their chances of pregnancy in the extended postpartum period [14]. Postpartum women may soon be in need of contraception, even if they are not necessarily at risk of pregnancy at the time of the survey. We therefore calculated unmet need for postpartum women using the same questions used by DHS for prospective unmet need for all fecund women who are not pregnant or postpartum amenorrheic[1].

[1] The prospective unmet need definition for postpartum women is based on the DHS Woman's Questionnaire, questions 703–705: "Would you like to have another child, or would you prefer not to have any more children?" If yes, all women are subsequently asked: "How long would you like to wait from now before the birth of another child?" Available from: http://dhsprogram.com/pubs/pdf/DHSQ6/DHS6_Questionnaires_5Nov2012_DHSQ6.pdf.

Table 1
Included DHS by country/state, survey year and sample size

| Country/state | Survey year | All women or ever-married women[a] | Number of all women aged 15–49 years | Number of postpartum women 0–23 months (% of all women aged 15–49 years) | Number of postpartum women 0–23 months who have been sexually active since the last birth |
|---|---|---|---|---|---|
| Bangladesh | 2011 | Ever–married | 17,749 | 3264 (18%) | 2788 |
| Burkina Faso | 2010 | All women | 17,087 | 5988 (35%) | 3296 |
| Ethiopia | 2011 | All women | 16,515 | 4453 (27%) | 3569 |
| Ghana | 2008 | All women | 4916 | 1178 (24%) | 639 |
| Haiti | 2012 | All women | 14,287 | 2782 (19%) | 2146 |
| Honduras | 2011–2012 | All women | 22,757 | 4158 (18%) | 3210 |
| India/Bihar | 2005–2006 | All women | 3818 | 972 (25%) | 830 |
| India/Uttarakhand | 2005–2006 | All women | 2953 | 494 (18%) | 411 |
| Kenya | 2008–2009 | All women | 8444 | 2264 (27%) | 1724 |
| Liberia | 2007 | All women | 7092 | 2120 (30%) | 942 |
| Madagascar | 2008–2009 | All women | 17,375 | 4807 (28%) | 3688 |
| Malawi | 2010 | All women | 23,020 | 7724 (34%) | 5478 |
| Mozambique | 2011 | All women | 13,745 | 4913 (36%) | 2425 |
| Nepal | 2011 | All women | 12,674 | 2030 (16%) | 1537 |
| Nigeria | 2008 | All women | 33,385 | 11,027 (33%) | 7661 |
| Pakistan | 2006–2007 | Ever–married | 10,023 | 3375 (18%) | 2741 |
| Philippines | 2008 | All women | 13,594 | 2423 (25%) | 2001 |
| Rwanda | 2010 | All women | 13,671 | 3208 (35%) | 2823 |
| Senegal | 2010–2011 | All women | 15,688 | 4516 (27%) | 3162 |
| Tanzania | 2010 | All women | 10,139 | 3266 (24%) | 2339 |
| Uganda | 2011 | All women | 8674 | 3092 (19%) | 2406 |
| Zimbabwe | 2010–2011 | All women | 9171 | 2448 (27%) | 1934 |

[a] The marital status of women included in the subsample corresponds with the marital status surveyed in the given DHS.

In addition to its prospective outlook, our "prospective unmet need" definition for postpartum women makes four other minor modifications to the standard DHS unmet need definition. All changes from the DHS standard definition [23] are illustrated in Fig. 1.

Third, we constructed a new composite pregnancy risk indicator for postpartum women who have been sexually active since the last birth that calculates the percentages of those at risk of pregnancy at a given postpartum time period according to varying practices and signs of fertility during that period. Specifically, this indicator defines those women not at risk as: (1) women 0–5 months postpartum who are exclusively breastfeeding or providing breastmilk and plain water only *and* whose menses have not returned *or* are using a modern family planning method; (2) women 6–11 months postpartum who are exclusively breastfeeding or providing breastmilk and plain water only *and* whose menses have not returned *or* are using a modern family planning method; and (3) women 12–23 months postpartum who are using a modern family planning method.

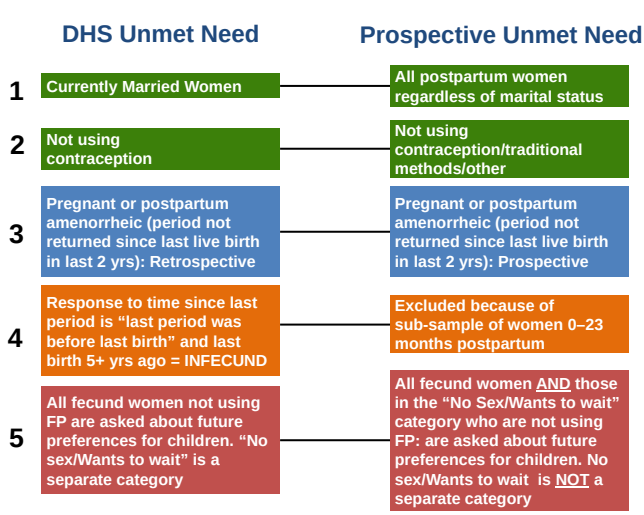



Fig. 1. Comparison of definitions for prospective postpartum unmet need and standard DHS unmet need.

Fourth, we evaluated family planning use and method mix, comparing use and nonuse among postpartum and non-postpartum women and distinguishing modern (long-acting, permanent and short-acting) from traditional methods based on the World Health Organization Medical Eligibility Criteria [24]. Methods were grouped in the following categories: (1) long-acting and permanent methods (sterilization, intrauterine devices and implants); (2) short-acting methods (injectables, pills, LAM, condoms and the Standard Days Method®); and (3) traditional methods/other (periodic abstinence/rhythm method, withdrawal, folk methods and other traditional or modern methods not included in the previous categories).

Fifth, and finally, we analyzed the reasons for not using contraception that were cited in the DHS by postpartum women who want to delay or avoid having another child. We identified the most frequently cited reasons for nonuse among all postpartum women in each survey.

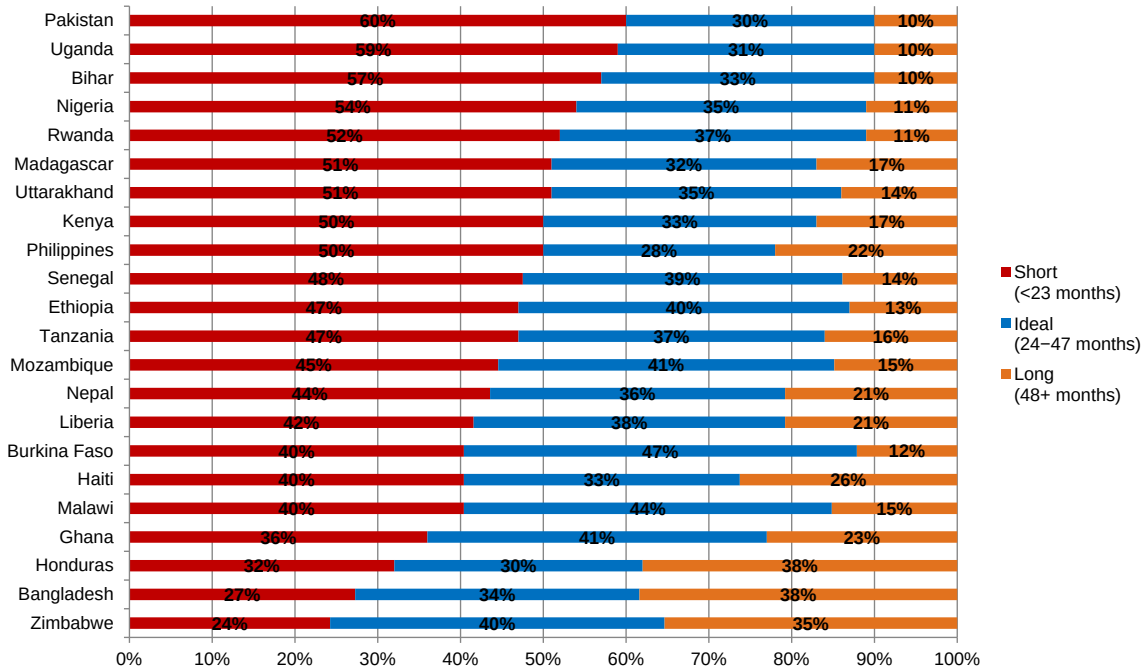
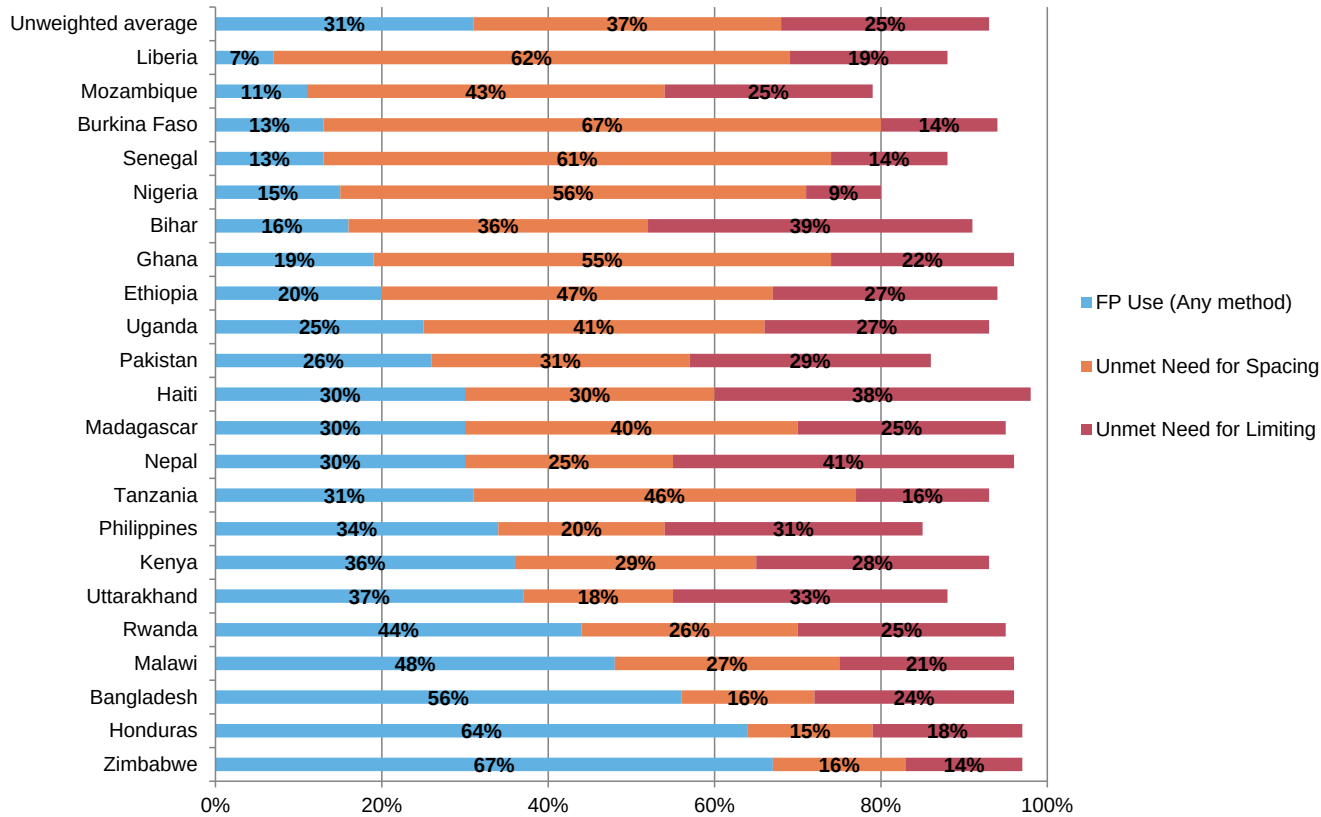



Fig. 2. Percentage of postpartum women with short, ideal and long interpregnancy intervals.




[a] The top bar shows the unweighted average family planning use and unmet need among women 0−23 months postpartum in all included surveys.

Fig. 3. Total family planning use and prospective unmet need among women 0–23 months postpartum[a].

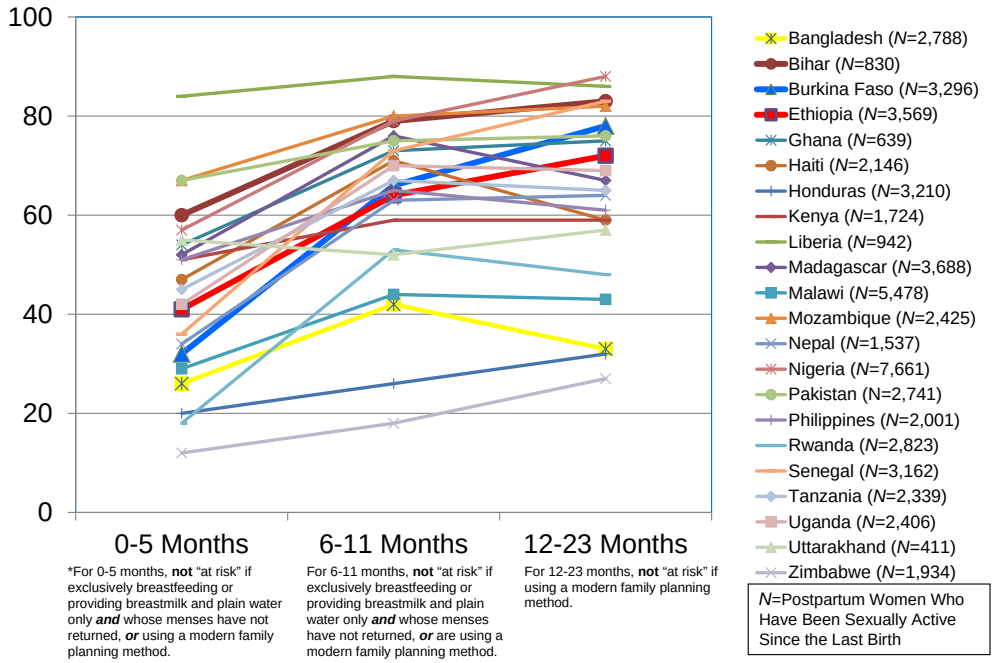
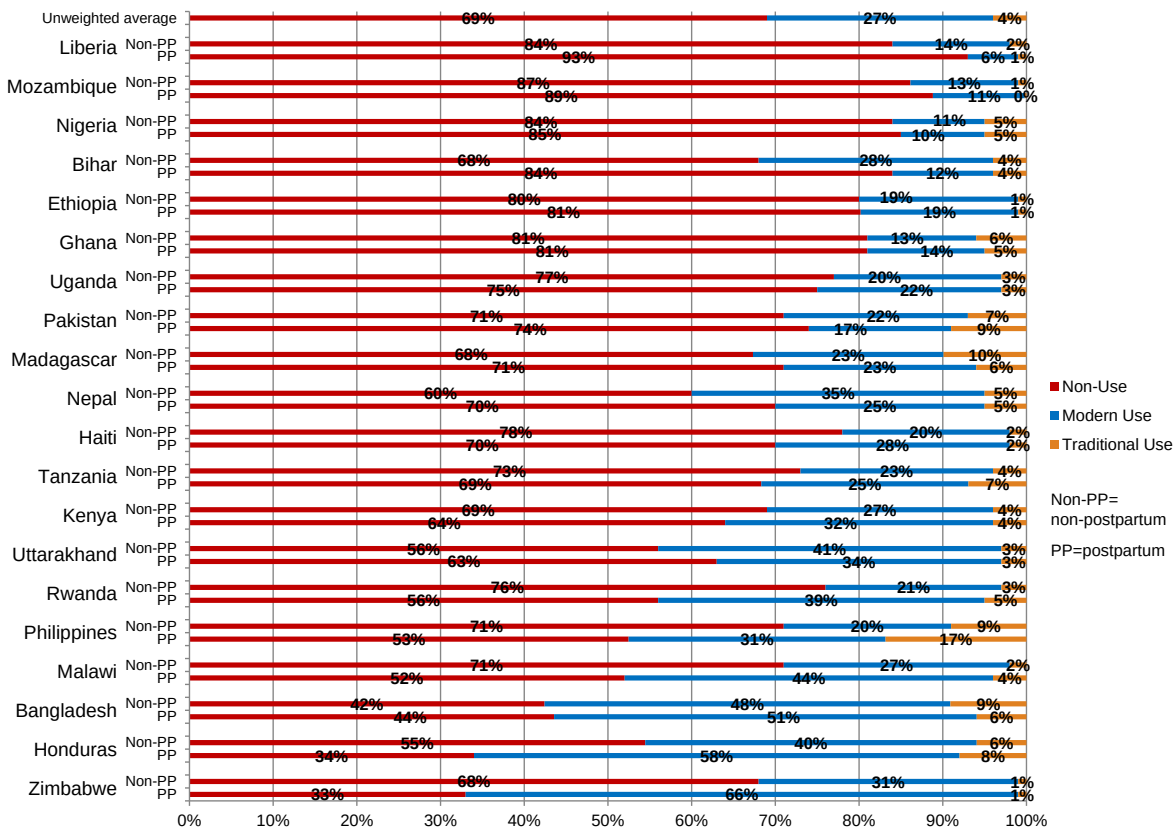



Fig. 4. Percentage of postpartum women 0–23 months who have been sexually active since the last birth who are at risk of pregnancy, by postpartum period*.




[a] The top bar shows the unweighted average family planning use among women 0−23 months postpartum in all included surveys.

Fig. 5. Family planning use among non-postpartum women and women 0–23 months postpartum[a].

## 3. Results

Fig. 2 depicts the percentages of short, long and ideal interpregnancy intervals among nonfirst births in the 5 years preceding the survey. A "short" birth-to-pregnancy interval is defined as a birth that is conceived less than 24 months following a previous birth and corresponds to DHS intervals of <6 months, 6–11 months and 11–23 months. "Long" intervals are 48 months or more following a previous birth and correspond to DHS intervals of 48–59 months and 60+ months. "Ideal" intervals are births that are conceived 24–47 months following a previous birth, corresponding to DHS intervals of 24–35 months and 36–47 months.

In 9 of the 22 surveys, 50% or more of nonfirst births occurred at interpregnancy intervals that are short. In most surveys, short intervals occurred for 40–55% of births. Among the surveys analyzed, the highest percentages of short intervals occurred in Pakistan (60%) and Uganda (59%), and the lowest percentages occurred in Zimbabwe (24%) and Bangladesh (27%). There seems to be no regional clustering. Data for each of the seven interpregnancy intervals analyzed in the DHS are shown in Web Annex Table 2. Among the short intervals, the majority of pregnancies occur between 12 and 23 months after a birth and the percentages of very short (<6 months) intervals are less than 5%, except in certain surveys from Asian countries: Pakistan (10%), Philippines (8%) and Bihar and Uttarakhand (7% each). These four surveys also have the highest percentages of interpregnancy intervals shorter than 1 year, with approximately one in five (19–24%) of second or higher-order live births conceived within 1 year of the previous birth.

In Liberia, Burkina Faso, Ghana, Senegal and Bihar, at least three out of four postpartum women have a prospective unmet need for family planning (Fig. 3 and related Web Annex Tables 3 and 4). Postpartum women in all surveys analyzed, except Bangladesh, Honduras, Malawi and Zimbabwe, have an unmet need exceeding 50%. Notably, in Nigeria and Mozambique, as many as one in five postpartum women desire another pregnancy soon, and another small percentage are infecund (remaining percentages not shown in bar chart). Across all 22 surveys, the unweighted average prospective unmet need for women 0–23 months postpartum is 61%, which is expectedly higher than the unweighted average standard DHS unmet need of 32%. The averages of its component parts, unmet need for limiting and spacing, are 25% and 37%, respectively.

Fig. 4 examines the subset of postpartum women who report being sexually active since the last birth to show the percentage who are neither protected by modern contraceptive use nor infecund as a result of breastfeeding practices or amenorrhea. Web Annex Figs. 1–22 depict the percentage "at risk" of pregnancy by postpartum period for each survey. These percentages typically vary by postpartum period as fecundity and contraceptive use changes. In 11 of the 22 surveys, the percentage continues to increase throughout the 2 years after birth — sometimes substantially — as women return to fecundity but do not use modern contraception. For the remaining 11 surveys, the combination of a higher percentage of postpartum women initiating contraception in the second year after birth than in the first year with an increasing return to fecundity toward the end of the first year creates either a peak in or a flattening of the percentage at risk of pregnancy in the period from 6 to 11 months after birth.

In 12 of the 22 surveys, postpartum women are using family planning in similar proportions (within five percentage points) to their non-postpartum counterparts (Fig. 5). Postpartum women in six of the remaining surveys are more likely to use family planning than non-postpartum women; they are less likely to do so in the two Indian states, Liberia and Nepal. Postpartum women in Zimbabwe have the highest modern method use and the largest difference in modern method use between postpartum and non-postpartum women (66% vs. 31%) among included surveys. The Philippines has the highest traditional method use among postpartum women of all included surveys, at 17% (mostly withdrawal) compared with only 9% of non-postpartum women. Overall, the unweighted average use of family planning among all postpartum women in these surveys is 31%.

The method mix among postpartum women (Fig. 6) is dominated by short-acting methods (51–96% of postpartum contraceptive users), with the exception of the State of Bihar, where 50% of postpartum women use long-acting methods, predominantly female sterilization. Web Annex Table 5 further examines the method mix by survey. Additionally, one in four postpartum women (22–27%) in Uttarakhand, Honduras and Nepal use long-acting and permanent methods, mostly female sterilization. African countries with higher rates of long-acting method use, such as Burkina Faso, Ethiopia, Senegal and Uganda, have rates of implant use between 9% and 15%. Malawi is an outlier for Africa, with a higher rate of female sterilization (9%) than any other long-acting method. In most surveys, pills and injectables dominate short-acting methods. Male condom use features prominently in Uttarakhand (54%), Pakistan (32%), Liberia (21%) and Nigeria (20%). About one in five (22%) Nigerian postpartum women currently using family planning report using LAM. In Bihar, Ghana, Nigeria, Madagascar, Mozambique, Philippines, Pakistan and Tanzania, at least one in five postpartum women relies on traditional methods.

Web Annex Table 6 shows the reasons for nonuse of contraception that were most frequently cited across the 22 surveys. The reasons for nonuse differed by country. The top reasons are: breastfeeding, fear of side effects/health concerns, postpartum amenorrhea, not having sex, infrequent sex and husband/partner opposed. In all surveys, either breastfeeding or postpartum amenorrhea was among the top five reasons for nonuse, and one or the other was the top reason in 15 of the 22 surveys. In two surveys, Bihar and the Philippines, prohibitive cost appeared as a top-five reason; it was the top reason in the Philippines.

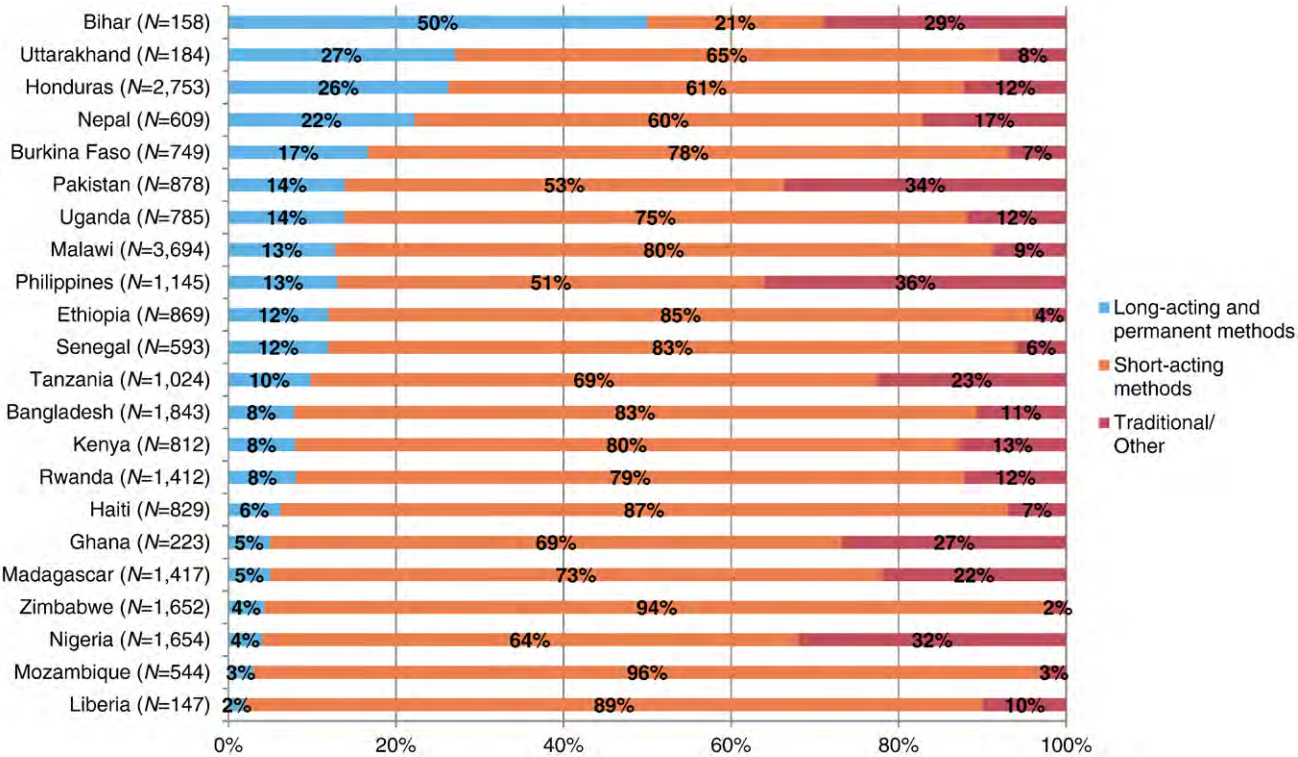



Fig. 6. Method mix by short-acting, long-acting and permanent and traditional methods among women 0–23 months postpartum. Long-acting and permanent methods=implants, intrauterine devices, sterilization. Short-acting methods=pill, injectables, LAM, male condom, Standard Days Method. Traditional/other= periodic abstinence/rhythm, withdrawal, other.

## 4. Discussion

Unmet need for family planning remains universally high among postpartum women in the included surveys, at 61% using the prospective unmet need definition, only slightly lower than the 65% found in the similar analysis published in 2001 [14]. Family planning use also remains low, at just 31% compared with 29% from 2001 [14]. Like their non-postpartum peers, postpartum women have high unmet need for both limiting and spacing methods. Given their high unmet need and the benefits of longer interpregnancy intervals, postpartum women should be encouraged to use contraception as much as, if not more than, non-postpartum women, and barriers to use should be studied further. In Liberia, for example, formative research has uncovered a cultural taboo around sexual activity before “a baby walks” that restricts postpartum family planning uptake [25].

Because we know that infecundity and modern contraceptive use, the two main factors that can protect postpartum women who are sexually active after a birth from an unintended pregnancy, vary over the extended postpartum period, we have proposed a new indicator to capture those at risk of pregnancy in this population. While the percentages of women who are at risk of pregnancy in the extended postpartum period vary greatly across countries, there is a common and logical increase in the percentages as time passes after a birth, as women return to fecundity with or without returning to menses yet do not use modern contraception. In some populations, the percentage peaks at 1 year after the last birth, whereas in others, the percentage continues to rise throughout the second year. In either case, efforts to reach women with family planning counseling earlier, and as early as the antenatal period, are clearly warranted. Additional programmatic options to offer family planning through other health services, such as facility births or well-child and immunization visits, could address these needs.

The new composite pregnancy risk indicator takes into account those who should be protected from pregnancy by amenorrhea and breastfeeding more systematically than women’s self-reported reasons for nonuse. Regardless of menstrual status, women 0–5 months postpartum who are exclusively breastfeeding are unlikely to have ovulatory cycles; for these women, ovulation returns later in the first year or once other foods are introduced [16]. Research has shown that postpartum women misunderstand the return to fecundity [18,26–28]. This is true even among self-reported LAM users: a recent analysis of DHS data showed that many

did not adhere to all three criteria for LAM effectiveness at the time of the survey [29]. Nevertheless, when postpartum women are exposed to postpartum family planning messages during other visits to health facilities, such as during labor and delivery, they are more likely to adopt a modern method [30,31]. In addition, community-based programs can increase the use of effective contraceptive methods in the postpartum period [32].

Even when postpartum women are using family planning, they rely overwhelmingly on short-acting methods and, in some countries, on traditional methods. A review of postpartum family planning program implementation found that increasing the range of methods offered at the time of birth or in the first six weeks postpartum increased the adoption of long-acting methods [30]. In addition, misconceptions about the appropriateness of long-acting and permanent methods for postpartum women among both providers and communities may be at play and are worth further exploration [33,34]. Postpartum women in sub--Saharan African countries, especially in West Africa, have a higher need for spacing than limiting, but long-acting reversible methods may still be acceptable if accessible.

There are many limitations to using cross-sectional surveys to analyze a segment of time in the reproductive life course. Certain analyses, such as method mix among postpartum women currently using contraception in surveys where overall use is low (Bihar, Ghana, Liberia and Uttarakhand), are based on small sample sizes, between 147 and 223 women. Furthermore, our analysis does not include pregnancies that resulted in a miscarriage, abortion or stillbirth. As a result, when live births are preceded by a nonlive pregnancy, we likely underestimate the proportion of births that are closely spaced. The prospective unmet need definition that we adapt has its own, well-recognized challenges, such as: (1) the inclusion of pregnant women who cannot have met need; (2) the inclusion of women who report “no sex/wants to wait” (though this is a small percentage); and (3) the same 24-month cutoff for postpartum amenorrhea as the standard DHS definition that is unrealistically long. We also used estimates of exclusive breastfeeding that likely overstate its usage, perhaps by as much as 50% [35]. Our new composite pregnancy risk approach attempts to address some of these challenges but must also be carefully interpreted because it equates pregnancy risk between the first and second years postpartum. Return to fecundity is actually more gradual and less clearcut than our assumptions, albeit conservative ones, and resulting analysis suggest. Furthermore, our pregnancy risk approach examines only a subset of sexually active women.

Unmet need for family planning is now a critical indicator for tracking achievement of international development goals; thus, it is important to consider whether the standard DHS definition sufficiently captures postpartum women’s reproductive intentions and unmet need. Because the standard DHS definition is based on the desire for the last birth, not on future fertility preferences that capture the potential for a closely spaced, subsequent birth, it likely underestimates unmet need for effective contraception in the extended postpartum period. Indeed, data from our analysis show that unmet need, if prospectively defined for postpartum women, is double that calculated using the standard DHS unmet need definition. In addition, our new composite pregnancy risk indicator attempts to quantify the large and generally increasing percentage of postpartum women who are — sometimes obliviously — at risk of pregnancy throughout the extended postpartum period. These findings need to be recognized in population-based surveys to more accurately measure unmet need and assess pregnancy risk among this subgroup of women. In advocating for and developing programs for postpartum women, we should continue to refine unmet need calculations for this population using a prospective definition, perhaps reducing the standard DHS definition’s amenorrhea cutoff to 6 months and improving estimates estimations of exclusive breastfeeding. Advocates may also wish to use a composite pregnancy risk indicator that is based on actual family planning practices and behaviors during the extended postpartum period to make the case for effective integration of services.

## 5. Conclusion

Despite increased attention to postpartum women as an important target population for family planning programs, overall unmet need for family planning in the extended postpartum period remains high, and pregnancy risk escalates during this period, suggesting that more targeted activities are needed to effectively reach this population at scale with the right messages and services. Large-scale surveys such as the DHS provide the means to explore this population further and better identify the missed opportunities to provide optimal access to family planning.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.contraception.2015.03.007.

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