Uptake of contraception following childbirth or pregnancy termination: implications for quality of care in developing countries: A preliminary analysis

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Introduction

Providing information and services to meet fertility desires of couples is a goal enshrined by the 1994 International Population Conference on Population and Development (ICPD). Yet, the timing of contraceptive uptake, choice and continuation of use following birth or pregnancy terminations/miscarriages are poorly understood. Short inter-pregnancy intervals are a well-established risk factor for child health and survival. Post-partum contraception is thus of special public health importance. While this topic has been investigated by Pebley, Goldberg and Menken (1985) and others, the availability of Demographic and Health Surveys (DHS) calendar data permits more thorough analyses than have been possible hitherto.

The analysis makes use of DHS calendar data on dates of birth and pregnancy terminations and durations of postpartum amenorrhoea, abstinence and breastfeeding for 19 developing countries. The main emphasis is on behavior following live births, in terms of contraceptive uptake, discontinuation and switching, but post-pregnancy termination/miscarriage is also examined. The main objectives of this analysis is to identify gaps in post-partum protection (both, natural and contraceptive) in the 12 months following pregnancy termination and to suggest ways in which postpartum provision of services and advice might be improved.

More specifically, the paper attempts to answer the following research questions:

1. What is the extent of redundant contraceptive protection during the post-partum period and how does this vary across countries and by type of methods?
2. Is there any relation between the timing of post-partum uptake of a method and contraceptive discontinuation or switching?
3. Does a contact with health personnel during pre-partum or intra-partum periods leads to an early uptake of a contraceptive method?

Data and methods

The data used in this study come from 35 Demographic and Health Surveys (DHS) conducted between 1990-2000 in 19 developing countries and coordinated by ORC Macro with funding from the US Agency for International Development (USAID) (see Appendix A for the surveys information). The DHS is the most important source of nationally representative information on contraceptive use in developing countries. The DHS offers advantages for comparative analyses since the surveys use standardized instruments, training, data collection and data processing.

All surveys which collected detailed histories of contraceptive use were selected for this. These histories take the form of month-by-month calendars for at least five years prior to the interview date. The type of method, dates of starting and ending episodes of use together with main reason for stopping, are ascertained. Pregnancies, live births and

terminations are also recorded but no attempt was made to distinguish spontaneous from induced abortions. This retrospective method of measurement obviously taxes the memory of respondents but recall is aided by prior entry into the calendar of live births ascertained earlier in the interview. The calendar section of the survey also contains detailed information (i.e., month-by-month) on marriages and unions history and information on residential mobility, which further helps to date episodes of contraceptive use.

Durations of postpartum amenorrhea, sexual abstinence and breastfeeding following live-births in the five-years before the survey (or three years in some surveys) collected in the maternity history section, were mapped into the calendar as months of postpartum insusceptibility and breastfeeding. In the paper, insusceptibility is defined by length of post-partum amenorrhea (or by length of post-partum abstinence if that is longer). For the small number of women who conceived before resumption of menses, the length of insusceptibility is defined by the conception. For abortions and miscarriages, a month of post termination insusceptibility was assumed. Periods of overlap between contraceptive use and postpartum insusceptibility were calculated and the time of contraceptive uptake is classified into before, at the same time, or after susceptibility. Post partum periods when women were breastfeeding and ammenorrheic were also calculated.

A wide range of reasons for stopping use is given by DHS respondents. For this analysis, these were presented in three categories: all causes; method-related reasons, comprising all reasons that imply some form of dissatisfaction with the method or associated services, which includes health concerns and side-effects, inconvenience of use, desire to switch to a better or more effective method, husband's dislike of the method, cost of the method and its lack of availability; and health-related reasons plus side-effects which is one component of method-related reasons.

A binary variable was constructed to indicate whether a delay in contraceptive uptake occurred in the 12 months post-partum or not. Delayed uptake was defined as contraception uptake at least one month after resumption of susceptibility or became susceptible and did not use any method. Women who became pregnant again without prior use of a method were also included in this category. The other category comprises women who started contraception before or in the same month as resumption of susceptibility.

Kaplan-Meier method (or single decrement life table) was applied to estimate the median duration of amenorrhea, sexual abstinence, breastfeeding and insusceptibility following live birth. This method was also used to estimated the 12-month probabilities of discontinuation of the first method used in the post-partum, for all reasons, for health concerns including side-effects and for all method-related reasons (Ali and Cleland, 1995).

Time to first post-partum event (contraceptive uptake, pregnancy or no use) was analyzed using cumulative incidence (or multiple-decrement life table). Standard errors of the cumulative incidence were calculated using methods developed in counting process and implemented in Stata (Ali, Babiker and Cleland, 2001 & Ali, 2000).

The influence of contact with skilled health personnel during antenatal care and during delivery on timely uptake was also assessed. In addition to the crude relative risk of contraceptive delay, the relative risks were adjusted for place of residence, women's level of education, age at conception, number of living children at use, and desire for another child, using Mental-Mantel-Haenszel methods.

The survey standardized sample weights (i.e., the inverse of the probability of selection corrected for non-response) were applied in all analysis. The cumulative incidence standard errors were estimated assuming a simple random sample, this approach underestimates the standard errors, one way to correct for this bias is to use the bootstrap methods (Ali, Babiker and Cleland, 2001). All analyses were implemented in Stata version 8 (www.stata.com).

Results

In order to first describe the context, we provide the background information from the data included in the paper. Overall, 196,274 pregnancies in 19 countries during the three years prior to the survey were covered by the analysis. The number of pregnancies by country differed with Indonesia contributing the largest number (35,562). A majority (76%) of all pregnancies ended in live birth, while 9% were terminated or miscarried and 14% were still continuing (Table 1). In all countries, except in Armenia, Kazakhstan and Turkey, over 70% of pregnancies during the last three years ended in a live birth. These three countries have more liberal abortion laws and show high percentage of pregnancies terminated or miscarried, especially in Armenia (58%). The median succeeding pregnancy interval, based on termination of pregnancies (live birth, abortion or miscarriage) to next conception was within the narrow range of 23-25 months for all countries (with an overall median or 25 months), except in Armenia and Kazakhstan (29 and 26 months, respectively).

Following a live birth, the median length of breastfeeding was 13 months, compared to 3.6 months for amenorrhea, 2 months for sexual abstinence and 5.6 months for insusceptibility (Table 2). As noted earlier, insusceptibility is defined by the absence of menses and sexual relations. Country variations are noteworthy with Armenia, Brazil, Jordan, Morocco and Turkey representing shorter (3 months or less) lengths of amenorrhea and insusceptibility periods, compared to Bangladesh, Bolivia, Guatemala, and Kenya, where these are prolonged on average approximately to 10 months or longer.

Contraceptive uptake following live-birth or pregnancy termination/miscarriage

The type of first contraceptive method adopted following a live birth or pregnancy termination (including miscarriage) and before the next conception show a wide variety of patterns (Table 3). In Bangladesh, Brazil, Dominican Republic, Kenya and Zimbabwe, oral contraceptive pill dominated the first contraceptive episodes, whereas IUD was the main method in Egypt and Kazakhstan, injections in Indonesia and Kenya, periodic abstinence in Bolivia and withdrawal in Armenia and Turkey. Another noteworthy finding is that at least one in five first contraceptive episodes following a live birth or pregnancy termination were accounted for by (female) sterilization in Brazil, Dominican Republic and Nicaragua. The condom remains one of the less favored first contraceptive method, but 17% of all first contraceptive episodes in Turkey and 13% in

Guatemala and Kazakhstan were of the condom. Overall, the oral pill is the most common type of first contraceptive episode. It is interesting to note that the type of the contraceptive method adopted following a live birth or pregnancy termination/miscarriage show the widest variety of patterns than any other indicator included in this study.

One simple way to identify gaps in post-partum protection is to examine the incidence of contraceptive uptake or conception. Following live births and pregnancy terminations, the cumulative incidence of contraceptive adoption (prior to conception) by month 12 was 55% (Table 4). By 12 month, 13% conceived and the remaining (about 32%) episodes were followed by non-use up until the 12^{th} month. Country variations in the 12-month cumulative incidence rate of contraception uptake or conception are striking. On one hand, one finds Bangladesh with a relatively low 12-month cumulative rate of contraceptive uptake (36%), together with a relative low conception rate (8%). On the other hand, several countries (for example, Armenia, Brazil, Dominican Republic, Egypt, Jordan, Kazakhstan, Nicaragua, and Turkey) manifest a relatively high incidence of contraceptive uptake, together with relatively high conception rates. Among the 19 countries, Jordan stands out for the highest (24%) incidence of conception, together with a relatively high (54%) contraceptive uptake. Other countries show the expected direction of relationship, that is, a high contraception uptake, together with a low conception rate and vice versa. Conception rates also show the extent (6% to 24%), to which high risk birth interval of less than two years prevail in these countries. Preventing short birth intervals still poses a challenge for maternal and child health in many countries.

The post-partum (or post-abortion) contraceptive trajectory obviously goes beyond the simple relationship between contraception and conception and includes breastfeeding, post-partum sexual abstinence, amenorrhea and insusceptibility. Countries with prolonged duration of breastfeeding are characterized with prolonged amenorrhea and insusceptibility (see Table 2) and in these countries one finds low contraceptive uptake with low conception rate within the 12 months following a live birth or pregnancy termination/miscarriage.

Timing of contraceptive uptake

The optimal timing of contraceptive uptake is central to meeting a couple's need for protection during the post-partum period and a hallmark for any successful family planning program. Contraceptive episodes started during insusceptibility represent a redundant protection while those that started one or more months after resumption of menses imply expose to the risk of conception. In some regards, the optimal time to start use is the month when 'natural' protection ends. Hormonal methods such as low-dose combined oral pill or combined injectable contraception are suggested for use at 6 months or later post-partum among women breastfeeding, and 21 days or later among those who are not breastfeeding (WHO, 2003). IUDs, on the other hand, can be inserted within 48 hours post-partum, irrespective of the breastfeeding status, or at 4 weeks or later. The available data do not provide the detailed breakdown by type of hormonal pill. We have classified contraceptive methods into two types: (a) hormonal; and (b) non-hormonal to take into account the fact that hormonal methods often induce monthly bleeding (and thus mimic menses). Furthermore, many women are aware that combined oral contraceptives are contraindicated during the first 6 months of lactation.

Nearly one-third (29%) of all live-births are followed by contraceptive uptake during insusceptibility (Table 5). As expected, the extent of redundant protection (i.e., using while insusceptible) was much higher (42%) for non-hormonal methods than for hormonal methods (15%). Importantly, in all countries and for both types of methods, perfect users (that is those starting use on susceptibility) are fewer (8%) than those who start sooner (29%) and experience redundant protection or start later (63%) and expose themselves to the risk of unintended pregnancy. The extent of redundant protection is much greater for non-hormonal methods and perhaps linked both to the post-partum insertion of IUDs or female sterilization as well as to such methods as abstinence or withdrawal. In Zimbabwe, 72% start using hormonal methods - mainly oral pill, during insusceptibility. Over 42% in Indonesia and Kenya follow the same pattern. Perhaps more disturbing is the finding that most episodes of hormonal contraceptives start after the return of susceptibility to pregnancy. [Note that episodes of hormonal contraceptives constitute 43% of all post-partum contraceptive episodes.] The information on breastfeeing and amenorrhea was obtained in a different part of the questionnaire and, therefore, recall errors cannot be ruled out while comparing the timing of uptake (which was in the calendar) in relation to insusceptibility. We shall examine whether the timing of contraceptive uptake has any bearing on the continuation of use or switching to another method. However, it is obvious that post-partum contraceptive uptake is far from being optimal in all of the countries studied.

The overall length of overlap between insusceptibility and hormonal contraceptive use was close to one month (Table 6). However, for those with an overlap, the median length was 5 months, compared to 2 months for all and 6 months for those with an overlap, for non-hormonal methods. The range of the overlap for hormonal methods is 2.5 months in Armenia to 8.7 months in Zimbabwe, compared to 4.6 months in Paraguay to 8.5 months in Bolivia for the non-hormonal methods. In general, the length of overlap is greater for the non-hormonal than for hormonal methods.

We also considered the empirical evidence with implications for a wider application of LAM. Overall, 43% are still breastfeeding and amenorrheic at six months post-partum, but countries range on this indicator from 5% in Armenia to 69% in Bangladesh (Table 7). In eight of the 19 countries, over 50% are still breastfeeding and amenorrheic at six-month post-partum.

Contraceptive discontinuation in relation to timing of adoption

In Table 5, it was shown that an appreciable minority of women who start post-partum contraception before conceiving again do so before the return of menses. A smaller minority start use in the same month that exposure to risk of conception resumes while over half delay contraception by at least one month after exposure to risk has resumed. Among those who start contraception during lactational amenorrhea, the length of overlap is considerable (Table 6).

Is this variation in timing of postpartum adoption related to uninterrupted length of subsequent use? While there are no compelling biological considerations for expecting a relationship, answers to the question have considerable practical relevance to the optimal nature of postpartum counselling and services.

A preliminary analysis on the pooled data set is shown in Table 8, in terms of cause-specific 12 month probabilities of discontinuation. The left hand panel gives the all-reason probabilities, the middle panel is restricted to discontinuation because of health concerns and side-effects (a major reason for stopping in many countries) while the right hand panel provides results for all reasons that imply dissatisfaction with the method or associated services. These include health concerns, side-effects, inconvenience, objections by spouse and desire to switch to a more effective method.

About 30% of all postpartum contraceptive episodes are discontinued for any reason within the first 12 months of adoption. In accordance with results from other studies, discontinuation of condoms is particularly high while IUD discontinuation is particularly low. For each method, couples who initiated use before return of menses are less likely to discontinue within 12 months than other couples. Furthermore, for all methods except IUD and withdrawal, those who start use in the same month as exposure to conception occurs are less likely to discontinue than those who delay the start of contraception.

One possible reason for the pattern of results in the left-hand panel, of course, is low failure rates among couples who initiate use before susceptibility resumes. In the middle and right-hand panels, failure is excluded and yet the same dominant association is apparent. With the exception of condoms and periodic abstinence, couples who start use before return of menses are less likely to discontinue because of health concerns than other couples. And with the single exception of the condom, early contraceptive adopters are also less likely than other couples to stop for any method-related reason. However, the differences between those who start use in the same month as resumption of menses and those who delay adoption tend to be small and erratic in direction.

Interpretation of these pooled, unadjusted results needs to be cautious, pending more rigorous analysis. One confounding factor may be motivation for pregnancy-avoidance. It is plausible that early adopters are more likely to want to limit family size than later adopters. As shown in previous analyses, the nature of contraceptive motivations (limitation versus spacing) tends to be a powerful determinant of discontinuation.

Contact with health personnel and contraceptive uptake

As stated earlier, we expect to find a positive relationship between contact with health staff during pregnancy and delivery, on the one hand, and prompt uptake of contraceptive in the post-partum period. Two main considerations underlie this expectation. First, public-sector family planning services are typically integrated with maternal and child health services and thus pre- and intra-partum contact with trained health staff offers an opportunity for counselling about future contraceptive needs. Second, it seems reasonable to assume that willingness and ability to access maternity services will be correlated with a similar propensity to use family planning services

Table 9 shows the coverage of antenatal and natal care in the 19 study countries. The pooled average estimate for live births in the preceding three years show that 66% of fertile pregnancies have the benefit of at least one antenatal visit from a skilled health worker and that 57% of deliveries were assisted by a skilled worker: most of these deliveries are institutional. In 8 of the 19 countries (Bolivia, Brazil, Colombia,

Dominican Republic, Egypt, Jordan, Morocco and Peru), the difference in antenatal and natal coverage is 5% or less, implying a high correlation between the two types of service: those who receive antenatal care have an assisted delivery, and vice versa. In 3 countries (Armenia, Kazakhstan and Turkey) supervised delivery is more common than receipt of antenatal care. In the remain 8 countries, supervised deliveries are appreciably less common than uptake of antenatal care, no doubt for a variety of reasons including financial costs.

The link between receipt of antenatal and natal care and contraceptive uptake was assessed in terms of the timing of contraceptive use (if any) in the postpartum. Women who delayed contraception for at least one month after the return of menses and sexual relations or used no method at all were classified as cases of delayed uptake. This category includes those who became pregnant before starting contraception and the small number of women who conceived before resumption of menses. Women who initiated use before or at the same time as susceptibility commenced form the other group. Women still insusceptible at time of survey were excluded from the analysis.

The results are shown in Table 10 in terms of crude and adjusted relative risks of delayed contraceptive uptake. The latter risks are adjusted for maternal age at conception, number of living children, whether desired family size is less, equal to or greater than living children, place of residence and mother's education. In addition, the pooled results at the foot of the table are shown unadjusted and adjusted for country.

The unadjusted or crude relative risks show large associations between receipt of maternity services and delayed (or no) contraceptive adoption in the post-partum. The pooled data shows a 50% elevated risk of delayed contraception among those who received no antenatal care compared with those who did. All country-specific results are in the same direction and all are statistically significant. The association is particularly strong in Brazil and Turkey. The unadjusted results for natal care are similar, with a 1.66 relative risk of delayed contraception among those whose delivery was unsupervised compared with the medically supervised group (pooled data). Again, all country-specific results are statistically significant, with the single exception of Kazakhstan, where 99% of deliveries were supervised.

The strength of these associations is severely attenuated after adjustment for demographic, socio-economic and motivational factors. In the pooled data, the adjusted relative risk of delayed contraceptive uptake associated with non-receipt of antenatal care is 1.07, which reduces further to 1.05 when an additional adjustment for country is introduced. The corresponding estimates for non-receipt of natal care are 1.11 and 1.06. The adjusted country-specific results remain statistically significant at the 95% confidence level in 14 countries for ante-natal care and 15 countries for natal care. However, these significant effects are small in magnitude: the adjusted relative risks exceed 1.10 for non-receipt of natal care in only three countries (Morocco, Nicaragua, Zimbabwe) and for non-receipt of natal care in only four countries (Dominican Republic, Morocco, Nicaragua, Turkey).

The tentative conclusion from this component of the exploratory analysis is clear: while links are apparent between use of maternity services and prompt uptake of post-partum contraception, they are rather weak once controls for common causes (such as maternal

education and rural-urban residence) are introduced. More positive results might be obtained if attention is restricted to modern methods or methods requiring clinical supervision (sterilization, IUD, Norplant, injectable).

Discussion:

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Table 1: Pregnancies conceived or resolved during the last 3 years prior to the survey, by country

Country		Total	Pregnancy outcome			Median succeeding pregnancy interval[1]
			Current pregnancy	Termination	Live birth	
Armenia		2,595	7.2	58.0	34.9	28.5
Bangladesh		9,825	14.6	8.7	76.7	25.5
Bolivia		4,581	13.7	8.0	78.3	24.5
Brazil		6,509	13.8	12.5	73.7	25.3
Colombia		10,971	14.6	11.7	73.7	24.5
Dominican		6,945	14.1	14.1	71.8	23.9
Egypt		25,195	14.8	11.9	73.3	24.9
Guatemala		10,312	13.6	5.5	80.9	23.8
Indonesia		35,562	14.1	6.2	79.7	24.7
Jordan		12,185	14.9	13.9	71.2	24.2
Kazakhstan		1,716	8.1	44.0	47.9	26.3
Kenya		4,235	13.8	5.6	80.6	23.2
Morocco		3,954	15.9	7.8	76.3	24.2
Nicaragua		5,858	14.0	7.3	78.7	25.1
Paraguay		3,155	13.9	10.0	76.1	24.3
Peru		27,019	13.0	9.4	77.7	25.1
Philippines		12,829	13.8	9.2	77.1	24.4
Turkey		6,888	13.4	24.3	62.3	25.0
Zimbabwe		5,940	16.4	8.0	75.6	24.3
Total	**Pooled**	**196,274**	**14.0**	**10.8**	**75.2**	**24.8**
	Median		**13.9**	**9.4**	**76.1**	**24.5**

[1] from termination of pregnancy to the next conception during the last 5years

Table 2: Median duration of breastfeeding, amenorrhea, sexual abstinence, and insusceptibility (following live birth in last 3-years)

Country		Breastfeeding	Amenorrhea	Abstinence	Insusceptibility
Armenia		6.5	2.6	1.4	3.0
Bangladesh		28.8	10.3	1.4	10.6
Bolivia		16.7	9.4	2.6	10.9
Brazil		5.5	1.7	1.4	2.5
Colombia		11.0	3.0	2.3	4.1
Dominican		5.9	2.7	2.0	3.4
Egypt		18.5	3.6	1.1	3.8
Guatemala		27.5	9.8	2.3	10.9
Indonesia		24.4	6.5	2.4	7.2
Jordan		12.0	2.3	1.1	2.4
Kazakhstan		12.5	5.1	1.4	5.7
Kenya		22.4	8.8	3.3	10.9
Morocco		14.6	2.6	1.0	3.0
Nicaragua		12.0	3.6	2.5	5.9
Paraguay		10.3	3.3	1.3	4.3
Peru		18.4	8.1	2.3	9.0
Philippines		11.9	4.7	2.5	5.6
Turkey		12.0	2.5	1.2	2.9
Zimbabwe		18.7	11.8	3.3	12.3
Total	**Pooled**	**18.0**	**5.5**	**1.9**	**6.2**
	Median	**12.5**	**3.6**	**2.0**	**5.6**

Table 3: Number of first contraceptive-use episodes that started after birth or pregnancy termination (and before next conception), by country and contraceptive method (the last 3 years before the survey)

Country		episodes	Pill	IUD	Injections	Condom	Sterilization	PA[1]	Withdrawal	Other[2]	Norplant	LAM/PBF[3]	Total
		N	%	%	%	%	%	%	%	%	%	%	%
Armenia		1,695	2	5	0	11	1	7	58	3	0	13	100
Bangladesh		3,615	53	4	13	11	2	10	5	2	0	0	100
Bolivia		1,671	8	10	2	3	4	51	5	18	0	0	100
Brazil		3,560	48	1	4	8	26	5	8	1	0	0	100
Colombia		6,701	25	12	7	11	11	9	13	9	0	3	100
Dominican		3,519	43	4	2	8	23	6	8	3	1	2	100
Egypt		11,005	26	54	8	3	1	1	1	1	0	7	100
Guatemala		2,084	21	6	20	13	18	15	6	1	0	0	100
Indonesia		17,405	23	12	49	2	2	2	2	1	6	0	100
Jordan		5,422	18	28	1	4	3	11	14	9	0	12	100
Kazakhstan		1,008	7	39	2	13	1	7	7	7	0	16	100
Kenya		1,314	29	3	30	7	4	22	2	3	1	0	100
Morocco		1,541	78	4	0	2	1	7	6	1	0	0	100
Nicaragua		2,725	34	18	13	7	22	2	1	3	0	0	100
Paraguay		1,198	30	7	16	6	7	11	4	19	0	0	100
Peru		14,342	11	12	21	8	7	27	6	6	0	2	100
Philippines		4,881	25	6	4	5	7	18	26	1	0	8	100
Turkey		3,893	10	17	1	17	3	2	48	3	0	0	100
Zimbabwe		3,272	73	0	8	5	1	1	7	2	0	2	100
Total	**Pooled**	**90,848**	**26**	**16**	**17**	**6**	**6**	**10**	**9**	**4**	**1**	**3**	**100**
	Median		**25**	**7**	**7**	**7**	**4**	**7**	**6**	**3**	**0**	**0**	

[1] PA= Periodic Abstinence, [2] includes abstinence, Diaphragm/Foam/Jelly, massage, vaginal douche, [3] PBF= Prolonged Breastfeeding

Table 4: 12-month cumulative incidence rates of first event after birth or pregnancy termination, by country

		Contraceptive uptake		Conceptions	
Country		Rate	SE	Rate	SE
Armenia		72.1	0.57	14.0	1.1
Bangladesh		35.7	0.76	7.7	0.5
Bolivia		41.8	1.28	11.6	0.8
Brazil		65.0	0.56	13.6	0.7
Colombia		73.9	0.78	7.5	0.4
Dominican		60.9	0.84	14.6	0.8
Egypt		51.8	0.34	15.5	0.4
Guatemala		24.0	0.46	14.6	0.8
Indonesia		57.5	0.39	7.5	0.3
Jordan		54.0	0.40	24.4	0.8
Kazakhstan		64.5	0.70	14.7	1.5
Kenya		34.6	0.84	10.7	0.9
Morocco		43.8	0.96	12.0	0.9
Nicaragua		55.2	0.89	11.9	0.9
Paraguay		44.3	1.20	16.3	1.3
Peru		59.0	0.62	7.3	0.3
Philippines		44.7	0.66	16.9	0.6
Turkey		68.0	0.86	13.3	0.8
Zimbabwe		68.1	0.82	5.5	0.5
Total	**Pooled**	**54.0**	**0.16**	**11.8**	**0.13**
	Median	**55.2**		**13.3**	

Table 5: Percent distribution according to timing of contraceptive uptake during 12-month post-partum, by type of method, and country

		All methods				Hormonal methods[1]				Non-hormonal methods[2]			
		N	Relative to insusceptibility			N	Relative to insusceptibility			N	Relative to insusceptibility		
Country			Before	Same time	After		Before	Same time	After		Before	Same time	After
Armenia		1,688	17.8	5.5	76.7	38	12.1	0.0	87.9	1,313	10.4	4.3	85.3
Bangladesh		2,554	10.6	2.8	86.5	1,579	5.6	2.0	92.5	729	21.2	4.2	74.6
Bolivia		1,484	41.1	7.2	51.7	138	15.0	9.2	75.8	631	63.8	6.8	29.4
Brazil		3,454	25.3	11.2	63.5	1,783	11.8	7.5	80.7	1,511	41.7	15.4	42.9
Colombia		6,491	29.7	11.3	59.0	2,046	8.9	7.6	83.5	3,688	40.7	14.5	44.8
Dominican		3,373	25.7	11.3	63.1	1,490	6.7	7.1	86.2	1,596	42.1	16.2	41.8
Egypt		10,297	24.9	5.1	70.0	3,292	15.1	4.8	80.1	6,152	22.3	5.3	72.4
Guatemala		1,925	37.6	7.8	54.6	747	21.7	6.6	71.7	896	49.4	9.5	41.2
Indonesia		15,931	43.9	11.4	44.8	12,193	41.9	11.3	46.8	3,400	51.4	12.3	36.3
Jordan		5,275	29.0	7.4	63.6	971	15.3	7.1	77.7	3,052	27.0	7.3	65.7
Kazakhstan		977	28.2	5.6	66.3	91	11.2	2.1	86.7	655	19.1	4.8	76.1
Kenya		1,139	52.5	11.0	36.5	655	46.8	12.1	41.1	218	51.8	9.6	38.6
Morocco		1,329	7.5	3.0	89.5	1,024	5.6	2.5	91.9	211	17.1	4.3	78.7
Nicaragua		2,574	43.0	14.6	42.4	1,189	28.0	13.7	58.4	1,325	56.4	15.6	28.0
Paraguay		1,094	16.2	6.8	77.1	490	4.6	3.4	92.1	480	26.5	10.7	62.8
Peru		12,588	33.7	6.9	59.4	3,974	32.8	7.5	59.7	5,328	46.7	9.1	44.2
Philippines		4,505	37.5	9.1	53.4	1,210	18.4	9.0	72.5	2,088	44.3	9.6	46.1
Turkey		3,809	20.2	8.2	71.7	390	10.3	3.3	86.5	3,354	21.4	8.7	69.9
Zimbabwe		3,146	71.7	8.6	19.7	2,573	72.2	8.8	19.1	506	68.6	7.7	23.7
Total	**Pooled**	**83,634**	**33.3**	**8.6**	**58.1**	**35,873**	**29.8**	**8.4**	**61.8**	**37,131**	**36.4**	**9.5**	**54.1**
	Median		**29.0**	**7.8**	**63.1**		**15.0**	**7.1**	**80.1**		**41.7**	**9.1**	**44.8**

[1] Hormonal methods are OCs, Injectables and Norplant, [2] Non-hormonal methods include: IUD Diaphragm/Foam/Jelly, Male or Female Condom, Male or Female Sterilization, Withdrawal, Abstinence, Herbs, Massage, vaginal douche

Table 6: Mean length (in months) of overlap between insusceptibility and hormonal and non-hormonal contraceptive use, by country

		Hormonal Methods				Non-hormonal methods			
		All episodes		overlapped only		All episodes		overlapped only	
Country		N	mean	N	mean	N	mean	N	mean
Armenia		38	0.3	5	2.5	1,313	0.5	137	5.0
Bangladesh		1,579	0.4	88	7.4	729	1.4	154	6.6
Bolivia		138	0.5	21	3.4	631	5.4	403	8.5
Brazil		1,783	0.8	211	6.9	1,511	2.2	630	5.4
Colombia		2,046	0.4	181	4.4	3,688	2.1	1,502	5.1
Dominican		1,490	0.3	100	3.8	1,596	2.1	671	5.0
Egypt		3,292	0.9	497	6.2	6,152	1.3	1,373	6.0
Guatemala		747	1.6	162	7.4	896	3.2	442	6.5
Indonesia		12,193	3.6	5,110	8.6	3,400	3.4	1,748	6.6
Jordan		971	0.8	148	5.1	3,052	1.7	823	6.3
Kazakhstan		91	0.4	10	4.0	655	1.0	125	5.3
Kenya		655	2.9	307	6.2	218	3.4	113	6.5
Morocco		1,024	0.3	57	5.4	211	1.0	36	5.8
Nicaragua		1,189	1.5	332	5.4	1,325	3.5	747	6.3
Paraguay		490	0.2	22	3.5	480	1.2	127	4.6
Peru		3,974	2.6	1,304	8.0	5,328	2.8	2,490	6.0
Philippines		1,210	1.0	223	5.6	2,088	2.3	926	5.1
Turkey		390	0.5	40	4.4	3,354	1.0	717	4.5
Zimbabwe		2,573	6.3	1,856	8.7	506	5.1	347	7.4
Total	**Pooled**	**35,873**	**2.4**	**10,676**	**7.9**	**37,131**	**2.2**	**13,512**	**5.9**
	Median		**0.8**		**5.4**		**2.1**		**6.0**

Table 7: Percentage of women who were still breastfeeding and amenorrheic at six-month post-partum, by country

Country		N	%
Armenia		409	5.4
Bangladesh		4917	69.2
Bolivia		2006	65.1
Brazil		1418	22.7
Colombia		2139	33.1
Dominican		1922	29.2
Egypt		7616	47.1
Guatemala		5328	57.5
Indonesia		11960	54.7
Jordan		3087	29.9
Kazakhstan		382	25.3
Kenya		1976	58.9
Morocco		1594	51.4
Nicaragua		1887	43.2
Paraguay		1223	41.5
Peru		9845	66.8
Philippines		4924	42.8
Turkey		1377	28.9
Zimbabwe		1316	56.2
Total	**Pooled**	**65327**	**51.5**
	Median		**43.2**

Table 8: 12-month discontinuation probabilities (per 100 episodes), by time of uptake relative to post partum susceptibility (pooled data)

	All reasons including failure			Health concerns			Method-related		
Method	Before	Same time	After	Before	Same time	After	Before	Same time	After
All methods	**28.2**	**32.7**	**35.8**	**8.1**	**11.4**	**12.8**	**21.7**	**22.9**	**23.2**
Pill	27.7	31.6	39.8	13.2	15.4	20.3	20.4	22.8	28.3
IUD	11.4	16.3	15.7	7.0	11.0	10.5	9.1	14.1	12.2
Injections	24.6	31.3	35.2	15.4	18.1	21.8	21.8	26.3	29.7
Condom	43.5	49.4	54.2	3.1	1.6	4.2	36.5	36.5	39.2
Periodic Abstinence	27.1	35.8	39.8	0.6	0.6	0.6	13.2	15.3	14.3
Withdrawal	31.5	49.4	43.5	0.9	1.7	1.1	20.6	26.3	19.5

Table 9: Percentage of live births in which mothers had a contact with health personnel during pregnancy and delivery, by country (live birth during the last 3 years)

Country		Number of live birth	ANC	Assisted with delivery
Armenia		904	82	96
Bangladesh		7457	27	9
Bolivia		3555	52	47
Brazil		4770	78	82
Colombia		8060	83	85
Dominican		4974	98	94
Egypt		18353	51	53
Guatemala		8318	56	37
Indonesia		28178	61	43
Jordan		8657	89	92
Kazakhstan		821	84	99
Kenya		3382	92	44
Morocco		3007	35	32
Nicaragua		4583	84	67
Paraguay		2393	85	67
Peru		20904	61	60
Philippines		9845	85	56
Turkey		4281	68	80
Zimbabwe		4460	90	71
Total	**Pooled**	**146902**	**66**	**57**
	Median		**82**	**67**

Note: contact with Doctor, nurse/midwife, or other country-specific health professional

Table 10: Proportions and relative risks of delay in contraceptive uptake in relation to contact with skilled health personnel, during pregnancy (ANC) or delivery, by country

	ANC						Assisted with delivery					
			Crude		Adjusted[1]				Crude		Adjusted[1]	
Country	No	Yes	RR	95%CI	RR	95%CI	No	Yes	RR	95%CI	RR	95%CI
Armenia	0.478	0.261	1.83	(1.50, 2.24)	1.07	(1.01, 1.15)	0.500	0.293	1.71	(1.18, 2.48)	0.91	(0.72, 1.14)
Bangladesh	0.754	0.590	1.28	(1.23, 1.33)	1.06	(1.03, 1.09)	0.732	0.472	1.55	(1.43, 1.69)	1.08	(1.02, 1.14)
Bolivia	0.745	0.527	1.42	(1.34, 1.49)	1.08	(1.04, 1.12)	0.735	0.514	1.43	(1.35, 1.51)	1.05	(1.02, 1.09)
Brazil	0.621	0.297	2.09	(1.95, 2.24)	1.09	(1.04, 1.14)	0.660	0.301	2.19	(2.05, 2.34)	1.14	(1.09, 1.20)
Colombia	0.442	0.263	1.68	(1.57, 1.81)	1.03	(0.98, 1.08)	0.441	0.268	1.64	(1.53, 1.77)	1.02	(0.97, 1.08)
Dominican	0.699	0.408	1.71	(1.51, 1.94)	1.07	(0.99, 1.16)	0.735	0.396	1.85	(1.71, 2.01)	1.11	(1.05, 1.18)
Egypt	0.559	0.404	1.38	(1.34, 1.43)	1.03	(1.01, 1.05)	0.598	0.372	1.61	(1.56, 1.66)	1.05	(1.03, 1.08)
Guatemala	0.920	0.682	1.35	(1.32, 1.38)	1.03	(1.02, 1.05)	0.916	0.570	1.61	(1.56, 1.66)	1.10	(1.08, 1.12)
Indonesia	0.564	0.395	1.43	(1.39, 1.46)	1.05	(1.04, 1.06)	0.533	0.367	1.45	(1.41, 1.49)	1.06	(1.04, 1.07)
Jordan	0.615	0.429	1.43	(1.36, 1.52)	1.08	(1.04, 1.12)	0.605	0.437	1.38	(1.29, 1.48)	1.06	(1.01, 1.11)
Kazakhstan	0.611	0.346	1.76	(1.49, 2.09)	1.00	(0.95, 1.06)	0.250	0.389	0.64	(0.12, 3.51)	1.61	(0.89, 2.92)
Kenya	0.831	0.663	1.25	(1.18, 1.33)	1.08	(1.05, 1.11)	0.780	0.545	1.43	(1.36, 1.51)	1.05	(1.01, 1.08)
Morocco	0.695	0.397	1.75	(1.62, 1.90)	1.12	(1.05, 1.18)	0.699	0.370	1.89	(1.73, 2.06)	1.11	(1.04, 1.18)
Nicaragua	0.724	0.437	1.66	(1.57, 1.76)	1.13	(1.09, 1.17)	0.665	0.396	1.68	(1.58, 1.77)	1.18	(1.13, 1.23)
Paraguay	0.788	0.573	1.38	(1.29, 1.47)	1.01	(0.98, 1.05)	0.780	0.519	1.50	(1.42, 1.60)	1.04	(1.01, 1.08)
Peru	0.582	0.401	1.45	(1.41, 1.49)	1.06	(1.04, 1.08)	0.612	0.378	1.62	(1.57, 1.67)	1.05	(1.02, 1.07)
Philippines	0.755	0.549	1.38	(1.33, 1.42)	1.05	(1.02, 1.07)	0.666	0.510	1.31	(1.26, 1.35)	1.01	(0.99, 1.04)
Turkey	0.557	0.280	1.99	(1.84, 2.14)	1.03	(0.99, 1.08)	0.669	0.293	2.28	(2.13, 2.45)	1.12	(1.07, 1.18)
Zimbabwe	0.509	0.302	1.69	(1.52, 1.87)	1.14	(1.09, 1.20)	0.421	0.282	1.49	(1.37, 1.62)	1.06	(1.01, 1.11)
Total												
Crude	0.634	0.426	1.49	(1.47, 1.50)	1.07	(1.07, 1.08)	0.642	0.387	1.66	(1.64, 1.67)	1.11	(1.10, 1.12)
Adjusted[2]			1.45	(1.43, 1.46)	1.05	(1.05, 1.06)			1.55	(1.54, 1.57)	1.06	(1.05, 1.07)

Note contraceptive delay includes women who started after became susceptible, or became pregnant or are currently susceptible

[1] adjusted for, place or residence, education level, age at conception, number of living children and desire for another child,

[2] adjusted for country

Appendix 1: Survey information, and contraceptive prevalence rate (CPR)

Country	Survey round	Survey information[1]			CPR
		Year of Fieldwork	Sample size	Response rate	
Armenia	I	2000	6,430	93.5	39.0
Bangladesh	I	1993/94	9,640	96.5	42.3
	II	1996/97	9,127	96.8	46.6
Bolivia	I	1994	8,603	90.2	30.1
Brazil	I	1991	6,223	85.7	39.1
	II	1996	12,612	80.6	55.4
Colombia	I	1996	8,488	81.4	39.9
	II	1995	11,140	82.5	48.1
	III	2000	11,585	85.8	52.8
Dominican Republic	I	1991	7,318	78.4	36.8
	II	1996	8,422	91.2	44.6
Egypt	I	1992	9,864	97.1	43.7
	II	1995	14,779	98.6	44.4
	II	2000	15,573	98.7	51.9
Guatemala	I	1995	12,403	89.0	21.4
	II	1998/99	6,021	83.4	26.6
Indonesia	I	1991	22,909	96.7	45.9
	II	1994	28,168	96.9	51.0
	II	1997	28,810	97.1	53.7
Jordan	I	1990	6,461	86.5	38.3
	II	1997	5,548	93.0	50.7
Kazakhstan	I	1999	4,800	95.9	48.0
Kenya	I	1998	7,881	92.6	29.9
Morocco	I	1992	9,256	95.7	22.9
Nicaragua	I	1997/98	13,634	90.5	40.8
Paraguay	I	1990	5,827	89.8	32.7
Peru	I	1992	15,882	91.0	35.7
	II	1996	28,951	90.5	40.9
	III	2000	27,843	92.8	44.0
Philippines	I	1993	15,029	97.5	24.2
	II	1998	13,983	95.9	28.9
Turkey	I	1993	6,519	92.0	60.3
	II	1998	8,576	84.9	44.2
Zimbabwe	I	1994	6,128	94.2	35.1
	II	1999	5,907	93.1	37.7

[1] Source: ORC Macro. 2003. MEASURE DHS+ STATcompiler. http://www.measuredhs.com, (accessed on 27 Feb 2004).