Monitoring Contraceptive Continuation: Links to Fertility Outcomes and Quality of Care

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This study examines the fertility consequences of contraceptive discontinuation, describes cross-national variation in continuation rates, and assesses the usefulness of the contraceptive discontinuation rate as a summary outcome indicator of quality of care. In the 15 countries included in this analysis, the total fertility rate would be between 28 and 64 percent lower if the births following discontinuations that were not the result of a desire to become pregnant had not occurred. The all-method discontinuation rate for quality-related reasons emerges as the most likely candidate for a summary measure of quality of care. Within a year of starting use of a method, between 7 and 27 percent of women cease to practice contraception for reasons related to the quality of the service environment. The results imply that as fertility declines, family planning programs would profit from a shift in emphasis from providing methods to new clients toward providing services to reduce discontinuation rates. (STUDIES IN FAMILY PLANNING 2002; 33[2]: 127–140)

As desired family size declines and contraceptive prevalence rises, the ability of couples to achieve their reproductive intentions will depend increasingly on the effectiveness and continuity with which they practice contraception. Contraceptive continuation, in turn, is thought to be linked strongly with the quality of the family planning service environment. Jain (1989), for example, argues that the quality of services affects contraceptive prevalence and ultimately fertility through increasing contraceptive acceptance and continuation. He emphasizes that the range of methods available is a key component of service quality that is likely to influence continuity of use. Based on his work and that of others, the contraceptive continuation rate has been proposed as an outcome indicator for monitoring quality of care (Bertrand et al. 1994). Although this proposal is conceptually appealing, little is known empirically about how discontinuation rates vary across countries and over time or about how this variation is associated with the quality of the service environment. Furthermore, the magnitude of the effect of discontinuation on fertility rates has not been assessed quantitatively.

This study attempts to answer several questions: (1) What are the fertility consequences of contraceptive discontinuation and failure? (2) How does contraceptive discontinuation vary across countries and over time? (3) To what extent does discontinuation vary with the service environment? (4) Can the contraceptive discontinuation rate be used as a summary outcome indicator of the quality of services?

Contraceptive Continuation and Quality of Services

Jain (1989) argues that the quality of family planning services is an important determinant of contraceptive use and ultimately fertility, because it is likely to affect contraceptive adoption and, more significantly, contraceptive continuation (see Figure 1). He concludes (page 6) that "programs can achieve better demographic results when they concentrate on a small number of annual acceptors and provide them with good care to enhance their satisfaction and thus to improve continuation rates, rather than trying to recruit a large number of acceptors at one time and not take care of them." Implicit in this

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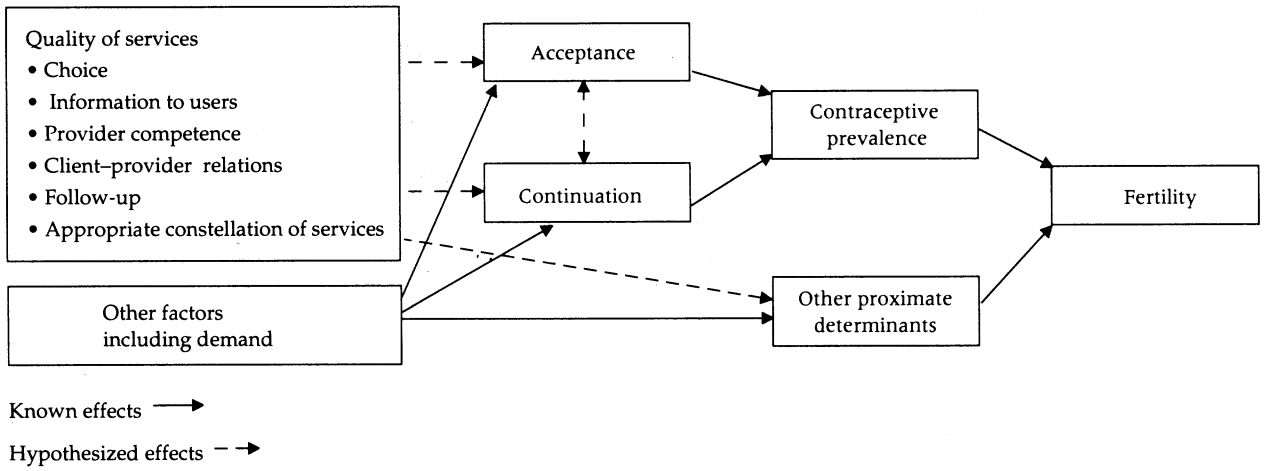
Figure 1 Schematic presentation of links between quality of family planning services and fertility



Source: Jain (1989: 3).

argument is the assumption that the quality of services is an important determinant of continuity of contraceptive use.

Since Jain's work, several authors have attempted to substantiate the theoretical link between the quality of the service environment and contraceptive use. For example, Mensch et al. (1996) found a moderate but significant effect of service quality on current contraceptive use in Peru. In Morocco, Hotchkiss et al. (1999) found a significant positive effect of the availability of the pill in local pharmacies and of the level of family planning infrastructure and equipment in local facilities on the use of modern contraceptives. Also in Morocco, Magnani et al. (1999) found a significant positive effect of the number of methods available in local facilities on subsequent contraceptive use among nonusers. The effect of the availability of methods at the nearest government facility was particularly strong among women who originally reported that they did not intend to use a contraceptive method. Hotchkiss et al. (1995) failed, however, to find any effects of service quality on contraceptive use in two states in northeast Brazil.[1]

Most studies using national surveys such as the Demographic and Health Surveys (DHS), the DHS Service Availability Module (SAM), and situation analysis (SA) have focused on current contraceptive use. Steele et al. (1999), however, linked calendar data from the 1995 DHS survey in Morocco to service data from the 1992 SAM to examine the effect of the service environment on pill discontinuation and switching. The results showed significantly higher pill continuation among women who obtained their pills from government facilities than among those who obtained them from private ones (including pharmacies). The availability of three or more methods in the local area did not affect overall pill discontinuation, and weak evidence was found that it increased the probability of switching to another method after discontinuing the pill.

In addition to the study by Steele and her colleagues, a few specialized, subnational studies have examined the effects of service quality on the separate components of contraceptive adoption and continuation. The largest of these examined women's perceptions of the quality of services provided by fieldworkers in Matlab, Bangladesh, on subsequent contraceptive adoption and continuation (Koenig et al. 1997). The study found a significant positive effect of women's perceptions of service quality on both adoption and continuation, but the effect was particularly strong for continuation, consistent with Jain's hypotheses. Other studies have shown a positive association between clients' receiving their chosen method and contraceptive continuation in Indonesia (Pariani et al. 1991) and between adequate counseling on side effects and contraceptive continuation in The Gambia and Niger (Cotten et al. 1992).

In general, the studies cited above provide support for Jain's hypothesized link between elements of service quality and contraceptive continuation. The validity of the contraceptive continuation rate (or discontinuation rate) as an outcome indicator of quality of care may depend, however, on its specificity. If many other factors affect contraceptive continuation in addition to the quality of services, a low continuation rate may indicate poor-quality services or it may reflect some other issue that is not related to the quality of services.

Relatively few multivariate analyses of the determinants of contraceptive discontinuation have been performed. Those that exist suggest that the determinants

of contraceptive discontinuation are less consistent across countries than are the determinants of current contraceptive use. The determinants that are significant also depend on the type of discontinuation studied. In general, demographic factors such as fertility intentions (spacing or limiting), the woman's age, her number of living children, and her marital status are most consistently related to continuity of use (Curtis and Blanc 1997; Ali and Cleland 1999). Socioeconomic factors such as education tend to be weakly associated with contraceptive discontinuation (Ali and Cleland 1999), but have been found to be associated with switching methods (Curtis and Blanc 1997). The specific method used is strongly associated with all types of contraceptive discontinuation.

On the whole, the literature confirms that contraceptive discontinuation is associated with the quality of services. Discontinuation is also associated with other factors, however, such as individual motivation. The relative importance of quality of care versus other factors in determining contraceptive discontinuation rates is likely to vary across countries. Therefore, how well the contraceptive continuation (or discontinuation) rate will perform as an outcome indicator of quality of care is unclear. Moreover, although the link between contraceptive discontinuation and fertility is clear, the fertility consequences of contraceptive discontinuation are scantily documented.

Data and Methods

The Demographic and Health Surveys program has been collecting data on contraceptive continuation in its "A core" questionnaire since its inception in 1985. Initially, the data on contraceptive continuation were gathered through incomplete contraceptive histories collected for birth intervals in the five years preceding the survey. Since 1990, the relevant data have been obtained through the DHS "calendar," which collects complete monthly contraceptive histories for the five calendar years before the survey. As of June 2001, the calendar had been used in 40 surveys in 20 countries. The analyses in this report are based on data collected in the following 15 surveys: Bangladesh 1996–97, Bolivia 1993–94, Brazil 1996,[2] Colombia 1995, Dominican Republic 1996, Egypt 1995–96, Guatemala 1995, Indonesia 1994, Jordan 1990, Morocco 1995, Paraguay 1990, Peru 1996, Philippines 1993, Turkey 1993, and Zimbabwe 1994.

The DHS calendar consists of a matrix of rows and columns. Each row represents a particular month, with the first row usually representing January of the fifth calendar year before the survey (for example, January 1990 for surveys conducted in 1995). The columns are used to record different types of information for each month. The first column is used to record information on periods of contraceptive use, nonuse, and pregnancies; the reason for discontinuation of each episode of contraceptive use is recorded in the second column in the row corresponding to the last month of continuous use of each method (see Macro International 1995). Based on this information, episodes of contraceptive use can be identified and linked to the reason for discontinuation. The design of the calendar allows only one reason for discontinuation to be recorded.

The calendar requires women to recall month-by-month information about contraceptive adoption and discontinuation for a five-year period before the survey. Such retrospective reporting relies heavily on the ability of respondents to recall these events accurately.[3] The calendar approach has been shown to yield more complete and internally consistent data than does the more traditional approach with structured questions that was used in the first phase of DHS surveys (Goldman et al. 1989; Westoff et al. 1990). Curtis and Blanc (1997) found evidence of modest heaping of durations of contraceptive use in calendar data from six countries but concluded that it was unlikely to be severe enough to affect estimates of discontinuation substantially. They also found close agreement between estimates of contraceptive prevalence obtained from the calendar and corresponding current-status estimates of contraceptive prevalence obtained from previous surveys.

Strickler et al. (1997) employed the panel design of the 1992 and 1995 Morocco DHS surveys to examine the reliability of reporting of events in the calendar. The calendars in the 1992 and 1995 DHS surveys overlap for the period 1990–92. Strickler and her colleagues compared individual responses in the calendar for the overlapping period. They found that reporting of contraceptive behavior at the aggregate level was good but that considerable unreliability existed in the individual-level responses, particularly for complex histories. The monthly histories for the period 1990–92 matched exactly for only 28 percent of women who reported at least one episode of contraceptive use in the analysis period in 1992. The reported reason for discontinuation among matched episodes of use was also unreliable, with slightly more than one-third of respondents giving a different reason for discontinuation (excluding censored episodes of use). Overall, a slight tendency was found in the 1995 DHS responses for respondents to be more likely to report that they had discontinued contraceptives in order to become pregnant than in those of the 1992 DHS, a finding that may reflect postevent rationalization if a pregnancy followed the discontinuation.

These findings have implications for our analysis. Strickler et al. (1997) show that the reporting errors in the calendar affect estimates of discontinuation and failure rates and conclude that "the unreliability of the reported reason for discontinuation should act as a caution regarding the conduct of complex statistical analysis designed to explain variation in reasons for discontinuation." Based on results of their analysis of the determinants of discontinuation, Curtis and Blanc (1997: 35) conclude that "asking women to provide only the main reason for discontinuing use . . . gives an oversimplified picture of the decision to stop using a method." For example, changes in marital status are strongly associated with discontinuation even when they are not given as the main reason for stopping. Clearly, some of the unreliability that is attributed to women in their reports of the reason for discontinuing may be a result of their commonly having multiple reasons for stopping (see Henry [2001] for an ethnographic account). At the same time, the assumption that women report the reason for discontinuing that is the most salient for them seems logical. The analysis presented below uses information about the reported reason for discontinuation. Although we are unable to assess empirically the effect of possible biases in reporting on the results, these are important to keep in mind when interpreting the findings.

The discontinuation and failure rates presented here are calculated using life tables to allow for the fact that many women were still using a method at the time of the survey.[4] The unit of analysis for the calculation of the discontinuation and failure rates is an episode of contraceptive use. The definition of an episode of contraceptive use depends on the type of discontinuation rate being calculated. For method-specific discontinuation rates, an episode of use is defined as a period of continuous use of a specific contraceptive method. "Continuous use" in this case indicates that no gaps of a month or longer occur in the monthly reporting of use of a specific method in the calendar. In this case, switching to a new method initiates a new episode of use. For all-method discontinuation rates, an episode of contraceptive use is defined as a period of continuous use (that is, no gaps indicating nonuse) of any contraceptive method (not necessarily the same method). The different types of rates are discussed more fully below.

The analyses are based on all episodes of use that began in the period from three to 62 months before the survey.[5] The three months immediately prior to the survey are excluded from the analysis to allow for underreporting of first-trimester pregnancies at the time of the survey that could bias estimates of failure rates. Life-table rates are not shown if the (unweighted) number of episodes of use is less than 125.

Family Planning Context

The 15 countries included here represent a diversity of situations regarding the level of family planning use, method mix, and service environment. Forty percent or more of married women currently practice contraception in all of the countries included in the analysis, except in Guatemala, where 31 percent are using a method (see Table 1). Contraceptive prevalence is particularly high in Brazil and Colombia, where the proportion using a method exceeds 70 percent. The distribution of users by method varies significantly across countries. In five countries—Bangladesh, Indonesia, Morocco, Paraguay, and Zimbabwe—the pill is the most common method used. Although the pill predominates in Indonesia, it is used by only about 31 percent of women practicing contraception, whereas about 28 percent use injectables and 19 percent use the intrauterine device (IUD). Indonesia is the only country in which a substantial proportion of those who practice contraception (9 percent) use the implant Norplant®. In contrast, the method mix is highly concentrated on the pill in Morocco and Zimbabwe, where pill use constitutes 68 and 69 percent of total use, respectively. The IUD is the most commonly used method in Egypt and Jordan, whereas female sterilization is the most commonly used method in Brazil, Colombia, Dominican Republic, Guatemala, and the Philippines. Turkey is unusual in that withdrawal is the most popular method there, comprising 42 percent of all reported use. Finally, in two countries—Bolivia and Peru—periodic abstinence is the most frequently reported method, encompassing almost half of all use in Bolivia and about 28 percent in Peru.

Fertility Consequences of Discontinuation and Failure

In the context of monitoring and evaluating family planning programs, an examination of contraceptive failure and discontinuation is essential because both can make a substantial contribution to outcomes that are central to most programs—overall fertility rates and levels of unintended fertility. Discontinuation and failure rates are particularly relevant measures for mature programs, because as the fertility desires of couples decline and contraceptive prevalence rises, the effectiveness with which couples use contraceptive methods becomes an increasingly important determinant of fertility levels (Bongaarts and Rodríguez 1991). Aside from their effect on fertility rates, pregnancies that result from contraceptive failure and discontinuation for reasons other than a desire to become pregnant can also influence induced abortion

Table 1 Percentage of currently married women aged 15–49 who are currently using a contraceptive method, by method used, Demographic and Health Surveys, 15 countries

Region/country	Method												
	Pill	IUD	Inject-able	Nor-plant*	Vaginal methods	Condom	Female sterilization	Male sterilization	Periodic abstinence	With-drawal	Other	Total	(N)
Sub-Saharan Africa													
Zimbabwe	33.1	1.0	3.2	0.2	0.0	2.3	2.3	0.2	0.1	4.2	1.7	48.1	(3,788)
North Africa, Asia, Near East													
Bangladesh	20.8	1.8	6.2	0.1	0.0	3.9	7.6	1.1	5.0	1.9	0.8	49.2	(8,450)
Egypt	10.4	30.0	2.4	0.0	0.1	1.4	1.1	0.0	0.8	0.5	1.0	47.9	(13,710)
Indonesia	17.1	10.3	15.2	4.9	0.0	0.9	3.1	0.7	1.1	0.8	0.8	54.7	(26,186)
Jordan	4.6	15.3	0.0	0.0	0.6	0.8	5.6	0.0	3.9	4.0	5.2	40.0	(6,168)
Morocco	28.1	3.2	0.1	0.0	0.2	0.9	3.0	0.0	3.0	2.6	0.3	41.5	(5,118)
Philippines	8.5	3.0	0.1	0.0	0.0	1.0	11.9	0.4	7.3	7.4	0.4	40.0	(8,961)
Turkey	4.9	18.8	0.1	0.0	1.2	6.6	2.9	0.0	1.0	26.2	0.9	62.6	(6,271)
Latin America and Caribbean													
Bolivia	2.8	8.1	0.8	0.0	0.1	1.3	4.6	0.0	22.0	1.7	3.9	45.3	(5,334)
Brazil	20.7	1.1	1.2	0.0	0.1	4.4	40.1	2.6	3.0	3.1	0.3	76.7	(7,578)
Colombia	12.9	11.1	2.5	0.7	1.4	4.3	25.7	0.7	5.2	5.8	1.8	72.2	(6,097)
Dominican Republic	12.9	2.5	0.5	0.6	0.3	1.4	40.9	0.1	1.8	1.9	0.7	63.7	(4,983)
Guatemala	3.8	2.6	2.5	0.0	0.0	2.2	14.3	1.5	3.6	0.9	0.1	31.4	(7,984)
Paraguay	13.6	5.7	5.2	0.0	0.8	2.6	7.4	0.0	5.3	2.9	5.0	48.4	(3,574)
Peru	6.2	12.0	8.0	0.3	0.7	4.4	9.5	0.2	18.0	3.2	1.6	64.2	(16,885)

rates and may have negative effects on women and, ultimately, on their children (Montgomery et al. 1997).

The significance for fertility of failure and discontinuation rates is demonstrated in Table 2, where the total fertility rate is decomposed by removing births preceded by contraceptive failure from the numerator (column 2), then removing births preceded by other types of discontinuations (except those resulting from a desire to become pregnant) from the numerator[6] (column 3), and then removing both (column 4). This calculation is a hypothetical one that is intended to illustrate the potential impact on fertility if these births had never occurred; realistically, however, some proportion of the births were simply being postponed through the use of contraceptives and would have occurred later. Thus, the results are dependent upon the chosen duration of the period subsequent to the discontinuation, which, in this case, is two years.

In the 15 countries included in this analysis, the total fertility rate (TFR) would be between 4 and 29 percent lower if the births resulting from contraceptive fail-

Table 2 Among women surveyed, total fertility rate and total unwanted fertility rate in the absence of contraceptive failure and discontinuation, for the three years preceding the survey, Demographic and Health Surveys, 15 countries

Region/country	Total fertility rate				Total unwanted fertility rate			
	Observed	Without failure	Without discon-tinuation	Without both	Observed	Without failure	Without discon-tinuation	Without both
Sub-Saharan Africa								
Zimbabwe	4.28	3.81	3.37	2.90	0.48	0.36	0.34	0.23
North Africa, Asia, Near East								
Bangladesh	3.23	3.00	2.37	2.14	0.46	0.38	0.26	0.18
Egypt	3.63	3.32	2.36	2.05	0.87	0.66	0.47	0.26
Indonesia	2.86	2.64	2.28	2.06	0.29	0.20	0.20	0.11
Jordan	5.57	4.71	2.89	2.03	1.44	1.06	0.69	0.32
Morocco	4.03	3.50	2.90	2.37	0.97	0.68	0.62	0.33
Philippines	4.07	3.56	2.67	2.17	0.80	0.65	0.51	0.35
Turkey	2.52	2.13	1.87	1.48	0.60	0.38	0.40	0.18
Latin America and Caribbean								
Bolivia	4.74	3.87	3.44	2.56	1.89	1.40	1.35	0.86
Brazil	2.52	2.01	1.75	1.24	0.62	0.42	0.38	0.18
Colombia	2.95	2.15	2.26	1.47	0.70	0.37	0.47	0.13
Dominican Republic	3.16	2.78	2.03	1.65	0.33	0.29	0.20	0.15
Guatemala	5.11	4.91	3.54	3.34	0.71	0.63	0.48	0.40
Paraguay	4.70	4.05	3.06	2.41	0.40	0.31	0.21	0.13
Peru	3.53	2.50	2.70	1.67	1.37	0.83	0.98	0.44

ure had not occurred.[7] The average across all countries is 14 percent. Consistent with the arguments of Bongaarts and Rodríguez (1991), the higher the contraceptive prevalence rate, the greater the relative contribution of contraceptive failure to fertility. The strength of this relationship is clearly affected by the method mix, however. For example, in Peru, where traditional methods dominate, the contribution of failure to the total fertility rate is comparatively high.

Without the births that were preceded by discontinuations for reasons other than a desire to become pregnant, the TFR would be reduced by between 20 (Indonesia) and 48 percent (Jordan). Unlike contraceptive failure, the reduction in the TFR due to contraceptive discontinuation is not significantly associated with the contraceptive prevalence rate (data not shown). Overall, between 28 and 64 percent of the TFR is associated with either a contraceptive failure or a contraceptive discontinuation for reasons other than a desire to become pregnant, and is more than half in Brazil, Colombia, Jordan, and Peru.

As might be expected, contraceptive failure and discontinuation have an even greater potential impact on unwanted fertility.[8] More than half of recent unwanted fertility was the result of births that were preceded either by a contraceptive failure or by discontinuation of method use in all countries except Guatemala. The total unwanted fertility rate would be between about 0.2 and 1.1 births lower in the absence of these births. In a few countries—Colombia, Indonesia, Peru, Turkey—the contribution of contraceptive failure to unwanted fertility equals or exceeds the contribution of all other types of discontinuation. Clearly, contraceptive discontinuation other than that resulting from a desire to become pregnant is a significant factor in observed unwanted fertility levels in all of the countries included in this study. This finding suggests that family planning programs that aim to reduce unwanted births should pay close attention to women who are current users of contraceptives, because a large proportion of these births are occurring among women who have recently used a contraceptive method, a conclusion consistent with that reached recently by Jain (1999).

Method and Reason-specific Discontinuation Rates

Table 3 provides an overall picture of the extent to which episodes of contraceptive use are discontinued. For method-specific discontinuation rates, all occurrences of switching between methods are counted as discontinuations (that is, a woman who uses the pill and then switches within a month to the condom is counted as having discontinued the pill). The method-specific rates are shown in Table 3 for six methods: the pill, the IUD, injectables, the condom, periodic abstinence, and withdrawal.[9] The total discontinuation rate in the last column includes these six methods plus Norplant and vaginal methods. This rate is also known as the first-method discontinuation rate.

In most of the countries, IUD discontinuation rates are substantially lower than the rates for other methods. The 12-month cumulative discontinuation rate for the IUD is in the range of 15–25 percent in nine of the 13 countries for which data are available; in Turkey and Bolivia, the rate is 10–12 percent, whereas Bangladesh and the Dominican Republic have the highest rates at 41 and 32 percent, respectively.

A greater proportion of women discontinue use of the pill than of the IUD within the first year. Discontinuation rates for the pill are between 34 and 64 percent in every country except Zimbabwe, where only 16 percent of users discontinue the pill within 12 months. Discontinuation of injectables is also very low in Zimbabwe at 16 percent. The 12-month discontinuation rate for injectables exceeds 50 percent in all of the other countries with sufficient data, except Indonesia where the rate is 29 percent. Similarly, at least 50 percent of users of the condom discontinue its use within 12 months, except in Zimbabwe, where the rate is slightly lower at 45 percent.

Relatively low rates of discontinuation of periodic abstinence (30–39 percent) are found in Bolivia, Guatemala, Indonesia, and the Philippines. In the remaining countries, rates are higher, reaching 70 percent in the Dominican Republic. Similar rates are evident for discontinuation of withdrawal, which vary from 30 percent (Zimbabwe) to 70 percent (Dominican Republic).

In general, a few countries stand out as having low discontinuation rates across all methods (for which there are sufficient data). Zimbabwe has relatively low proportions of users discontinuing in the first year across the four methods for which we have data: the pill, injectables, the condom, and withdrawal. Indonesia also has comparatively low rates for all six methods, especially for injectables. At the other extreme, the Dominican Republic and, to some extent, Paraguay, are notable for their high rates of discontinuation, particularly for the condom and, in the Dominican Republic, for the IUD.

Failure Rates

Contraceptive failure is of particular interest because it contributes to overall fertility, to levels of unwanted and mistimed fertility, and to the level of induced abortion.

Table 3 Twelve-month life-table discontinuation rates for selected contraceptive methods, Demographic and Health Surveys, 15 countries

Region/country	Contraceptive method													
	Pill		IUD		Injectables		Condom		Periodic abstinence		Withdrawal		Total	
	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)
Sub-Saharan Africa														
Zimbabwe	15.7	(2,445)	—	(49)	16.2	(134)	45.0	(312)	—	(36)	29.6	(345)	20.1	(3,329)
North Africa, Asia, Near East														
Bangladesh	45.1	(3,232)	41.4	(264)	51.7	(1,030)	65.2	(759)	42.6	(608)	61.3	(314)	48.8	(6,216)
Egypt	47.1	(3,015)	14.6	(4,626)	53.4	(479)	56.2	(391)	46.1	(133)	—	(107)	30.7	(8,802)
Indonesia	34.0	(5,338)	15.5	(1,851)	29.3	(5,829)	52.0	(333)	33.2	(376)	36.3	(296)	27.9	(15,297)
Jordan	63.9	(1,161)	20.9	(1,553)	—	(10)	66.1	(142)	55.3	(690)	54.7	(602)	46.6	(4,326)
Morocco	37.4	(2,869)	18.7	(252)	—	(33)	—	(108)	51.7	(368)	46.6	(272)	39.4	(3,945)
Philippines	41.0	(1,503)	22.4	(288)	—	(21)	60.5	(201)	32.0	(966)	41.1	(1,251)	38.7	(4,238)
Turkey	56.0	(756)	10.2	(1,218)	—	(23)	49.5	(734)	—	(126)	39.6	(2,252)	38.0	(5,274)
Latin America and Caribbean														
Bolivia	58.1	(578)	12.1	(533)	75.0	(194)	69.1	(221)	38.8	(2,293)	55.6	(241)	42.8	(4,118)
Brazil	42.3	(4,183)	—	(131)	62.8	(384)	58.1	(1,282)	50.0	(591)	58.7	(672)	47.9	(7,170)
Colombia	52.7	(2,483)	19.4	(979)	67.0	(684)	63.9	(1,020)	53.4	(1,225)	62.4	(1,088)	53.8	(7,989)
Dominican Republic	59.2	(2,267)	31.6	(278)	—	(102)	82.6	(526)	69.7	(477)	69.7	(505)	62.9	(4,273)
Guatemala	47.3	(765)	18.8	(244)	56.9	(371)	52.2	(403)	36.7	(463)	—	(148)	44.4	(2,425)
Paraguay	60.3	(1,454)	15.1	(252)	71.5	(801)	72.9	(288)	51.2	(528)	44.1	(180)	58.8	(3,582)
Peru	54.1	(3,174)	17.8	(2,779)	53.9	(2,550)	59.8	(1,941)	45.9	(6,592)	55.8	(1,375)	47.1	(19,142)

Note: Total includes Norplant and vaginal methods. — = Fewer than 125 cases.

Programmatically, failure rates are significant because they represent an area in which upgrading service quality can improve outcomes for women.

Table 4 presents net 12-month cumulative contraceptive failure rates for six methods. Between 5 and 7 percent of pill users experience a failure within 12 months in ten of the 15 countries. The rate is less than 3 percent in three countries (Bangladesh, Paraguay, and Zimbabwe) and reaches 9 percent in Jordan. In most countries (for which data are available), failure rates for injectables are substantially lower or approximately the same as the pill-failure rates. In Paraguay, however, the failure rate for injectables is much higher—8 percent within 12 months, compared with the pill-failure rate there of 3

Table 4 Twelve-month life-table net failure rates for selected contraceptive methods, Demographic and Health Surveys, 15 countries

Region/country	Contraceptive method													
	Pill		IUD		Injectables		Condom		Periodic abstinence		Withdrawal		Total	
	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)	Percent	(N)
Sub-Saharan Africa														
Zimbabwe	2.2	(2,445)	—	(49)	1.4	(134)	4.3	(312)	—	(36)	9.4	(345)	3.3	(3,329)
North Africa, Asia, Near East														
Bangladesh	2.9	(3,232)	0.0	(264)	1.2	(1,030)	6.3	(759)	10.4	(608)	5.0	(314)	3.8	(6,216)
Egypt	6.6	(3,015)	1.4	(4,626)	0.7	(479)	10.3	(391)	16.3	(133)	—	(107)	3.9	(8,802)
Indonesia	4.2	(5,338)	1.9	(1,851)	1.6	(5,829)	5.7	(333)	12.2	(376)	11.4	(296)	3.0	(15,297)
Jordan	8.5	(1,161)	2.5	(1,553)	—	(10)	12.3	(142)	29.1	(690)	19.6	(602)	12.3	(4,326)
Morocco	5.9	(2,869)	2.2	(252)	—	(33)	—	(108)	25.0	(368)	11.2	(272)	8.0	(3,945)
Philippines	5.3	(1,503)	2.7	(288)	—	(21)	15.8	(201)	15.9	(966)	21.3	(1,251)	12.7	(4,238)
Turkey	6.6	(756)	1.0	(1,218)	—	(23)	8.4	(734)	—	(126)	15.4	(2,252)	10.1	(5,274)
Latin America and Caribbean														
Bolivia	5.1	(578)	1.5	(533)	4.2	(194)	5.2	(221)	19.1	(2,293)	15.2	(241)	13.0	(4,118)
Brazil	4.8	(4,094)	—	(131)	4.3	(384)	5.2	(1,282)	18.1	(591)	17.1	(672)	7.1	(7,170)
Colombia	6.4	(2,483)	3.1	(979)	5.5	(684)	5.0	(1,020)	17.9	(1,225)	14.9	(1,088)	9.2	(7,989)
Dominican Republic	7.1	(2,267)	2.1	(278)	—	(102)	7.0	(526)	25.3	(477)	16.7	(505)	9.8	(4,273)
Guatemala	5.3	(765)	0.0	(244)	2.6	(371)	11.2	(403)	14.6	(463)	—	(148)	7.7	(2,425)
Paraguay	2.7	(1,454)	1.8	(252)	8.1	(801)	4.3	(288)	18.2	(528)	10.9	(180)	6.8	(3,582)
Peru	5.5	(3,174)	0.6	(2,779)	2.4	(2,550)	6.8	(1,941)	23.5	(6,592)	17.9	(1,375)	12.1	(19,142)

Note: Total includes Norplant and vaginal methods. — = Fewer than 125 cases.

percent. As expected, failure rates for the IUD are very low, reaching as high as 3 percent only in Colombia, Jordan, and the Philippines.

Almost 16 percent of condom users in the Philippines experience a contraceptive failure within 12 months. Condom failure rates greater than 10 percent are also seen in Egypt, Guatemala, and Jordan. As has been found in previous studies, failure rates for periodic abstinence and withdrawal tend to be substantially higher than for other methods. More than one in five respondents who practice periodic abstinence experience a contraceptive failure within a year in the Dominican Republic, Jordan, Morocco, and Peru.

All-method Discontinuation Rates

Switching between methods occurs with frequency in some countries (Blanc et al. 1999). The amount of switching between methods is expected to increase as the quality of services increases. Jain (1989: 13) argued that "making multiple methods available through various outlets . . . may reduce method-specific continuation by making switching easier." Bongaarts and Bruce (1995: 69) also recognized this link: "Good counseling may encourage clients to present problems at an earlier point and lead to switching, thus marginally reducing first-method continuation rates; but it may also lay the foundation for longer-term contraceptive use and greater client satisfaction. Using first-method continuation rates as indicators of quality of care . . . is therefore, not appropriate." Blanc et al. (1999) found evidence to support these arguments; the first method-discontinuation rate was significantly negatively related to the index of dissimilarity for method mix,[10] indicating higher method-specific discontinuation in populations with greater method choice. Therefore, a more useful measure of contraceptive discontinuation in the context of quality of care is one that gauges the extent to which women cease practicing contraception entirely. All-method discontinuation rates measure the rate at which women shift from using any method of contraception (excluding sterilization) to using no method. Thus, a discontinuation is defined here as stopping any contraceptive use, that is, switching to another method is not considered a discontinuation if the user switched immediately to the new method. Because, except in rare instances, sterilization cannot be reversed or discontinued, segments of use that begin with sterilization are not included. Segments that begin with use of another method followed by a switch to sterilization are censored in the month in which the sterilization occurred because the woman is no longer exposed to the risk of switching or discontinuing. The rates given in Table 5 represent the proportion of users who have discontinued all contraceptive use by a given duration following initiation of use.

In Table 5, we categorize reasons for ending use of any method into three groups. The first group—quality-related reasons—consists of reasons that can be addressed by improvements in the quality of family planning service delivery and that do not suggest a reversal of the woman's desire to stop or delay childbearing. These include: contraceptive failure, desire for a more effective method, side effects, health concerns, lack of access, cost, and inconvenience of using the method. Among the reasons categorized as quality related, side effects and health concerns account for the majority of discontinuations in most countries. We believe that the all-method discontinuation rate for quality-related reasons is the most suitable candidate for a summary outcome indicator of quality of care. The second group includes reasons that imply a reduced need for contraception, including: wanting to become pregnant, having infrequent sex or absence of husband or partner, being menopausal or subfecund, and marital dissolution or separation. These are reasons that are not related to the characteristics of the method or the service environment, and the level of discontinuation for these reasons is not expected to be influenced by the quality of care. Finally, the third group includes all other rea-

Table 5 Twelve-month cumulative net contraceptive discontinuation rates excluding sterilization, by reason for discontinuation, Demographic and Health Surveys, 15 countries

Region/country	Reason for discontinuation				
	Quality-related reasons[a]	Reduced need[b]	Other	All reasons	(N)
Sub-Saharan Africa					
Zimbabwe	7.3	6.9	2.1	16.3	(3,065)
North Africa, Asia, Near East					
Bangladesh	16.6	12.8	4.5	33.9	(4,423)
Egypt	12.3	8.9	1.5	22.7	(7,351)
Indonesia	9.0	7.3	1.4	17.7	(12,135)
Jordan	23.7	10.1	4.2	38.0	(3,663)
Morocco	13.8	15.8	2.8	32.4	(3,384)
Philippines	19.9	7.9	5.9	33.6	(3,802)
Turkey	12.8	9.1	3.7	25.6	(3,857)
Latin America and Caribbean					
Bolivia	19.7	8.8	3.1	31.5	(3,313)
Brazil	19.9	10.9	3.7	34.5	(5,307)
Colombia	19.2	14.4	1.9	35.5	(5,326)
Dominican Republic	26.6	19.6	7.1	53.3	(3,444)
Guatemala	20.6	8.9	5.4	34.8	(2,023)
Paraguay	26.0	9.5	7.3	42.9	(2,494)
Peru	19.7	8.9	3.5	32.1	(13,525)

[a] Quality-related reasons include: contraceptive failure, desire for a more effective method, side effects, health concerns, lack of access, cost, and inconvenience of using the method. [b] Reduced need includes: wanting to become pregnant, having infrequent sex or husband or partner absent, being menopausal or subfecund, and marital dissolution or separation.

sons provided by women for discontinuing use of a method, including husband's disapproval, being fatalistic, and other (unspecified) reasons.

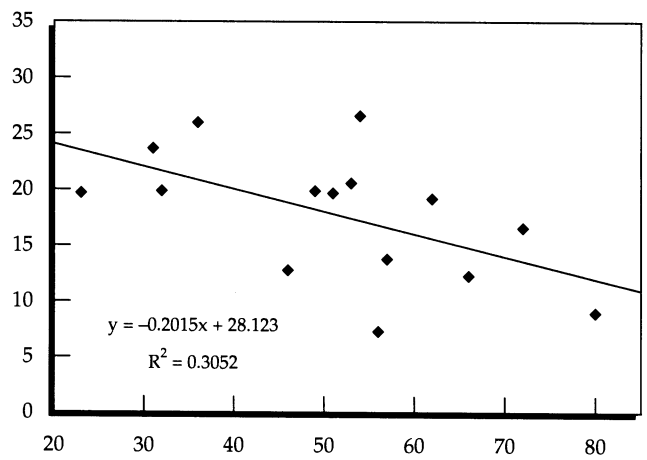
The 12-month cumulative all-method discontinuation rates for quality-related reasons range from 7 percent in Zimbabwe to 27 percent in the Dominican Republic. By 36 months, between 19 and 42 percent of users have stopped practicing contraception for these reasons. In all countries except Morocco, the rate of discontinuation resulting from reduced need is less than the rate resulting from quality-related reasons. The extent to which quality-related reasons dominate varies across countries, however, with the discontinuation rate for this group constituting between 43 percent (Morocco) and 63 percent (Bolivia) of the total rate at 12 months.

One of the reasons for differences between countries in all-method discontinuation rates could be differences in the method mix. In order to assess the relative effect on the all-method rates for quality-related reasons of within-country method mix versus within-country method-specific discontinuation rates, we calculated indirectly standardized rates. (Some countries do not have sufficient numbers of cases to calculate method-specific rates for each method, so that direct standardization cannot be used.) We calculated 12-month all-method discontinuation rates for quality-related reasons by first method used for the six most commonly used methods. For example, a woman who first used the pill and switched to injectables would be categorized under "pill." The average all-method discontinuation rate for quality-related reasons is similar for the pill, injectables, the condom, periodic abstinence, and withdrawal, but is lower for the IUD. Therefore, a country in which a large proportion of those who practice contraception use the IUD will tend to have a relatively low all-method discontinuation rate, all other things being equal. The standardized results indicate, however, that method mix is not the main determinant of the variation in all-method discontinuation rates across countries and that the all-method rates would vary substantially even if all countries had the same method mix.[11]

If the all-method discontinuation rate for quality-related reasons is a good summary outcome indicator of the quality of services, we would expect it to be correlated with other indicators associated with quality of care. Unfortunately, indicators of quality of care that are suitable for cross-national comparisons are distinctly lacking in the literature. The Family Planning Program Effort (FPPE) score, although not explicitly a measure of quality of care, is perhaps the most widely used indicator that measures the strength of family planning programs and includes some aspects of quality (Ross et al. 1993). The FPPE score is intended to summarize the characteristics of family planning programs in the areas of policy and stage-setting activities, service and service-related activities, record keeping and evaluation, and accessibility of fertility-control supplies and services. The higher the score, the stronger the family planning program. Figure 2 shows the relationship between the 12-month all-method discontinuation rate for quality-related reasons and the FPPE score for 1989, a date just prior to or during the period to which the rates refer.[12] Overall, the discontinuation rates vary inversely with the program effort scores, that is, strong programs tend to have relatively low quality-related discontinuation rates. The relationship between the two indicators is statistically significant ($p = 0.03$), but not particularly strong ($R^2 = 0.31$).

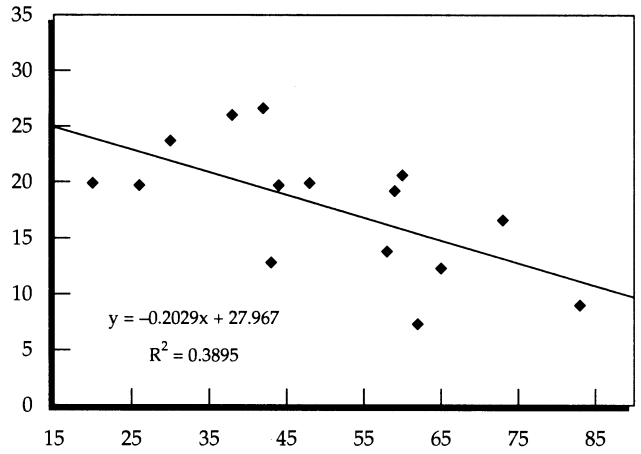
The service-related component of the FPPE score measures several aspects of the service environment including some related to service quality (for example, training, logistics, and supervision) and some related to the accessibility of services (for example, community-based distribution, home visits, and social marketing) (Mauldin and Ross 1991). If low discontinuation rates are viewed as a measure of high-quality care, then we would expect a negative (and perhaps stronger) relationship between the discontinuation rate and the service-related component of the program effort score. As shown in Figure 3, the relationship between the 12-month all-method discontinuation rates for quality-related reasons and the service-related component of the FPPE score is negative and statistically significant ($p = 0.01$). The correlation is also somewhat stronger; about 39 percent of the vari-

Figure 2 Twelve-month cumulative all-method contraceptive discontinuation rates for quality-related reasons, by total program effort score, 15 countries



Source: The program effort scores for 1989 are from Ross et al. 1993.

Figure 3 Twelve-month cumulative all-method contraceptive discontinuation rates for quality-related reasons, by service-related program effort score, 15 countries



Source: The service-related program effort scores for 1989 are from Ross et al. (1993).

ance in the 12-month all-method discontinuation rate for quality-related reasons is explained.

Greater method choice should also be associated with lower all-method discontinuation rates for quality-related reasons if users are more likely to switch methods rather than abandon use entirely when a variety of methods is available. When we examined the relationship between the access and availability component of the FPPE, which is a score that measures access to each of six methods, and discontinuation rates, however, it was not statistically significant.[13]

Trends in All-method Discontinuation Rates

Because nationally representative data on contraceptive discontinuation have become available only relatively recently, little is known about the extent to which discontinuation rates have changed over time and how rapidly such change has occurred. Seven of the 15 countries in this study conducted prior DHS surveys with calendar data that make calculating discontinuation rates for earlier periods possible.[14] These are shown in Table 6.[15] Overall rates of discontinuation declined in all countries, except Colombia. In six of the seven countries, with Colombia again the exception, the 12-month all-method discontinuation rate for quality-related reasons also decreased between the two surveys. The declines are substantively small, however, ranging from less than one to five percentage points.

Standard errors for the rates can be calculated under the assumption of simple random sampling and used to construct confidence intervals (Namboodiri and Suchindran 1987). These standard errors are underestimates because we are unable to account for the effects of the cluster sampling used in the Demographic and Health Surveys or other structural characteristics of the samples (design effects). In three of the seven surveys—Egypt, northeast Brazil, and Peru—the 95 percent confidence intervals do not overlap, that is, the rates from the two surveys are significantly different from each other. We can approximate the impact of the design effects roughly by applying the average design effect for the survey in each case (Lê and Verma 1997). When we do so, the rates remain significantly different only for Peru. Thus, for most of the countries, little evidence is found that the rate at which women discontinue for quality-related reasons has changed substantially during the time period covered by these surveys.

Discussion

In this study, we have examined contraceptive discontinuation across a diverse set of 15 countries in which overall contraceptive prevalence among married women ranges from 31 to 77 percent. Great variation occurs also in the distribution of specific methods used in these countries. Despite the variation in the current contraceptive-use patterns across countries, contraceptive discontinuation for quality-related reasons is a relatively common event in all countries. Within a year of starting use of a method, between 7 and 27 percent of women stop practicing contraception for reasons related to the quality of the service environment. Between 40 and 60 percent of the overall discontinuation rate reflects decisions based on these reasons.

One of the objectives of this study was to assess the validity of contraceptive discontinuation as an outcome indicator of quality of care. The all-method discontinuation rate for quality-related reasons is proposed as the most likely candidate for a useful summary measure. The advantages of this rate over other types of discontinuation rates are, first, that it focuses on discontinuation of any method of contraception rather than on a specific method. It incorporates, therefore, the notion that high rates of method switching (without unprotected gaps between methods) are not necessarily negatively related to quality. This type of discontinuation is of greater programmatic interest than is discontinuation of a specific method because it leaves women unprotected from the risk of pregnancy. Second, this rate includes only those who discontinued for reasons that can be addressed by improvement in the family planning program.

Despite these advantages, the analysis provides mixed results on the merits of the all-method discontinuation rate for quality-related reasons as a summary out-

Table 6 Twelve-month all-method discontinuation rates (excluding sterilization), by reason for discontinuation for subsequent surveys, seven countries

Country/percent change	Reason for discontinuation				Standard error (quality-related reasons)	95 percent confidence interval (quality-related reasons)	(N)
	All	Quality related[a]	Reduced need[b]	Other			
Bangladesh 1996–97	33.9	16.6	12.8	4.5	0.6	15.4–17.8	(4,423)
Bangladesh 1993–94	36.2	18.5	12.9	4.9	0.6	17.3–19.6	(4,728)
Percent change	–2.3	–1.9	–0.1	–0.4			
Egypt 1995–96	22.7	12.3	8.9	1.5	0.4	11.5–13.1	(7,351)
Egypt 1992	23.1	14.4	8.1	0.6	0.5	13.4–15.4	(5,171)
Percent change	–0.4	–2.1	0.8	0.9			
Indonesia 1994	17.7	9.0	7.3	1.4	0.3	8.5–9.6	(12,135)
Indonesia 1991	18.3	9.4	6.7	2.3	0.3	8.7–10.0	(9,745)
Percent change	–0.6	–0.4	0.6	–0.9			
Northeast Brazil 1996	42.3	25.0	13.9	3.3	1.3	22.6–27.5	(1,321)
Northeast Brazil 1991	43.9	29.7	10.8	3.4	1.1	27.6–31.9	(1,981)
Percent change	–1.6	–4.7	3.1	–0.1			
Colombia 1995	35.5	19.2	14.4	1.9	0.6	18.1–20.3	(5,326)
Colombia 1990	31.4	17.3	11.5	2.6	0.7	15.9–18.7	(3,241)
Percent change	4.1	1.9	2.9	–0.7			
Dominican Republic 1996	53.3	26.6	19.6	7.1	0.8	25.1–28.2	(3,444)
Dominican Republic 1991	58.2	29.3	20.5	8.4	0.9	27.4–31.1	(2,582)
Percent change	–4.9	–2.7	–0.9	–1.3			
Peru 1996	32.1	19.7	8.9	3.5	0.4	19.0–20.5	(13,525)
Peru 1991/92	36.4	23.1	10.3	3.0	0.5	22.1–24.2	(6,974)
Percent change	–4.3	–3.4	–1.4	0.5			

[a] Quality-related reasons include: contraceptive failure, desire for a more effective method, side effects, health concerns, lack of access, cost, and inconvenience of using the method. [b] Reduced need includes: wanting to become pregnant, having infrequent sex or husband or partner absent, being menopausal or subfecund, and marital dissolution or separation.

come indicator of quality of care when it is judged by its relationship to other measures used to characterize the service environment. A good summary measure of service quality has not emerged in the literature, and the measures against which we are comparing contraceptive discontinuation have their own weaknesses. The all-method discontinuation rate for quality-related reasons is moderately and significantly negatively related to the total family planning program effort score, but the relationship is stronger between the rate and the service component of the FPPE score. Some of the indicators included in this component are thought to be crucial indicators of service quality, such as the training and supervision of providers, but others may not be related as directly to service quality (for example, the use of the mass media for information, education, and communication). The inverse relationship observed suggests that a low all-method discontinuation rate for quality-related reasons may reflect specific dimensions of the service environment.

Contrary to expectation, however, the indicator is not related to the access and availability component of the family planning program effort score (which measures access to each of six methods). The relationship between method choice and contraceptive discontinuation is not a straightforward one and warrants further investigation.

Our analysis shows that the rate of discontinuation for quality-related reasons has not changed substantially over the time period represented by the surveys. This finding has implications for its use as an outcome indicator of quality of care. Quality of care may, in fact, have changed little over this period. Also, the indicator may not be particularly sensitive to small changes in the service environment. Moreover, change in this indicator over relatively short periods of time (for example, three to five years) may be difficult to detect with sample sizes in the range used in Demographic and Health surveys.

Although we would not recommend ranking the quality of care in countries on the basis of discontinuation rates, a comparison of the rates across countries and programs is informative because it can highlight country-specific patterns that are anomalous and that may deserve programmatic attention. For example, the all-method discontinuation rate for quality-related reasons in Paraguay is second highest of any country included in this analysis. Discontinuation rates for injectables and the condom are particularly high, and a great deal of switching of methods (as judged by the all-method versus first-method rates) is apparent. Failure rates for injectable users in Paraguay are 1.5 times greater than those of the country with the next-highest rates. These results suggest that family planning program managers may want to examine more closely the delivery of injectables and possibly of condoms as well. The exceptionally high IUD-discontinuation rates in Bangladesh and the Do-

minican Republic are further examples in which significant issues for country programs are highlighted by comparative analysis.

Although our conclusions regarding the use of discontinuation rates as summary outcome indicators of quality of care are equivocal, the study clearly demonstrates the substantial fertility consequences of contraceptive discontinuation and failure. Births resulting from contraceptive failure account for between 4 and 29 percent of total fertility. Contraceptive failure becomes an increasingly important determinant of fertility as contraceptive prevalence increases. An even greater proportion of recent fertility is associated with other types of contraceptive discontinuation. The total fertility rate would be reduced by between 20 percent (Indonesia) and 48 percent (Jordan) in the absence of births occurring in the two years following a contraceptive discontinuation for any reason other than a desire to become pregnant or contraceptive failure.

Not surprisingly, the impact of contraceptive failure and discontinuation is even greater on unwanted fertility. More than half of the total unwanted fertility rate was due to births that were preceded by a contraceptive failure or by contraceptive discontinuation in all countries except Guatemala. Clearly, the reduction of failure and discontinuation rates can make a substantial contribution to reducing unwanted fertility. These results imply that as fertility declines, family planning programs would profit from a shift in emphasis from providing methods to new clients toward providing services, such as counseling, that may help reduce discontinuation rates. Although little research exists to date substantiating the relationship between counseling and reduced discontinuation rates, such research is urgently needed.

Notes

1 An index of mechanisms to promote continuity of use did have a significant effect on use, but the effect was negative.

2 The information from four participants in the Brazil survey was excluded from the analysis because of implausible contraceptive histories.

3 During the secondary editing phase of the processing of DHS survey data, a number of internal consistency checks are performed on the calendar data. These include several related to the reported reason for discontinuation. For example, if the respondent reported that she became pregnant while using a method but no pregnancy is recorded in the month after discontinuation, the case is flagged and may be modified if the discrepancy is only one month. Another inconsistency that is checked occurs when the respondent reports that she stopped using a method in order to become pregnant but the discontinuation is not followed by either the beginning of a pregnancy or at least one month of nonuse (for further details, see Macro International, no date).

4 Throughout the analysis, we examine various reasons for discontinuation of contraception (or various types of behavior following discontinuation). At any point, a woman is simultaneously at risk of discontinuing for any one of a number of different reasons. This type of data is often described as "competing risks" data. Two ways to model competing risks in life tables are used. The first approach (the multiple-decrement approach) models the observed dependent rates (net rates), whereas the second approach (the associated single-decrement approach) models the underlying independent rates (gross rates). Because gross rates are independent of the particular distribution of reasons for discontinuation in a population, they are generally thought to be the appropriate measures for comparing across groups (or countries). Although the analyses in this report are comparative, we are primarily interested in comparing the observed patterns of discontinuation across countries rather than the underlying risks of different types of discontinuation. Therefore, we have chosen to present net rates rather than gross ones. For further discussion, see Blanc et al. (1999). For methodological discussions of life-table discontinuation rates, see Steiner et al. (1996); Kost (1993); and Curtis and Hammerslough (1995).

5 If there are fewer than 62 months in the calendar for a country, the longest period possible is used.

6 In this decomposition of the total fertility rate, a birth is excluded from the numerator if it occurred within two years of a contraceptive discontinuation in the preceding pregnancy interval for any reason other than a desire to become pregnant or contraceptive failure. If another pregnancy occurred between the discontinuation and the index birth, the index birth is not classified as the result of contraceptive discontinuation. We only count the first birth occurring after a discontinuation as a result of the discontinuation. The total fertility rates in this table differ slightly from those shown in most DHS final country reports because they refer to the period 0–35 months prior to the survey with the month of interview allocated as one-half month of exposure, whereas the rates in the DHS reports refer to the period 1–36 months prior to the survey.

7 A discontinuation is classified as a contraceptive failure if the respondent reports that she became pregnant while using the method even if the contraceptive failure was the result of incorrect use of the method.

8 The definition of an unwanted birth is based on the mother's response to the question "At the time you became pregnant with NAME, did you want to become pregnant then, did you want to wait until later, or did you want no (more) children at all?" Births are classified as unwanted if the mother reported that she did not want any (more) children. The responses to this question have been shown to be unreliable (Westoff and Bankole 1998). In particular, women are less likely to report a birth as unwanted as the child gets older. Therefore, the proportion of all children that were actually unwanted when they were conceived is likely to be understated. Women who were practicing contraception or who had recently discontinued using a method at the time of an unwanted pregnancy might be more likely to report the resulting births as unwanted than might women who did not use a contraceptive at all prior to the pregnancy. This reporting pattern would lead to an overstatement of the proportion of unwanted births that were the result of contraceptive failure or discontinuation. The size of this effect is unknown, but we do not expect it to be large.

9 These rates are slightly different from those presented in DHS final country reports for two reasons: First, the analysis in this study excludes left-truncated episodes of use (episodes that began at a known duration before the three-to-62-month analysis period but continued into it). Left-truncated episodes of use are included in the calculation of the rates in the final reports. Second, in the life-table calculations in this study, censored observations receive half a month of exposure for the month in which they are censored. In the final report calculations, they receive a full month of exposure.

10 The index of dissimilarity in method mix has been proposed as a population-based indicator of method choice (Bertrand et al. 2000). The index measures the degree of skew in the method mix in a country by comparing it with a standard method mix. A highly skewed method mix is associated with a high value of the index, which in turn is interpreted as indicating low method choice.

11 For further details and results, see Blanc et al. (1999).

12 The FPPE scores are based on data collected in 1989, prior to the fieldwork dates of the surveys used here. Since the discontinuation rates are calculated on the basis of data referring to the (roughly) five years prior to the surveys, the FPPE scores refer to a date either just prior to or during the five-year period.

13 We also examined the relationship between the all-method discontinuation rates and the index of dissimilarity (Bertrand et al. 2000). The relationship was not quite statistically significant ($p = 0.06$) and, contrary to expectation, was negative.

14 Because the rates are based roughly on five years of retrospective data, the periods covered by the two estimates overlap to some degree for the surveys that are less than five years apart.

15 For Brazil, the rates shown are for the northeast region only because the earlier (1991) survey covered only this region.

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