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K. B. Pathak, Griffith Feeney, and Norman Y. Luther

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India's National Family Health Survey (NFHS) was conducted in 1992–93 under the auspices of the Ministry of Health and Family Welfare. The survey provides national and state-level estimates of fertility, infant and child mortality, family planning practice, maternal and child health care, and the utilization of services available to mothers and children. The International Institute for Population Sciences, Mumbai, coordinated the project in cooperation with 18 population research centres throughout India, the East-West Center Program on Population in Honolulu, Hawaii, and Macro International in Calverton, Maryland. The United States Agency for International Development provided funding for the project.

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Correspondence addresses:
International Institute for Population Sciences
Govandi Station Road, Deonar, Mumbai - 400 088, India
Fax: 91-22-556-3257 • E-mail: ipps@axcess.net.in

East-West Center, Program on Population/Publications
1601 East-West Road, Honolulu, Hawaii 96848-1601, U.S.A.
Fax: 1-808-944-7490 • E-mail: poppubs@ewc.hawaii.edu

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Abstract. *Three-quarters of contraceptive users in India are sterilized, more than five times the level typical of developing countries. Because sterilization is irreversible, couples are unlikely to use this method unless they are certain they will not want more children in the future. Indian women who choose sterilization have already had an average of four children.*

Non-users of contraception who say they do not want another child are identified as having an 'unmet need' for family planning. The 1992–93 National Family Health Survey (NFHS) identified one-fifth of currently married Indian women as having an unmet need, either for limiting or for spacing births. If all those with an unmet need became users, use in India would rise from 41 percent of married couples to 60 percent. This could lower total fertility rates to 2.3 children per woman, only slightly above the population-replacement level.

Temporary methods not only allow those women who want more children later to defer having them, but also are appropriate for those who are unsure whether they want more children and are therefore unlikely to choose sterilization. According to the NFHS, two-thirds of current users of temporary methods said they wanted no more children; that is, they were using temporary methods for limiting, not spacing, births. Among those not currently practising contraception but intending to do so in the future, 36 percent preferred to use a temporary method. Thus a considerable demand exists for temporary methods in India.

This report uses NFHS data to analyze the relative effects of sterilization and temporary methods on Indian fertility. The analysis includes comparisons between India and other developing countries, based on comparable data from the Demographic and Health Surveys (DHS), and between India and selected developed countries.

Taking into account changes over time in the behavior of Indian women of various reproductive age groups who have chosen sterilization in the past, the authors apply that behavior to women who have not yet chosen sterilization nor reached the end of their reproductive age span. The result suggests that sterilization will not be as effective in reducing fertility below the current level of 3.4 children per woman as it has been in reducing fertility from higher levels in the past.

The relationship between temporary methods, birth spacing, and fertility level is complex because temporary methods may be used for spacing or limiting births. The NFHS data suggest that most Indian births are spaced about 2.5 years apart. This average, which is consistent among women of diverse characteristics, is comparable to the average birth intervals in other developing countries and also similar to those in

13 developed countries. This broad similarity in median birth intervals among countries with very different levels of fertility and contraceptive use implies that most contraceptive use occurs in the interval following a woman's last birth—in other words, that women use temporary methods for limiting rather than for spacing births.

Higher levels of temporary-method use do not appear to lengthen average birth intervals, either in India or in other developing countries, unless more than 30 percent of women are using a modern temporary method. When the overall level of contraception is low, most use appears to be for limiting births, and little is for spacing. In any case, the NFHS and DHS data suggest that increasing the length of birth intervals has only a small effect on total fertility levels.

The results of the analysis indicate that no fertility decline can be expected as a result of lengthening birth intervals. However, the increased use of temporary methods by Indian women to stop childbearing may lower total fertility significantly. Continued heavy reliance on sterilization by the Indian family planning programme runs the risk of stalling India's fertility decline, whereas increased use of temporary methods holds promise for accelerating it.

K. B. Pathak, Griffith Feeney, and Norman Y. Luther

K. B. Pathak is Director of the International Institute for Population Sciences, Mumbai, India. Griffith Feeney and Norman Y. Luther are Senior Fellows at the East-West Center's Program on Population.

India is unique in the extent to which sterilization dominates contraceptive use. The 1992–93 Indian National Family Health Survey (NFHS) showed that three out of four users of contraception in India are sterilized.This is more than five times the level typical of developing countries.

In some respects sterilization has been well suited to the early phase of fertility decline, during which most users of contraception are older women with relatively large numbers of children who wish to stop childbearing. Because sterilization is irreversible, however, women are unlikely to use this method unless they are certain they will not want any more children in the future. In the past, at least, this has meant that women tend to become sterilized only after having substantial numbers of children.

Temporary contraceptive methods allow women who want more children in the future to defer having them. Perhaps more importantly, temporary methods allow women who are ambivalent about having more children, and therefore unlikely to become sterilized, to defer additional births for a time. Particularly in a period of rapid social change, women may adjust their family-size desires downward during this period of delay and end up with fewer children.

The NFHS results indicate substantial demand for temporary methods in India. Among women not currently using contraception but intending future use, 36 percent say they prefer to use a temporary method. Among currently married women not using contraception, 11 percent were estimated to have an unmet need for contraception for spacing. Temporary methods are used for limiting births as well. Two-thirds of current users of temporary methods say they want no more children. Continued fertility decline requires that family planning spread to younger women with fewer children. This report considers the role of sterilization and temporary methods in facilitating this spread. Using the NFHS data and similar data from the Demographic and Health Surveys (DHS) conducted throughout the world, we consider the prevalence of temporary methods and sterilization and their likely impact on the level of fertility.

THE DOMINANCE OF STERILIZATION IN INDIA

Sterilization is overwhelmingly the dominant method of contraception in India. Among Indian women using contraception at the time of the NFHS, 76 percent were sterilized. This percentage ranges from a high of 95 in Andhra Pradesh to a low of 34 in Assam and Tripura. These figures and various others that will be used throughout this report are given in Table 1.

International comparisons are necessary to appreciate how exceptionally high this figure for India is. Table 2 presents data similar to that shown in Table 1 for 28 developing populations throughout the world, including 15 African countries, 6 Asian

Table 1 Current use of contraception, fertility indicators, and total population in India, by state, 1992–93

State	Percentage of currently married women age 15–49 using contraception						Sterilization share (%)	Median non-susceptible period (months)	Total fertility rate[a]	Median last closed birth interval (months)	Total population in 1991 (millions)
	Any method	Modern temporary method	Traditional method	Sterilization							
				Total	Female	Male					
India	40.6	5.5	4.3	30.7	27.3	3.4	76	10.2	3.40	31.6	846.3
Andhra Pradesh	47.0	1.8	0.5	44.7	38.1	6.6	95	10.1	2.59	33.4	66.5
Arunachal Pradesh	23.6	8.6	4.3	10.7	10.3	0.4	45	10.6	4.25	29.8	0.9
Assam	42.8	5.4	22.9	14.4	12.1	2.3	34	10.9	3.53	29.8	22.4
Bihar	23.1	2.9	1.5	18.6	17.3	1.3	81	10.6	4.00	33.9	86.4
Delhi	60.3	31.3	5.7	23.2	20.0	3.2	38	4.8	3.02	30.6	9.4
Goa	47.8	7.3	9.9	30.5	29.5	1.0	64	6.7	1.90	35.2	1.2
Gujarat	49.3	5.9	2.4	41.0	37.5	3.5	83	9.4	2.99	30.0	41.3
Haryana	49.7	9.6	5.3	34.7	29.7	5.0	70	8.9	3.99	28.1	16.5
Himachal Pradesh	58.4	8.6	4.0	45.8	32.6	13.2	78	8.5	2.97	28.3	5.2
Jammu Region	49.4	10.0	9.7	29.7	25.3	4.4	60	6.3	3.13	30.9	7.7
Karnataka	49.1	4.8	1.8	42.5	41.0	1.5	87	10.0	2.85	29.9	45.0
Kerala	63.3	6.1	8.9	48.3	41.8	6.5	76	7.3	2.00	34.9	29.1
Madhya Pradesh	36.5	4.0	1.0	31.5	26.4	5.1	86	9.4	3.90	32.1	66.2
Maharashtra	53.7	6.4	1.2	46.2	40.0	6.2	86	9.8	2.86	28.7	78.9
Manipur	34.9	10.3	10.8	13.8	10.9	2.9	40	9.3	2.76	31.6	1.8
Meghalaya	20.7	5.1	5.6	10.0	9.4	0.6	48	11.0	3.73	27.5	1.8
Mizoram	53.8	8.3	0.9	44.6	44.5	0.1	83	6.0	2.30	27.6	0.7
Nagaland	13.0	6.5	0.0	6.4	6.3	0.1	49	10.7	3.26	28.1	1.2
Orissa	36.3	3.0	1.6	31.6	28.2	3.4	87	10.2	2.92	32.7	31.7
Punjab	58.7	17.3	7.4	34.0	31.5	2.5	58	4.4	2.92	29.3	20.3
Rajasthan	31.8	3.3	0.9	27.7	25.3	2.4	87	8.6	3.63	32.5	44.0
Tamil Nadu	49.8	5.7	4.6	39.5	37.5	2.0	79	9.3	2.48	31.6	55.9
Tripura	56.1	9.5	27.5	19.1	16.7	2.4	34	7.9	2.67	33.9	2.8
Uttar Pradesh	19.8	5.5	1.3	13.1	11.7	1.4	66	9.5	4.82	32.1	139.1
West Bengal	57.4	6.7	20.1	30.6	26.3	4.3	53	10.0	2.92	31.7	68.1

Source: NFHS national and state reports.

a. For the 15–49 age range during the three years preceding the survey.

Table 2 Current use of contraception and fertility indicators: selected developing countries, 1987–96

Country	Year	Percentage of currently married women age 15–49 using contraception: Any method	Modern temporary method	Traditional method	Sterilization: Total	Sterilization: Female	Sterilization: Male	Sterilization share (%)	Median non-susceptible period (months)	Total fertility rate	Median last closed birth interval (months)
Bangladesh	1993–94	44.6	27.0	8.4	9.2	8.1	1.1	21	10.8	3.37	34.7
Bolivia	1994	45.3	13.2	27.5	4.6	4.6	0.0	10	11.4	4.80	29.7
Brazil (northeastern)	1991	59.2	15.9	5.5	37.8	37.7	0.1	64	3.3	3.70	27.6
Burkino Faso	1993	7.9	3.9	3.7	0.3	0.3	0.0	4	22.2	6.90	34.7
Cameroon	1991	16.1	3.1	11.8	1.2	1.2	0.0	7	16.0	5.82	30.3
Colombia	1990	66.1	33.2	11.5	21.4	20.9	0.5	32	5.0	2.90	33.0
Côte d'Ivoire[a]	1994	11.4	3.6	7.1	0.7	0.7	0.0	6	16.6	5.70	33.2
Dominican Republic	1991	56.4	13.2	4.7	38.5	38.5	0.0	68	4.3	3.30	28.5
Egypt	1992	47.1	43.7	2.3	1.1	1.1	0.0	2	6.1	3.93	29.9
Ghana	1993	20.3	9.2	10.1	0.9	0.9	0.0	4	16.2	5.50	36.4
Haiti	1994–95	18.0	10.1	4.4	3.4	3.1	0.3	19	12.5	4.80	30.4
Indonesia	1994	54.7	48.3	2.7	3.8	3.1	0.7	7	7.8	2.85	41.8
Madagascar	1992	16.7	4.2	11.6	0.9	0.9	0.0	5	13.4	6.13	28.9
Malawi[b]	1992	13.0	5.7	5.6	1.7	1.7	0.0	13	11.9	6.73	32.7
Morocco	1992	41.5	32.5	6.0	3.0	3.0	0.0	7	4.0	4.04	31.2
Namibia	1992	28.9	18.4	2.9	7.6	7.4	0.2	26	12.8	5.40	33.5
Nepal	1996	28.5	8.5	2.5	17.5	12.1	5.4	61	11.3	4.64	32.0
Niger	1992	4.4	2.2	2.2	0.1	0.1	0.0	2	15.8	7.37	30.1
Nigeria	1990	6.0	3.2	2.5	0.3	0.3	0.0	5	19.0	6.01	30.2
Pakistan	1990–91	11.8	5.5	2.8	3.5	3.5	0.0	30	7.5	5.36	29.1
Paraguay	1990	48.4	27.8	13.2	7.4	7.4	0.0	15	5.4	4.70	27.7
Peru	1991–92	59.0	24.8	26.2	8.0	7.9	0.1	14	9.5	3.50	30.6
Philippines	1993	40.0	12.6	15.1	12.3	11.9	0.4	31	6.4	4.09	28.1
Rwanda	1992	21.2	12.2	8.3	0.7	0.7	0.0	3	17.1	6.23	31.6
Tanzania	1991–92	10.4	5.0	3.9	1.6	1.6	0.0	15	15.6	6.25	33.3
Thailand	1987	65.5	35.1	1.9	28.5	22.8	5.7	44	5.6	2.36	NA
Zambia	1992	15.2	6.8	6.3	2.1	2.1	0.0	14	13.3	6.50	31.4
Zimbabwe	1994	48.1	39.7	6.0	2.5	2.3	0.2	5	14.1	4.29	37.4
Median	NA	28.7	12.4	5.8	3.2	3.1	0.0	14	11.7	4.8	31.2

Source: DHS reports.

NA—not available.

a. Figure given only for 'other modern methods'.

b. No median non-susceptible period given; only median post-partum amenorrhoea.

countries, 6 Latin American countries, and northeastern Brazil. The median level of current contraceptive use is 28.7 percent, about 70 percent of the aggregate level for India. With respect to sterilization, the contrast with India could hardly be more striking. The median share of sterilization over these 28 countries is only 14 percent. Although there are a few other developing countries with high sterilization shares (Dominican Republic, northeastern Brazil, Nepal), the sterilization share in India is larger than the share in any of these countries and is more than five times as large as the median share for the other developing countries as a whole.

THE IMPACT OF STERILIZATION ON THE LEVEL OF FERTILITY

Because sterilization is irreversible, only women who are certain they will not want to have more children in the future are likely to use it. Table 3 shows average numbers of children ever born to currently married women by age and contraceptive use. Sterilized women have an average of 4.0 children, as compared with 2.6 children for users of modern temporary methods, 2.8 children for users of traditional methods, and 2.7 children for non-users of contraception.

These numbers do not of course mean that sterilization has had no impact on the level of fertility in India. Sterilized women have more children because women with more children are more likely to become sterilized. These women would undoubtedly have had even more children had they not been sterilized. Causation is at work in Table 3, but it runs from high fertility to sterilization, not the other way around. The high average number of children ever born to sterilized women does raise the question, however, of how effective sterilization will be in reducing fertility below the levels already reached. The average number of children born to sterilized women is well over the total fertility rate of 3.4 children per woman. If sterilization is to facilitate further fertility decline, the average number of children born to women at the time of sterilization must decline substantially.

The evidence of Table 3 is suggestive but ambiguous. Younger sterilized women have fewer children than do older sterilized women. Relatively few young women are sterilized, however—only 1.3 percent of currently married women in the 15–19 age group and 10.9 percent of those 20–24 years old, as shown in the lower panel of Table 3. They are unrepresentative of Indian women in these age groups. Moreover, the average number of children born to sterilized women in a cohort will increase if, as is likely, women who become sterilized at older ages bear larger numbers of children than do women sterilized at younger ages.

Table 3 shows that sterilized women in the 30–34 and older age groups have far more children, on average, than the current total fertility rate. If the same turns out to be true of women under 30 at the time of interview when they reach these older ages, sterilization will not reduce fertility below the levels already achieved. What we re-

Table 3 Average number of children ever borne and percentage distribution of women, by age and contraceptive use: Currently married women, India, 1992–93

Age group	Non-user	Sterilized	Modern temporary method	Traditional method	Number of currently married women
Average number of children ever borne, by method					
15–49	2.7	4.0	2.6	2.8	84,328
15–19	0.6	2.2	1.0	0.6	8,897
20–24	1.5	2.7	1.6	1.5	17,491
25–29	2.7	3.3	2.3	2.4	16,798
30–34	3.9	3.8	3.1	3.2	13,911
35–39	4.6	4.2	3.8	3.9	11,597
40–44	5.1	4.7	4.2	4.1	8,730
45–49	5.3	5.2	4.4	4.6	6,904
Percentage distribution of women, by method					
15–49	59.3	30.9	5.6	4.3	84,328
15–19	92.9	1.3	2.7	3.1	8,897
20–24	79.0	10.9	6.4	3.7	17,491
25–29	57.7	29.3	8.4	4.6	16,798
30–34	44.1	43.7	7.2	4.9	13,911
35–39	38.9	50.3	5.1	5.6	11,597
40–44	43.8	49.0	2.7	4.5	8,730
45–49	54.2	42.1	1.2	2.5	6,904

Source: NFHS data.

Note: Percentages may not add exactly to 100.0 because of rounding.

ally want to know for these younger cohorts is the average number of children that cohort members will have prior to sterilization as the cohorts age and progressively more women become sterilized.

To address this question, we use the NFHS data to generate retrospective data on the average number of children born to sterilized women. From the NFHS information on date of sterilization for sterilized, currently married women we can determine the number of these women who were sterilized x years prior to being interviewed. From the birth-history information we can determine the number of children ever born to these women x years prior to the interview. It is thus possible to compute a time series of figures like those shown in Table 3 and examine the trend in average number of children born to sterilized women in each age group.

The top panel of Table 4 shows the results of this calculation. The bottom panel shows corresponding numbers of sterilized women. The middle panel shows change over time in average children born to sterilized women in various cohorts. The calculation and significance of these values may be illustrated by a simple example. The upper panel of the table shows that sterilized women 15–19 years old 10 years prior to the NFHS interview had borne an average of 2.22 children. Five years later (that is, five years prior to the interview), women in this cohort were 20–24 years old, and women in the cohort who were sterilized at this time had borne an average of 2.96 children. The difference represents an increase of 0.74 children per woman, which is the entry in the upper left cell in the middle panel of the table. Similarly, women 15–

Table 4 Observed and projected changes in average number of children born to sterilized women prior to sterilization, by age: India, 1982–93

	Years prior to interview										
Age group	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Average number of children born											
15–19	2.22	2.21	2.29	2.39	2.39	2.35	2.30	2.39	2.32	2.36	2.18
20–24	2.97	2.97	2.94	2.95	2.95	2.96	2.89	2.86	2.84	2.78	2.74
25–29	3.56	3.54	3.55	3.54	3.53	3.51	3.46	3.38	3.33	3.31	3.25
30–34	4.22	4.19	4.18	4.16	4.09	4.02	3.97	3.93	3.84	3.81	3.77
35–39	4.88	4.84	4.78	4.74	4.71	4.60	4.52	4.43	4.36	4.28	4.18
40–44	*	5.19	5.22	5.20	5.19	5.13	5.09	5.00	4.89	4.82	4.69
45–49	NA	NA	NA	NA	*	*	5.36	5.33	5.31	5.26	5.17
Five-year cohort increment to average number of children born											
	Observed						Projected				
15–19	0.74	0.68	0.57	0.45	0.39	0.39	0.34	0.34	0.34	0.34	0.34
20–24	0.54	0.49	0.44	0.38	0.36	0.29	0.28	0.26	0.25	0.25	0.25
25–29	0.46	0.43	0.38	0.30	0.28	0.26	0.22	0.20	0.19	0.18	0.18
30–34	0.38	0.33	0.25	0.20	0.19	0.16	0.12	0.10	0.09	0.08	0.08
35–39	0.26	0.25	0.22	0.15	0.11	0.09	0.04	0.03	0.02	0.01	0.01
40–44	NA	0.17	0.11	0.11	0.07	0.04	NA	NA	NA	NA	NA
Number of women											
15–19	69	77	97	118	137	155	153	168	160	137	118
20–24	830	942	1,143	1,288	1,536	1,635	1,790	1,738	1,829	1,873	1,899
25–29	2,304	2,622	2,896	3,317	3,568	3,807	4,061	4,405	4,501	4,821	4,928
30–34	2,760	3,080	3,586	3,810	4,400	4,845	5,205	5,304	5,710	5,805	6,085
35–39	2,302	2,584	2,822	3,299	3,604	3,940	4,272	4,796	4,937	5,443	5,837
40–44	1	370	847	1,340	1,863	2,807	3,084	3,255	3,700	3,948	4,275
45–49	NA	NA	NA	NA	1	2	418	932	1,436	1,974	2,907
15–39	8,265	9,305	10,544	11,832	13,245	14,382	15,481	16,411	17,137	18,079	18,867

Source: NFHS data.

Notes: See text for explanation. Zero years prior to interview represents the time of interview. NFHS interviews were carried out between April 1992 and September 1993, so that 0 years prior to interview corresponds, on average, to the beginning of 1993, 1 year prior to interview corresponds to the beginning of 1992, and so on, with 10 years prior to interview corresponding to the beginning of 1983.

* Mean not shown; based on < 25 women.

NA—not available.

19 years old five years prior to the survey had borne an average of 2.35 children, whereas sterilized women in the same cohort five years later had borne an average of 2.74 children, an increase of 0.39 children per woman. The remaining values in the first six columns of the middle panel of Table 4 are computed in the same way.

It should be understood that the group of women represented in these averages for any cohort in the top panel of Table 4 changes with time as more members of the cohort become sterilized. The number of children born to specific women who are then sterilized does not, of course, change after they are sterilized. The average number of children born to women in a cohort who subsequently become sterilized will increase over time, however, if the average number of children born to recently sterilized women is greater than the average number born to women sterilized in the past. As a way of projecting, at the time of the survey, the future fertility of women in each age group who eventually become sterilized, we add cohort increments for earlier

cohorts to the average number of children born to sterilized women in each age group. For the 15–19 age group, for example, we begin with the average number of children born as of the time of interview to women in this age group who become sterilized, which is 2.18, and we add the increments 0.39 (for women who were 15–19 years old five years before the interview), 0.29 (for women who were 20–24 years old five years before the interview), and so on, to obtain

$$2.18 + 0.39 + 0.29 + 0.26 + 0.16 + 0.09 + 0.04 = 3.41$$

children per woman. The same calculation for the 20–24, 25–29, . . ., and 40–44 age groups yields 3.58, 3.80, 4.06, 4.31, and 4.73 children per woman, respectively.

This result suggests that the completed fertility of women who were in the 15–19 year age cohort at the time of the interview and who will eventually become sterilized will be about the same as the current total fertility rate, while the completed fertility of older cohorts will be higher. If this is indeed the case, sterilization will contribute nothing to reducing fertility below the current level. In imputing the increments observed over the five years prior to interview to the five years following the interview, however, we make no allowance for changing behavior over time. Scrutinizing the increments in the first six columns of the middle panel of Table 4, we see that the increments for each age group declined substantially during the decade prior to the NFHS, so that it is unreasonable to impute the increments for the five-year period prior to the NFHS interviews to the five-year period following the interviews.

What is needed is an appropriate way of extrapolating past declines into the future. Fitting a straight line to the increments for each age group by least squares and using the resulting intercept and slope to extrapolate forward in time gives increments very close to zero within five years. This is an unreasonable result, for increments can be zero only if all sterilized women want the same number of children. To see this, imagine first a cohort in which all women who become sterilized want exactly two children and become sterilized after having their second child. In this situation, women in any cohort who become sterilized in any year will have a mean of two children each, and there will be no increase in the average number of children ever born to sterilized women in a cohort as the cohort ages, i.e., an increment of zero. The same will be true if all women want to bear any other fixed number of children and become sterilized after having this number of children.

We can be certain, however, that not all women who become sterilized want the same number of children, that there is a distribution of desired number of children for women who become sterilized as there is for women as a whole. Among currently sterilized women interviewed by the NFHS, for example, we find 16 percent with two children, 28 percent with three children, 22 percent with four children, and 15 percent with five children. When different women want different numbers of children

and become sterilized after having the number they want, the mean number of children born to sterilized women in a cohort will increase as the cohort ages. This is because women who want fewer children will become sterilized earlier, on the average, than women who want more children. The proportional distribution of women in the cohort who are still unsterilized as the cohort ages will therefore include fewer and fewer women who want smaller numbers of children and more and more women who want larger numbers of children. The average number of children born to women in the cohort who are sterilized later will therefore be higher than the number born to women who are sterilized earlier. This implies that the average number of children born to sterilized women in the cohort must increase as the cohort ages.

A simple linear extrapolation of the increment trends in Table 4 is therefore unacceptable. Indeed, close inspection of the trends in the increments in the middle panel of Table 4 shows a distinct non-linearity, with an increasing rate of decline for the earliest three years of the series and a generally decreasing rate for the last three years. This suggests fitting a logistic curve, which we have done to obtain the projected values shown in the last five columns of the middle panel of Table 4. While there is an inevitable and significant element of judgment involved in arriving at these extrapolations, they are clearly superior either to assuming no future change in increments (which gives future increments that are too large) or to assuming a linear decline in increments (which gives future increments that are too small).

Repeating the same calculation as before, but using the projected values in the last column of the middle panel of Table 4 instead of the most recent observed values, gives projected completed fertility of 3.04 children per woman for the cohort 15–19 years old at the time of the interview. Corresponding values for cohorts 20–24, 25–29, and 30–34 are 3.26, 3.52, and 3.86 children per woman, respectively.

We are now in a position to assess the impact of sterilization on the future decline of fertility. Extrapolating the behavior of Indian women with respect to sterilization into the near future suggests that sterilized women in the three youngest cohorts, ages 15–29 at the time of the interview, will have a completed fertility of between 3.0 and 3.5 children. Although these figures are generally lower than the total fertility rate of 3.4 children per woman, the difference is small. There appears to be a significant risk that sterilization will not be as effective in reducing fertility below the current level as it has been in reducing fertility in the past.

THE NEED FOR TEMPORARY METHODS

Modern temporary methods of contraception include oral contraceptives (pills), intrauterine devices (IUDs), injections, and condoms. Traditional methods, which are also temporary, consist primarily of periodic abstinence and withdrawal. Use of temporary methods in India is low, in both absolute and relative terms. Only 9.8 percent

of currently married women interviewed by the NFHS were using temporary methods, and they constituted only 24 percent of all currently married users (IIPS 1995, table 6.5; Ramesh, Gulati, and Retherford 1996, table 5.1). Use of particular temporary methods is extremely low—1 percent for pills and 2 percent each for IUDs and condoms. Nearly half of all temporary method use is of traditional methods.

Temporary methods may be used either to limit or to space births. One might expect that women who want no more children would prefer sterilization to a temporary method. Yet the NFHS shows that two-thirds of all Indian women using temporary methods want no more children; that is, they are using temporary methods to limit, not to space, births. Table 5 shows these percentages for all users of temporary methods and for users of each temporary method. Remarkably, the percentages of women wanting no more children are similar for users of all methods except injections and 'other', both of which involve very small numbers of women. These data indicate that, despite the widespread availability and use of sterilization, there is a need for temporary methods for limiting births.

Table 5 Percentage distribution of current users of temporary methods by desire for additional children and place of residence: India, 1992–93

Place of residence	Want more	Want no more	Other	Total	Number of women
India					
All temporary methods	32	65	3	100	8,300
Pill	35	63	2	100	1,013
IUD	31	64	5	100	1,590
Injection	19	78	3	100	32
Condom	32	64	4	100	2,054
Periodic abstinence	32	66	2	100	2,224
Withdrawal	36	62	3	100	1,202
Other	9	83	9	100	185
Urban					
All temporary methods	27	69	4	100	3,841
Pill	31	67	2	100	425
IUD	29	66	5	100	865
Injection	20	80	0	100	5
Condom	29	66	5	100	1,279
Periodic abstinence	22	77	2	100	766
Withdrawal	28	69	4	100	455
Other	2	96	2	100	46
Rural					
All temporary methods	36	61	3	100	4,460
Pill	37	60	2	100	588
IUD	33	63	4	100	724
Injection	19	78	4	100	27
Condom	37	60	4	100	775
Periodic abstinence	37	60	2	100	1,460
Withdrawal	40	58	2	100	747
Other	11	78	11	100	139

Source: NFHS data.

Note: Percentages may not add exactly to 100 because of rounding.

A different kind of evidence is provided by non-using women who said they intended to use a method in the future and were asked which method they preferred. While 59 percent said they preferred sterilization, 36 percent said they preferred a temporary method (IIPS 1995, table 6.26). Five percent said they were uncertain. The percentage of intended users preferring temporary methods is thus larger by half than the 24 percent of current users who use temporary methods (IIPS 1995, table 6.6).

Non-users of contraception who say they do not want to have a child, either at all or in the near future, are identified as having 'unmet need' for family planning. Women who want no more children are classified as having unmet need for limiting births. Women who want more children after waiting two or more years are classified as having unmet need for spacing births. Also classified as having unmet need are pregnant women whose pregnancy was unwanted or mistimed and amenorrhoeic women whose last pregnancy was unwanted or mistimed.

For India as a whole, 19.5 percent of currently married women were identified as having unmet need, 8.5 percent with unmet need for limiting and 11.0 percent with unmet need for spacing (IIPS 1995, table 7.5). Both groups represent a need for temporary methods.

THE FERTILITY IMPACT OF TEMPORARY METHOD USE

If all women classified as having unmet need for contraception became users, use would rise by half, from the 40.6 percent recorded in the NFHS (IIPS 1995, table 6.5) to 60.1 percent. The relationship between contraceptive prevalence and total fertility rates indicated by international data (Robey, Rutstein, and Morris 1992) suggests that this could lower the total fertility rates in India from 3.4 children per woman, the level indicated by the NFHS for the early 1990s, to 2.3 children per woman. Given current mortality levels in India, a total fertility rate of 2.3 is only slightly above the population-replacement level.

While this figure of 2.3 children per woman provides a useful benchmark, assessing the fertility decline likely to result from changes in contraceptive prevalence is problematic for several reasons. These include the confounding effect of continuing change in desired numbers of children and the tendency for self-selection among contraceptive users.

In particular, 56 percent of the women classified as having unmet need were identified as wanting another child after an interval of two or more years. If all these women were indeed to have another child, how much would birth intervals lengthen, and what effect would this have on the level of fertility? These questions, simple enough to pose, turn out to be difficult to answer. To answer them, in the next several sections we examine evidence on birth spacing in relation to temporary method use and the level of fertility.

Contraceptive use, birth spacing, and fertility level

A woman's reproductive history divides into three parts: the period prior to marriage, the closed intervals between marriage and first birth and between births, and the terminal open interval following the last birth. Childless women have neither closed nor open intervals. When analyzing data from a particular survey, we are also presented with the open interval between a woman's most recent birth and the time of the survey. The designation of such intervals as open is specific to the time of observation, however. An open interval of this type in one survey might, if the same woman were interviewed again, form part of a closed interval in a subsequent survey.

Permanent methods of contraception are by definition usable only for limiting childbearing, but temporary methods may be used for either spacing or limiting. Generally speaking, the use of temporary methods in closed birth intervals corresponds to birth spacing and the use of any contraceptive method in the terminal open interval following a woman's last birth corresponds to limiting. A woman may experience contraceptive failure, however, turning what was intended to be a terminal open interval into a closed interval; and a woman who uses contraception to delay a desired additional birth may find that she is unable to conceive, turning an intended closed interval into a terminal open interval.

Because temporary contraceptive methods may be used for limiting as well as for spacing, the relationship between the level of use of these methods and birth spacing is less simple than might at first be supposed. The use of temporary contraceptive methods for limiting obviously will not affect birth spacing except to the extent that users experience contraceptive failure. It would therefore be useful to identify temporary method use that occurs within closed and terminal open birth intervals. To do so, however, requires information on a woman's history of contraceptive use. Since the NFHS does not include this information, we must address the relationship between spacing and temporary method use indirectly.

The relationship between birth intervals and fertility level is similarly problematic. For women reproducing continuously over a fixed time interval, shorter intervals obviously result in more children and longer intervals in fewer children. But the two premises of this observation rarely hold. Women do not reproduce continuously, in general, because they have the option of stopping childbearing after any given number of children, and they do not reproduce over a fixed time interval because of the variability in both the age at initiation of childbearing and the age at which secondary sterility begins. Except in populations with very high fertility, longer birth intervals may simply spread the same number of births out over more of the reproductive age span, producing little or no effect on the total number of children born. While such spacing of births will tend to lower the period total fertility rate, the effect is transitory and is likely to be small.

Birth spacing in India in international perspective

The next-to-last column of Table 1 shows the median last closed birth intervals terminating during the five years preceding the NFHS. The median interval for India is 31.6 months. The median interval for states ranges from 27.5 months for Meghalaya to 35.2 months for Goa. This variability is modest, given the large differences in other demographic characteristics, including fertility level. Median intervals for most states are within a few months of two and one-half years.

The length and variation of birth intervals in India are typical of developing countries generally. For the DHS data shown in Table 2, the median last closed interval (last column) over all surveys is 31.2 months, virtually identical to the median value for India. The range of median intervals is larger, but only because of two outlier countries with very long intervals, Indonesia (41.8 months) and Zimbabwe (37.4 months).

It might be supposed that birth intervals in developed, low-fertility countries would be longer than intervals in developing, high-fertility countries. In fact, the differences are very small. Published information strictly comparable to that just given for India and other developing countries is not available for developed countries, but we have assembled roughly comparable median closed birth intervals for 12 European countries and the United States (Ford 1984). Data are available only for the first-to-second and second-to-third birth intervals, which may be averaged for comparison with the values in Tables 1 and 2. The data for these 13 developed countries are shown in Table 6.

The medians are computed from synthetic cumulative-distribution functions for interbirth intervals derived by life-table methods. Since the distributions end at 84 months' duration, the medians are necessarily conditional on this interval, making them slightly lower than they would be if the truncation point were higher. The magnitude of the bias may be assessed by assuming that 3 percent of all intervals are longer than 84 months, a conservatively high figure, and recomputing the medians on this basis. This calculation shows biases varying from country to country, but in no case exceeding one month.

The median birth interval for the 13 developed countries shown in Table 6 is 32.6 months, only slightly longer than the medians for India and the developing countries shown in Table 2. The modest differences in length of birth intervals between developing and developed countries contrasts strikingly with the large differences in levels of fertility. Women in developed, low-fertility countries have the option of very long birth intervals, but few women exercise this option. This broad similarity of median birth intervals across countries with very different levels of fertility and contraceptive use suggests that most contraceptive use occurs in the terminal open interval following last birth, i.e., that most contraceptive use is for limiting rather than for

Table 6 Median birth intervals in 13 developed countries: Recent years

Country	1st to 2nd	2nd to 3rd	Average
Belgium	27.0	31.8	28.5
Czechoslovakia	37.2	38.4	37.5
Finland	34.2	41.0	35.9
France	32.7	33.0	32.8
Great Britain	29.2	NA	29.2
Hungary	35.6	34.0	35.3
Italy	34.3	37.5	35.2
Netherlands	30.0	36.0	31.5
Norway	33.5	39.8	35.4
Poland	31.9	33.7	32.4
Spain	29.3	34.8	31.2
United States	31.5	35.0	32.6
Yugoslavia	29.4	29.7	29.5
Median	31.9	34.9	32.6

Source: Ford (1984).

Note: Due to limitations of data, the calculation of median intervals assumes the existence of no intervals greater than 84 months and also assumes a uniform distribution of births over the six-month interval in which the cumulative probability of 0.50 lies. These averages are weighted by the number of women completing an interval within 84 months.

NA—not available.

spacing births. Unfortunately, to bring direct evidence to bear on this point requires allocating contraceptive use to the three components of women's reproductive lives (the period prior to the first birth, the closed birth intervals, and the terminal open interval following the last birth). As noted earlier, this is possible only with information on history of contraceptive use, which is unavailable in the NFHS survey.

While it appears that most contraception is used to limit rather than to space births, this generalization is an oversimplification in one important respect, for the similarity in birth spacing between developed and developing countries results from quite different behavior. Breastfeeding in developing countries is far more widespread and prolonged than it is in developed countries, so that the duration of post-partum amenorrhoea is much shorter in developed than in developing countries. The fourth-to-last column of Table 1 shows, for India, the duration of the median non-susceptible period resulting from the combined effect of post-partum amenorrhoea and post-partum abstinence. The value for India is 10.2 months, of which amenorrhoea accounts for 9.0 months (IIPS 1995 table 5.26). The third-to-last column of Table 2 shows similar statistics for the 28 DHS surveys, with a median over all surveys of 11.7 months.

In contrast, where there is little breastfeeding, the mean duration of post-partum amenorrhoea can be as low as 2–3 months (Bongaarts and Potter 1983). If women in developed countries did not use contraception for birth spacing, median birth intervals would be considerably shorter in developed countries than in developing countries. That median birth intervals in developed countries are as long as or longer than

median intervals in developing countries is thus indirect but clear evidence of birth spacing in developed countries. Since few women in developed countries have more than three children, however, the amount of implied contraceptive use within closed birth intervals is small in relation to the long period of protection required following the last birth. This suggests that even in developed countries most contraceptive use is for stopping rather than for spacing.

Birth intervals by women's characteristics

The small variation in typical birth-interval lengths leads us to ask how much birth intervals vary according to women's characteristics. The NFHS reports show the variation in median birth intervals by several characteristics, including the mother's age, order of prior birth, sex of prior birth, survival of prior birth, urban/rural residence, and mother's education, religion, and caste or tribe. Similar information is available for the DHS surveys listed in Table 2.

Remarkably, there is no large and consistent variation in birth-interval lengths for any of these variables except mother's age and survival of prior birth. Table 7 shows data for these characteristics for the 19 states of India in which the NFHS collected this information. The duration of birth intervals increases sharply with mother's age, from about two years for women in the 15–19 age group to about three

Table 7 Median last closed birth intervals (in months), by age of mother and survival of prior birth: 19 states of India, 1992–93

State		Age of mother				Survival of prior birth		
	Total	15–19	20–29	30–39	40+	Living	Dead	Living minus dead
India	31.6	24.8	29.8	36.4	41.8	32.5	25.7	6.8
Andhra Pradesh	33.4	26.0	31.8	41.1	NA	34.1	25.4	8.7
Assam	29.8	23.7	28.6	32.4	37.4	31.0	24.9	6.1
Bihar	33.9	23.3	31.7	37.2	43.4	34.8	26.1	8.7
Delhi	30.6	NA	28.5	36.9	39.0	31.6	23.9	7.7
Goa	35.2	NA	29.6	39.7	50.3	35.7	25.5	10.2
Gujarat	30.0	22.7	28.1	34.9	34.7	30.6	25.5	5.1
Haryana	28.1	24.0	26.7	33.3	43.5	29.0	23.7	5.3
Himachal Pradesh	28.3	NA	26.5	35.2	50.1	28.6	23.1	5.5
Jammu Region	30.9	NA	27.6	36.6	49.5	31.1	25.9	5.2
Karnataka	29.9	24.9	29.3	34.9	38.5	30.6	25.0	5.6
Kerala	34.9	NA	31.2	44.3	46.0	34.9	33.5	1.4
Madhya Pradesh	32.1	27.8	30.2	35.6	38.7	33.0	26.9	6.1
Maharashtra	28.7	24.9	28.1	35.1	34.0	29.4	24.1	5.3
Orissa	32.7	23.2	31.3	36.7	49.1	34.2	26.3	7.9
Punjab	29.3	NA	27.5	35.5	42.5	29.7	24.8	4.9
Rajasthan	32.5	24.5	30.6	36.4	43.2	33.1	28.0	5.1
Tamil Nadu	31.6	NA	29.0	40.1	50.1	32.3	24.8	7.5
Uttar Pradesh	32.1	23.3	29.6	34.7	39.6	33.2	26.2	7.0
West Bengal	31.7	25.5	30.4	37.1	40.2	33.0	25.0	8.0

Source: NFHS state reports.

NA—not available.

and one-half years for women 40 and older. Median birth intervals for which the initial child was surviving at the time of the interview are about seven months longer than intervals for which the initial child was deceased, on the average.

These observations hold for developing countries generally. For the DHS surveys shown in Table 8, strong and consistent variation in birth-interval length is observed only by mother's age and survival of prior birth. The patterns for these countries are similar to those for India.

Temporary methods and birth spacing: Empirical evidence

We have seen that the effect of temporary method use on the length of birth intervals depends on the extent to which these methods are used for limiting rather than spacing births. If all use of temporary methods occurs in closed birth intervals, there may

Table 8 Median last closed birth intervals (in months), by age of mother and survival of prior birth: selected developing countries, 1987–96

			Age of mother				Survival of prior birth		
Country	Year	Total	15–19	20–29	30–39	40+	Living	Dead	Living minus dead
Bangladesh	1993–94	34.7	26.0	33.9	36.6	37.5	35.8	26.4	9.4
Bolivia	1994	29.7	21.5	27.0	31.3	36.7	30.2	26.2	4.0
Brazil (northeastern)	1991	27.6	15.8	25.5	29.3	37.0	27.6	27.4	0.2
Burkina Faso	1993	34.7	24.6	33.1	35.8	37.4	34.4	27.7	6.7
Cameroon	1991	30.3	27.2	29.0	31.4	36.5	30.9	25.7	5.2
Colombia	1990	33.0	22.1	27.6	42.8	48.4	33.1	25.8	7.3
Côte d'Ivoire[a]	1994	33.2	30.4	32.6	33.8	35.0	34.1	26.7	7.4
Dominican Republic	1991	28.5	20.1	25.8	36.7	43.9	28.8	24.3	4.5
Egypt	1992	29.9	22.8	26.5	33.0	41.4	30.6	24.4	6.2
Ghana	1993	36.4	NA	34.2	38.2	39.0	37.1	30.5	6.6
Haiti[a]	1994–95	30.4	27.1	27.9	32.0	35.0	30.9	26.6	4.3
Indonesia	1994	41.8	25.9	35.1	47.4	47.4	43.6	28.5	15.1
Madagascar	1992	28.9	22.9	27.0	30.2	35.6	29.5	25.0	4.5
Malawi[b]	1992	32.7	24.2	30.7	34.6	36.5	34.0	26.7	7.3
Morocco	1992	31.2	20.0	27.4	32.6	37.5	32.1	22.8	9.3
Namibia	1992	33.5	NA	31.2	35.0	37.2	34.1	26.9	7.2
Niger	1992	30.1	23.8	28.9	31.4	33.6	32.1	25.3	6.8
Nigeria	1990	30.2	25.2	28.6	30.9	36.4	30.9	26.9	4.0
Pakistan	1990–91	29.1	23.7	26.8	30.8	37.9	30.0	23.7	6.3
Paraguay	1990	27.7	20.7	25.1	29.5	33.5	27.9	24.0	3.9
Peru	1991–92	30.6	21.5	26.8	34.7	39.2	31.2	25.2	6.0
Philippines	1993	28.1	19.3	24.6	30.9	36.4	28.4	24.2	4.2
Rwanda	1992	31.6	23.4	28.8	32.6	34.5	32.5	24.5	8.0
Tanzania	1991–92	33.3	25.4	30.9	35.0	38.1	33.9	28.3	5.6
Zambia	1992	31.4	26.3	29.9	33.2	36.2	32.0	27.3	4.7
Zimbabwe	1994	37.4	29.0	34.7	40.6	41.2	38.0	27.7	10.3

Source: DHS reports.

a. Published reports for Haiti and Côte d'Ivoire show the interval for prior child deceased to be longer than the interval for prior child living, but this is a typographical error.

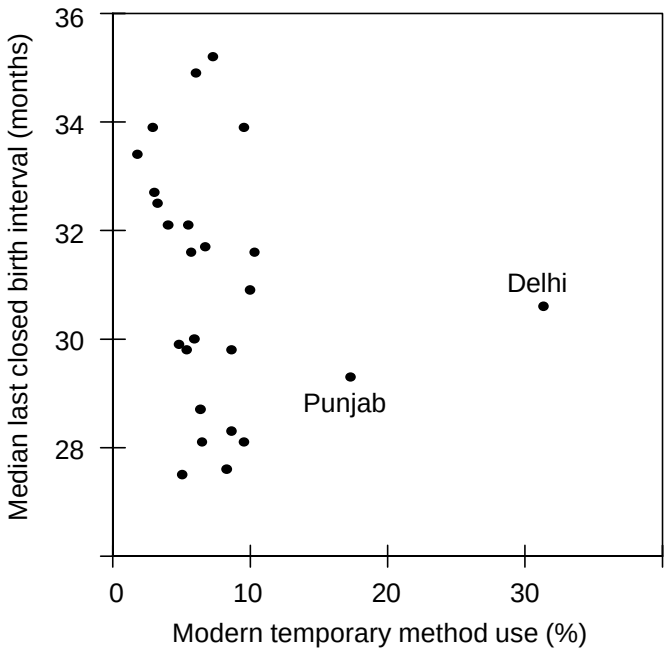
b. Data for Malawi are given in five-year age groups for ages 20–39. Age groups are averaged for comparability with other countries.

NA—not available.

be a substantial lengthening of intervals. If all use of temporary methods occurs in the terminal open interval following the last birth, there will be no effect on interval length.

Because the available data do not allow us to identify the use of temporary methods as being in closed or open intervals, we proceed indirectly by looking at the covariation between current use of modern temporary methods and the median last closed birth interval for several populations. This is not an ideal test, for women who are currently using such methods were not necessarily using them during their last closed birth interval. It is the best we can do with the available data, however, and it is reasonable to assume some correlation between current use and use during the last closed interval.

Figure 1 plots the median last closed birth interval against the percentage of women currently using modern temporary methods for the 25 states of India. There is no tendency for states with higher levels of use of temporary methods to have longer birth intervals. All states except Delhi and Punjab show levels of temporary method use under 10 percent. The length of birth intervals in Delhi, with more than 30 percent of ever-married women using a modern temporary method, and Punjab, with a level of nearly 20 percent, is generally similar to the level for the other states. The same conclusion applies if we replace current use by ever use or modern temporary methods by traditional methods.



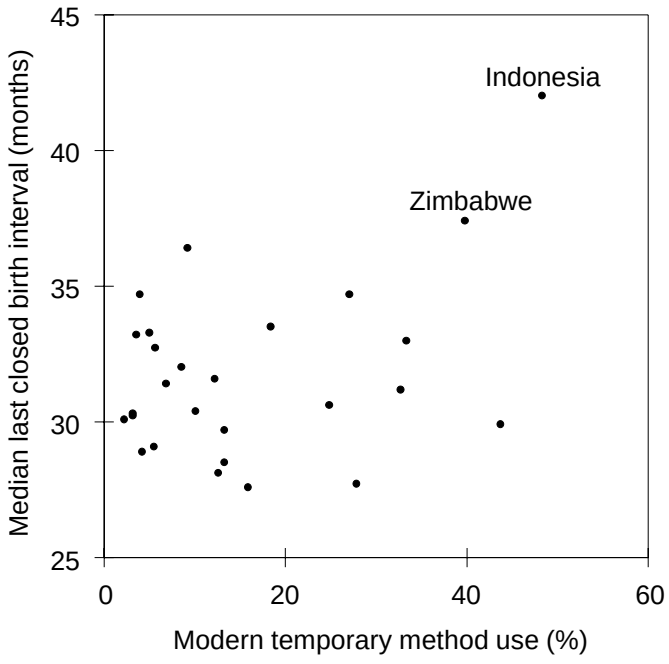
Source: Table 1.

Figure 1 Median last closed birth interval and percentage of women currently using a modern temporary contraceptive method: 25 states of India

The states of India provide a poor basis for estimating the birth-interval-lengthening effect of temporary method use, however, because of the low variability of temporary method use between states. A second test is provided by data for the DHS surveys shown in Table 2, among which the range of variation in temporary method use is greater. Figure 2 shows median last closed birth intervals plotted against the percentages of women currently using modern temporary methods for the 27 countries for which this information is available. While there appears to be some tendency toward positive correlation, it is due entirely to the points for Indonesia and Zimbabwe.

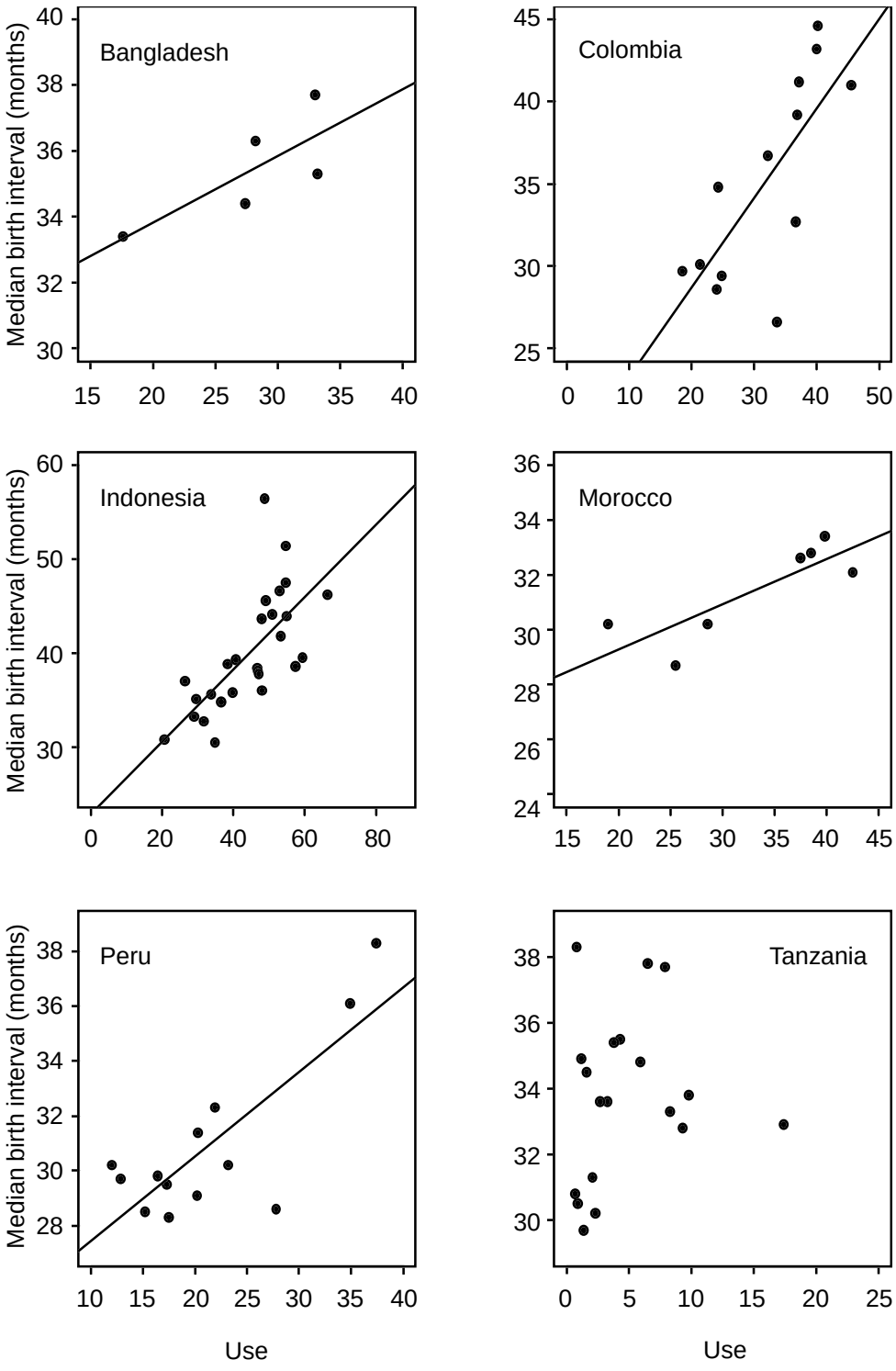
We have identified six DHS countries for which published data on birth intervals and temporary method use are available for varying numbers of subnational units—Bangladesh, Colombia, Indonesia, Morocco, Peru, and Tanzania. These data (not shown but available in the published reports) do indicate a relationship between the use of temporary contraceptive methods and the length of birth intervals, as shown in Figure 3. The fitted lines for Bangladesh, Colombia, Indonesia, Morocco, and Peru give slopes of 0.20, 0.54, 0.38, 0.16, and 0.31, respectively. No line has been fitted for Tanzania, for which there is clearly no relationship.

On close inspection of Figure 3, it will be seen that there is no relationship between temporary method use and the length of birth intervals if attention is re-



Source: Table 2.

Figure 2 Median last closed birth interval and percentage of women currently using a modern temporary contraceptive method: Selected developing countries



Source: Published DHS reports.

Figure 3 Median last closed birth interval and percentage of women currently using a modern temporary contraceptive method: Subnational data for six developing countries

stricted to the data points corresponding to use levels below 30 percent. This suggests a threshold effect in the relation between temporary method use and the length of birth intervals. As long as the use of temporary methods is lower than about 30 percent, varying the level of this use has no discernible effect on the length of birth intervals. Beyond this threshold level, increased use of temporary methods results in longer birth intervals.

It is not surprising that there should be little use of contraception for spacing at low use levels and increasing use for spacing as use levels rise. It is plausible that the first women to use contraception in a society are those concerned mainly with limiting births and that contraceptive use for spacing occurs only when use has become more widespread. In other words, women's behavior, in general, only gradually extends from using contraception for limiting births to using contraception for spacing births.

The appearance of a threshold effect at 30 percent is puzzling, however. It is difficult to see why there should be a discontinuity between overall use levels below or above any particular level. If there were such a discontinuity, it would be unclear why the threshold level would be the same in every country. Although we do not doubt that contraceptive spacing is initially low and increases disproportionately with overall level of use, we suspect that the apparent threshold may simply be a quirk of the limited data available.

The conclusion pointed to by the evidence presented in this section is that when the overall level of contraceptive use is low, most contraceptive use is for limiting births and very little is for spacing births. Only when the level of use becomes substantially higher than it currently is in India can we expect to find significant use for spacing and a positive relationship between the level of temporary-method use and the length of birth intervals.

Birth spacing and level of fertility: Empirical evidence

We have seen that longer birth intervals imply lower fertility only when fertility is very high. There is no necessary relation between birth-interval length and the level of fertility when fertility is low or when it is moderate as it is currently in India. In this section we ask whether there is an empirical relation between the level of fertility and the length of birth intervals.

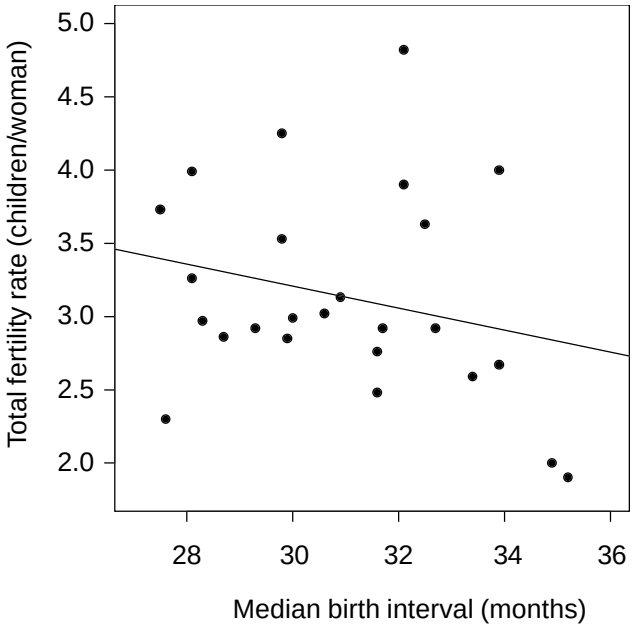
Figure 4 shows the relation between the total fertility rate and the median last closed birth interval for the 25 Indian states listed in Table 1. Based on the fitted line, an increase of one month in the median birth interval corresponds to a decline in the total fertility rate of 0.075 children per woman. The scatter of the observed points about the fitted line is so great, however, that one would not have confidence that such a lengthening of intervals would in fact result in a decline in fertility of this magnitude.

Figure 5 shows the same picture for the DHS countries listed in Table 2. The fitted line indicates a reduction of 0.04 children per woman for each one-month increase in the median birth interval, just over one-half the value for Figure 4. Again, there is considerable scatter of the observed points about the fitted line.

Figure 6 shows the same picture for subnational data from five of the six countries shown in Figure 3—Bangladesh, Colombia, Indonesia, Morocco, and Peru. (Total fertility rates for the subnational units of Tanzania are not available.) The range of median intervals for Bangladesh, Morocco, and Peru is too small to support fitting a line; but the slopes of the fitted lines for Colombia and Indonesia are -0.09 and -0.08, respectively. This suggests that lengthening birth intervals by one month might reduce the total fertility rate by just under one-tenth of a child per woman, a very small effect.

DISCUSSION

We are now in a position to consider again the likely impact of meeting the unmet need for modern temporary methods of contraception in India. Recall that the NFHS estimates that 19.5 percent of currently married women have an unmet need for contraception, of which 8.5 percent is for limiting and 11.0 percent for spacing (IIPS 1995, table 7.5). If all these women became users of contraception, use would rise from 40.6 percent (IIPS 1995, table 6.5) to 60.1 percent. Given the relationship be-



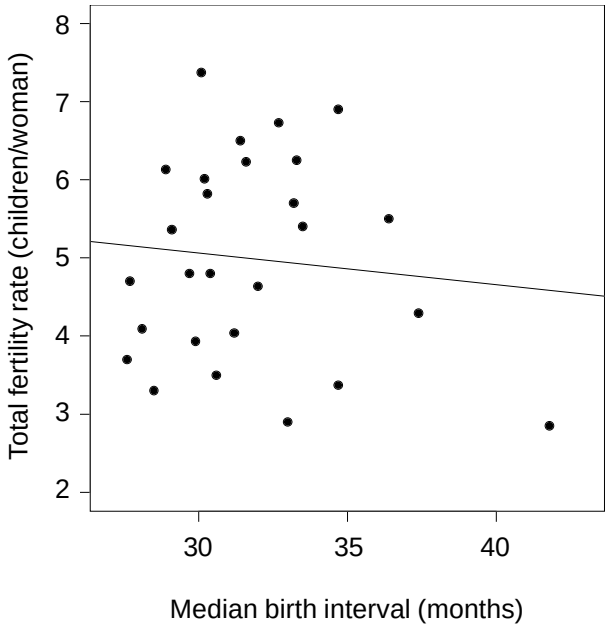
Source: Table 1.

Figure 4 Total fertility rate and median last closed birth interval: 25 states of India

tween the total fertility rate and contraceptive prevalence observed internationally (Robey, Rutstein, and Morris 1992), this increase in use could lower the total fertility rate by about one child per woman.

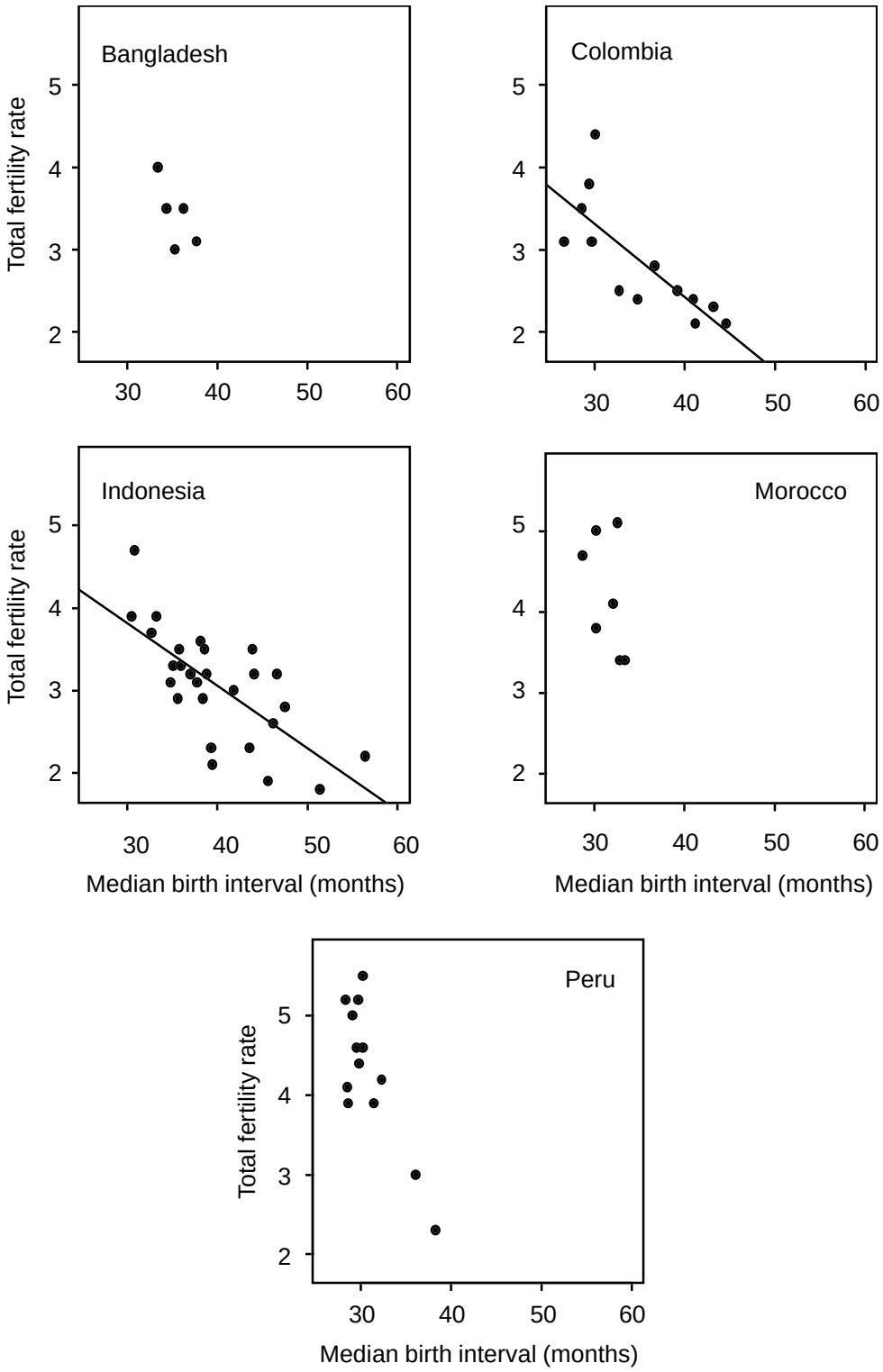
If all women with unmet need for spacing were to begin using modern temporary methods, the level of use of these methods would rise from the 5.5 percent recorded in the NFHS (Table 1) to 16.5 percent. Evidence from India and other developing countries generally suggests that such an increase would have no effect on the length of birth intervals, 16.5 percent being far below the level of 30 percent at which we discern a relationship between these two variables in international data.

On the one hand, this result means that no fertility decline should be expected as a result of lengthening birth intervals. This conclusion is not as surprising as it might at first seem. When fertility falls to the levels currently observed in India, childbearing typically ceases long before the end of the reproductive age span. The NFHS results show that the median age at last birth for 40–49-year-old women was 30.6 years (IIPS 1995, table 5.19). For a woman who has four children, increasing the length of all closed birth intervals by three months, a very substantial increase in view of the modest overall variation in typical birth-interval lengths, would increase her age at last birth by less than one year. Increasing the expected age at last birth by one year in a woman's early 30s poses little risk that the woman will become infertile before having this birth. Spacing births at this moderate level of fertility will merely spread



Source: Table 2.

Figure 5 Total fertility rate and median last closed birth interval: Selected developing countries



Source: Published DHS reports.

Figure 6 Total fertility rate and median last closed birth interval: Subnational data for six developing countries

a woman's births over a slightly longer interval, producing a negligible effect on the total number of children she bears.

On the other hand, the same evidence that suggests that birth intervals would not lengthen also suggests that most of the increased use of temporary methods might well turn out to be for limiting births rather than for spacing them. This suggestion appears to contradict women's intentions, for the NFHS respondents indicated that they would want more births later. We caution, however, against too literal an interpretation of their stated preferences. Many women identified by the survey as wanting another child later may have simply been reluctant to make the definitive decision against future childbearing that sterilization entails. It is possible that many of these women would, if they initiated use of a temporary method, turn out to be limiters rather than spacers.

The evidence presented here points to three conclusions. First, increased use of temporary methods in India will not result in longer birth intervals until the overall level of use becomes much higher than it is at present. Second, as an immediate consequence, no fertility decline will result from longer birth intervals due to increased use of temporary methods. Third, since nearly all contraceptive use at low use levels appears to be for limiting births, rather than for spacing, it is likely that increased use of temporary methods would indeed reduce the level of fertility. Fertility would decline not as a result of longer birth intervals, however, but rather as a result of women using temporary methods to limit births.

CONCLUSION

The NFHS data show that considerable demand for temporary methods already exists in India, both for spacing and for limiting births. Making these methods more widely known, available, and used can be expected to promote further demand. Given the overwhelming dominance of sterilization in India at present, it is reasonable to aim for increased use of temporary methods.

It is impossible to predict with certainty how much fertility will decline as a result of increased use of temporary methods. There is a possibility, however, that continued heavy reliance on sterilization will stall the fertility decline of recent decades.The NFHS found sterilized women to have borne high average numbers of children, and there can be no certainty that the past fertility decline will continue.

Survey data such as those produced by the NFHS do not provide information on the psychosocial aspects of family formation. Even so, it is reasonable to suppose that practising family planning in the early childbearing years promotes the concept of family planning while family-size desires are still being formed. Women who begin using temporary contraceptive methods to space births early on will acquire knowledge, habits, and attitudes that are likely to foster a desire for fewer children.

Sterilization will remain an important component of family planning in India, but it should be balanced by increased knowledge, availability, and use of temporary contraceptive methods. The Indian government's current programme to promote the use of temporary contraceptive methods is important to the continued decline of fertility. Efforts in this area by the private sector, which supplies approximately half of all modern temporary methods, should be encouraged as well.

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