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Fertility in India

M M Gandotra, Robert D Retherford,
Arvind Pandey, Norman Y Luther,
and Vinod K Mishra

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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 iips nfhs@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 *This Subject Report analyzes fertility differentials by socioeconomic and demographic characteristics for all India and for individual states, based on data from India's 1992–93 National Family Health Survey The findings indicate a wide diversity among Indian states in the total fertility rate, which ranges from about two children per woman in Goa and Kerala to about five children per woman in Uttar Pradesh By socioeconomic characteristics the total fertility rate tends to be higher among rural women than among urban women, higher among women with less education, higher among Muslim women than among Hindu women and higher among scheduled-caste (SC) women and scheduled-tribe (ST) women than among non-SC/ST women*

Estimates of period parity progression ratios (PPPRs) from birth to first marriage imply nearly universal marriage, with 96 percent of all Indian women eventually marrying However this overall figure masks some diversity among the states The PPPRs from birth to marriage range from almost 100 percent in Punjab and Bihar to 89 percent in Orissa Assam and Goa implying that 11 percent will never marry in these latter three states In the country as a whole, progression from marriage to first birth is also nearly universal at 97 percent Again there are exceptions most notably Andhra Pradesh where the PPPR from marriage to first birth implies that 7 percent of married women will never have a first birth In the country as a whole the progression ratio from first to second birth is also quite high at 93 percent At higher parities progression ratios fall off more rapidly How rapidly depends to a considerable extent on the general level of fertility in a particular state

The multivariate analysis indicates much higher parity progression ratios among women who have experienced one or more child deaths than among women who have not experienced any child deaths Parity progression ratios are much lower among women who have one living son than among women who have no living son and much lower among women who have two or more living sons than among women who have only one living son Controls for urban/rural residence and education affect these results hardly at all

Parity progression ratios tend to be higher among rural women than among urban women but this difference virtually disappears when education is controlled On the other hand differentials by education persist when residence is controlled indicating that urban women have lower fertility largely because they are more educated Differentials in parity progression ratios by husband s education largely disappear when residence and wife's education are controlled indicating that wife s education is a considerably more important determinant of fertility than husband's education Differentials in parity progression by religion tend to be large and mostly unaffected by controls for residence and education indicating that differences by religion in levels of urbanization and education do not explain fertility differences by religion On the other hand parity progression ratio differentials by caste/tribe which tend to be small to begin with are reduced further by controls for residence and education

Parity progression ratios tend to be considerably lower among women who are regularly exposed to the electronic mass media than among women who are not so exposed and this effect is reduced only partly by controls for residence and education Parity progression ratios also tend to be considerably lower among women who have been exposed to family planning messages on radio or television than among women who have not been exposed, and again this effect is reduced only partly by controls for residence and education These findings indicate that the government's efforts to spread family planning through the electronic mass media are having some effect

M M Gandotra, Robert D Retherford, Arvind Pandey, Norman Y Luther, and Vinod K Mishra

M M Gandotra is Additional Director of the Population Research Centre M S University of Baroda Vadodara Robert D Retherford is a Senior Fellow at the East-West Center s Program on Population Arvind Pandey is a Professor in the Department of Mathematical Demography and Statistics at the International Institute for Population Sciences Mumbai Norman Y Luther is a Senior Fellow and Vinod K Mishra is a Visiting Fellow at the East West Center s Program on Population

PREFACE

This Subject Report is a product of the Project to Strengthen the Survey Research Capabilities of the Population Research Centres in India A major component of this project is the 1992–93 National Family Health Survey (NFHS), findings from which form the basis for this report The project was launched by the Ministry of Health and Family Welfare (MOHFW) in 1991 The MOHFW designated the International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency for providing coordination and technical guidance to the NFHS The data collection was undertaken during 1992–93 by various consulting organizations in collaboration with the concerned population research centre (PRC) in each state Basic survey reports and summary reports for 25 states (including Delhi which recently attained statehood) and all India were published during 1994–95 The East-West Center (Honolulu, Hawaii, U S A) and Macro International (Calverton Maryland, U S A) provided technical assistance for all survey operations Funding for the PRC/NFHS project has been provided by the United States Agency for International Development (USAID)

Upon completion of the basic survey reports and summary reports in December 1995, the NFHS data were released to the scientific community for further research As a part of this further research, and as a continuation of the project, a Subject Report series was launched as a collaborative effort between IIPS, the East-West Center, Macro International, the population research centres and the MOHFW, covering various topics The present Subject Report on fertility in India is the ninth report in this series

This report is an outcome of the Workshop on Determinants of Fertility in India, held between 15 January and 3 February 1996 in Honolulu Hawaii In addition to the authors of this report, the workshop participants included R K Aggarwal (Population Research Centre, Centre for Research in Rural and Industrial Development, Chandigarh), Muneer Ahmad (Population Research Centre, University of Kashmir, Srinigar), P Arokiasamy (International Institute for Population Sciences, Mumbai) Deepak Grover (Population Research Centre Panjab University Chandigarh), B B Hota (Population Research Centre Utkal University Bhubaneshwar), D K Kalita (Population Research Centre Gauhati University, Guwahati) Z A Lari (Ministry of Health and Family Welfare Delhi) S C Luthra (Ministry of Health and Family Welfare Delhi), P K Mamgain (Population Research Centre Lucknow University, Lucknow), R B Mehta (Population Research Centre, Patna University Patna), S Rajamanickam (Gandhigram Institute of Rural Health and Family Welfare Trust Ambathurai R S Tamil Nadu), N V Rajeswari (Population Research Centre, J S S Institute of Economic Research Dharwad), U S Rao (Population Research Centre Mohanlal Sukhadia University Udaipur), K V Subrahmanyam (Population Research Centre Andhra University Visakhapathnam) Savita Thakur (Population Research Centre Himachal Pradesh University Shimla), C P M

Thampi (Population Research Centre University of Kerala, Thiruvananthapuram), and R P Tyagi (Population Research Centre Institute of Economic Growth Delhi)

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INTRODUCTION

India's 1992–93 National Family Health Survey collected information on marriage fertility family planning, mortality, maternal and child health, infant feeding practices, and child nutrition The survey covered 25 states, including the former Union Territory of Delhi, which has since attained statehood Not covered were Sikkim, the Kashmir region of the state of Jammu and Kashmir, and the smaller union territories The covered areas comprise 99 percent of the country's population

Results of the survey have been published in one national report and 20 state reports, one of which is a combined report for six small northeastern states (see the reference list at the end of this report) In the basic survey reports the principal fertility measures were age-specific fertility rates and conventional total fertility rates calculated from age-specific fertility rates In this Subject Report, the principal measures are parity progression ratios as well as total fertility rates and total marital fertility rates calculated from parity progression ratios A woman s parity is defined as the number of children she has ever borne, and a parity progression ratio is defined as the proportion of women of a specified parity who eventually go on to have at least one more child

Parity progression ratios have the advantage of describing directly the family-building process A major purpose of the current report is to gain a better understanding of this process as it occurs in India Such an understanding is important not only for scientific reasons but also for evaluating India's population policies and programmes, which tend to have goals formulated in terms of parity progression (e g , stopping at two)

A related purpose is to gain a better understanding of the demographic and socioeconomic determinants of parity progression Hazard regression is the multivariate analysis technique used to analyze these determinants, which include the number of children who have died, number of living sons, urban/rural residence, woman's education, husband's education, religion, caste/tribe, exposure to electronic mass media, and exposure to family planning messages on radio or television To make the hazard regression results more accessible to non-statisticians these results are transformed via multiple classification analysis into simple bivariate tables of parity progression ratios cross-tabulated by the categories of each predictor variable The underlying hazard regression coefficients themselves are not shown

Because health and family welfare programmes in India are implemented mainly at the state level and because states differ considerably in their fertility levels and trends the analysis is done not only for the nation as a whole but also for individual states Results are not shown separately for the six small northeastern states of Arunachal Pradesh Manipur Meghalaya, Mizoram, Nagaland, and Tripura because their sample sizes are too small to give satisfactory results However, these six states are included in the all-India analysis

Following this introduction, the report is divided into five sections data and methods, total fertility rates and mean number of children ever born, period parity progression ratios, multivariate analysis of parity progression, and conclusion

DATA AND METHODS

Data collection for the NFHS occurred during 1992 and 1993 The field operation was organized in three overlapping phases, corresponding to three groups of states Interviewing commenced in the first wave of states in April 1992 In Punjab, which was the last state to be covered, interviewing commenced in July 1993 Information was collected from a probability sample of 89,777 ever-married women of reproductive age in 88,562 households, as indicated in Table 1 Sample size varied from state to state

The numbers in Table 1 are unweighted, but subsequent tables in this report incorporate weights Although the sample design for some states is self-weighting, in other states certain categories of respondents (e g , those from urban areas) were over-sampled, so that weights are needed to restore the correct proportions The weights are designed to preserve the total numbers of households and ever-married women interviewed in each state, so that the weighted state total equals the unweighted state total

For tabulations at the national level, a different set of weights is required because sampling fractions vary from state to state The all-India weights are designed to preserve the total number of 89,777 ever-married women interviewed in all the states Thus each woman has two weights, one that is used when the state is the unit for tabulation, and another that is used when the whole country is the unit for tabulation A typical table in this report contains results for both all India and individual states In such a table, the all-India results make use of the national-level weights, and the results for individual states make use of the state-level weights The sample design of the NFHS is discussed in more detail in the basic reports for all India and the individual states

Three questionnaires were used in the NFHS—one for villages (this questionnaire was administered only in rural areas), another for households, and a third for ever-married women within households To these three questionnaires correspond three data files—the village data file, the household data file, and the individual data file This Subject Report makes use of only the household data file and the individual data file We have used the household data file indirectly by writing household characteristics of interest from the household data file into the individual data file For example, religion, which was covered in the household questionnaire, is written into the individual data file for each ever-married woman in the household This augmented individual data file is the only data file actually used in the analysis described below

Table 1 Numbers of households and ever-married women interviewed

Month and year of fieldwork and unweighted numbers of households and ever married women interviewed by residence and state NFHS 1992–93

	Month and year of fieldwork		Number of households interviewed			Number of ever married women interviewed		
State	**From**	**To**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
India	4/92	9/93	28 822	59 740	88 562	27 534	62 243	89 777
North								
Delhi	2/93	5/93	3 377	300	3 677	3 189	268	3 457
Haryana	1/93	4/93	1 033	1 702	2 735	1 002	1 844	2 846
Himachal Pradesh	6/92	10/92	1 036	2 083	3 119	930	2 032	2 962
Jammu region of J & K	5/93	7/93	988	1 851	2 839	945	1 821	2 766
Punjab	7/93	9/93	937	2 276	3 213	836	2 159	2 995
Rajasthan	12/92	5/93	1 103	3 911	5 014	1 019	4 192	5 211
Central								
Madhya Pradesh	4/92	8/92	1 459	4 398	5 857	1 476	4 778	6 254
Uttar Pradesh	10/92	2/93	2 315	7 795	10 110	2 337	9 101	11 438
East								
Bihar	3/93	6/93	1 088	3 660	4 748	1 267	4 682	5 949
Orissa	3/93	6/93	1 296	3 306	4 602	1 143	3 114	4 257
West Bengal	4/92	7/92	1 086	3 152	4 238	898	3 424	4 322
Northeast								
Assam	12/92	3/93	1 230	2 025	3 255	1 107	1 899	3 006
West								
Goa	12/92	2/93	1 834	1 907	3 741	1 559	1 582	3 141
Gujarat	2/93	6/93	1 360	2 515	3 875	1 344	2 488	3 832
Maharashtra	11/92	3/93	1 754	2 309	4 063	1 699	2 407	4 106
South								
Andhra Pradesh	4/92	7/92	1 096	3 112	4 208	1 116	3 160	4 276
Karnataka	11/92	2/93	1 449	2 820	4 269	1 442	2 971	4 413
Kerala	10/92	2/93	1 220	3 167	4 387	1 218	3 114	4 332
Tamil Nadu	4/92	7/92	1 449	2 838	4 287	1 371	2 577	3 948

Note This table is based on the number of households with completed interviews and on the number of women present in the households from whom the completed interviews were obtained Besides the states identified in this table the NFHS included the six small northeastern states of Arunachal Pradesh Manipur Meghalaya Mizoram Nagaland and Tripura In this subject report all India numbers include these six states However findings for the six states are not tabulated separately

J & K Jammu and Kashmir (in this and subsequent tables)

Source IIPS 1995 Table 2 1

Following procedures used in the production of the basic survey reports, we have incorporated never-married women into the individual data file by means of 'all-woman factors' which were calculated from the household data file, added to the individual data file, and used when necessary to inflate the number of ever-married women in the individual data file to include never-married women When calculating age-specific fertility rates for example, we multiply each ever-married woman in the denominator of a rate by her all-woman factor so that the denominator pertains to all women regardless of marital status However we do not use the all-woman factors when calculating births in the numerator We derive births in the numerator from the birth histories for ever-married women in the individual sample In doing

so, we assume that never-married women have not had any births This assumption, which is reasonable though not precisely accurate for India is in any case necessary because the NFHS did not collect fertility information from never-married women From this discussion, it is clear that age-specific fertility rates by women's characteristics (those of all women regardless of marital status) can be calculated only for those characteristics of women for which information was collected in the household questionnaire

One of our summary measures of fertility is the conventional total fertility rate (TFR), defined as the number of children a woman would have if, hypothetically, she lived through her reproductive years (ages 15–49) experiencing the age-specific fertility rates prevailing in the population during a particular time period In this report the time period is the three years immediately preceding the survey The TFR is calculated by summing age-specific fertility rates between ages 15–19 and ages 45–49 for this three-year time period and multiplying the sum by five The TFR is what demographers call a 'period' measure of fertility, because the data that underlie its calculation pertain to a particular time period

We also make use of parity progression ratios, which are useful for analyzing the family-building process As mentioned earlier, a woman's parity is defined as the number of children that she has ever borne, and a parity progression ratio (PPR) is defined as the proportion of women of a specified parity who eventually go on to have another child Although the concept of parity is normally defined in terms of birth events, it is extended here to include the event of a woman's own birth and the event of her own first marriage This extension enables us to analyze 'parity' transitions from birth to marriage and from marriage to first birth, as well as transitions from first birth to second birth, from second birth to third birth, and so on

A period parity progression ratio (PPPR) is a parity progression ratio that is calculated from a set of birth probabilities for a particular time period, which in this case is again the three-year period immediately preceding the survey These birth probabilities are specified by parity and duration in parity A birth probability for women of a specified parity and duration in that parity (with duration measured in years) is estimated as the proportion of such women who progress to the next parity in one year's time A PPPR is computed from a set of duration-specific birth probabilities by life-table methods, in the same way that the probability of dying by a specified age is calculated from age-specific death probabilities in an ordinary period life table (For methodological details, see Feeney 1986, Feeney and Saito 1985) To summarize, in this report a PPPR indicates the proportion of a hypothetical (also called synthetic) cohort of women of specified parity who would ultimately progress to the next parity if they were to experience the duration-in-parity-specific birth probabilities observed in the population during the three-year period under consideration

The life-table calculations of PPPRs incorporate the following simplifications To count as progressing to first marriage, a woman must marry by age 40, to count as progressing from marriage to first birth, the woman must have the first birth within 13 years of marriage, and to count as progressing from any given birth to the next, the woman must have the next birth within 10 years of the preceding birth Thirteen years was chosen as the cut-off point for progression from marriage to first birth to allow for delays in the consummation of early marriages The assumption is that women who do not have a first marriage or birth within the specified cut-offs are at negligible risk of subsequently having a first marriage or birth

As already mentioned, the total fertility rate is conventionally calculated from age-specific fertility rates A TFR can also be calculated from a set of PPPRs as

$$\mathrm{TFR}_p = p_B p_M + p_B p_M p_1 + p_B p_M p_1 p_2 + \qquad (1)$$

where p_B denotes the proportion of women who progress from birth to first marriage, p_M denotes the proportion who progress from first marriage to first birth, and p_i denotes the proportion who progress from the ith to the $(i+1)$th birth, $i = 1, 2,$ In applying this formula to Indian data, we truncate this calculation at parity transition 15→16 Because of potential problems with small numbers of cases, the last three transitions (13→14, 14→15, and 15→16) are averaged, and these average values are substituted for the original values for these transitions The total fertility rate calculated from PPPRs, denoted as TFR_p, usually differs somewhat from the conventional total fertility rate calculated from age-specific fertility rates, denoted simply as TFR Differences between TFR_p and TFR have been studied in depth by Feeney and Yu (1987), see also Pandey and Suchindran (1997) and Ryder (1983)

A total marital fertility rate may be calculated from PPPRs as

$$\mathrm{TMFR}_p = p_M + p_M p_1 + p_M p_1 p_2 + \qquad (2)$$

This formula is the same as formula (1), except that p_B is set to one The sequence of terms begins at the woman's marriage instead of at her own birth

In this report we also estimate the effects of selected demographic and socioeconomic characteristics on parity progression, while controlling for certain other variables by holding them constant Hazard regression (using both proportional hazard models and time-dependent hazard models) is the multivariate method used for this purpose A more detailed discussion of hazard regression is deferred to the section that deals with this analysis

To conclude this section, we look briefly at how the sample women are distributed on the background characteristics used in the analysis of socioeconomic differentials in the total fertility rate, in the mean number of children ever born among

Table 2 Distribution of the sample on selected background characteristics

Percentage distribution of women age 15–49 on selected background characteristics used in the analysis of current fertility by state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	29	71	57	19	25	81	12	7	12	9	80
North											
Delhi	93	7	31	14	55	82	10	8	5	1	94
Haryana	28	72	56	18	26	89	4	8	26	0	74
Himachal Pradesh	10	90	42	27	31	98	1	1	21	4	75
Jammu region of J & K	19	81	46	16	38	78	16	6	29	1	70
Punjab	28	72	44	19	37	38	1	61	26	0	74
Rajasthan	21	79	78	10	13	92	6	3	19	17	64
Central											
Madhya Pradesh	25	75	70	14	16	92	6	2	7	26	67
Uttar Pradesh	23	77	71	11	19	82	17	1	16	1	83
East											
Bihar	16	84	74	11	15	82	16	2	9	8	82
Orissa	16	84	60	23	17	97	1	2	9	21	70
West Bengal	31	69	45	30	25	77	20	2	9	5	86
Northeast											
Assam	13	87	50	24	25	71	25	5	4	17	80
West											
Goa	49	51	23	27	50	67	4	29	2	2	96
Gujarat	36	64	49	21	30	88	10	2	5	14	81
Maharashtra	45	55	43	25	31	76	13	11	6	9	85
South											
Andhra Pradesh	29	71	62	13	24	87	9	4	14	5	81
Karnataka	35	65	54	20	26	85	11	4	11	5	83
Kerala	29	71	13	32	55	56	24	21	3	3	93
Tamil Nadu	36	64	44	24	32	87	6	7	17	0	83

Note This table pertains to all women regardless of marital status In this and subsequent tables percentages may not always add exactly to 100 because of rounding

women age 40–49, and in period parity progression ratios Table 2 shows the percentage distribution of all women of reproductive age, not just ever-married women, by residence (urban, rural), education (illiterate, literate but less than middle school complete, middle school complete), religion (Hindu, Muslim, other), and caste/tribe (scheduled caste (SC), scheduled tribe (ST), other (non-SC/ST)) Scheduled castes and scheduled tribes are groups that the Indian Government identifies as socially and economically backward and in need of special protection from social injustice and exploitation

In India as a whole, about three-tenths of the women live in urban areas, and about seven-tenths live in rural areas A substantial majority of 57 percent are illiterate, and only 25 percent have completed middle school By religion, 81 percent are Hindu, 12 percent are Muslim, and 7 percent belong to other religions, those of other religions are mainly Christians, Sikhs, Buddhists, and Jains By caste/tribe, 12 percent are from sched-

uled castes, 9 percent are from scheduled tribes, and 80 percent are non-SC/ST

The distributions of women on these characteristics vary considerably by state, especially the distributions by education, religion, and caste/tribe The proportion urban is comparatively high in Delhi (93 percent), Goa (49 percent), and Maharashtra (45 percent), which contains Mumbai (formerly Bombay), but below 15 percent in Himachal Pradesh and Assam The proportion of women who have completed middle school exceeds 35 percent in Delhi, the Jammu region of Jammu and Kashmir, Punjab, Goa, and Kerala, but is below 20 percent in Rajasthan Madhya Pradesh, Uttar Pradesh, Bihar, and Orissa The proportion Muslim exceeds 15 percent in Jammu, Uttar Pradesh, Bihar West Bengal, Assam, and Kerala, but is below 5 percent in Haryana, Himachal Pradesh, Punjab, Orissa, and Goa The proportion identified in the 'other' religion category is especially high in Punjab (61 percent), where Sikhs are a majority Goa and Kerala, which have large Christian minorities, also have relatively high percentages in the 'other' religion category There is considerable variation by caste/tribe For example, the proportion from scheduled castes ranges from 29 percent in Jammu to 2 percent in Goa Scheduled-caste women are a larger proportion of all women in the northern region than in other regions In all northern states except Delhi, the proportion from scheduled castes is at least 19 percent The proportion from scheduled tribes ranges from 0 percent in Haryana, Punjab, and Tamil Nadu to 26 percent in Madhya Pradesh The proportion from scheduled tribes is comparatively high in Rajasthan in the North, Madhya Pradesh in the central region, Orissa in the East, Assam in the Northeast, and Gujarat in the West

TOTAL FERTILITY RATES AND MEAN NUMBER OF CHILDREN EVER BORN

Table 3 and Figure 1 present NFHS estimates of the conventional TFR for all India and individual states for the three-year period 1990–92 The TFR for India is estimated at 3 4 children per woman, but there are wide variations by state Six states located mostly in the northern and central parts of the country—Haryana, Rajasthan Madhya Pradesh Uttar Pradesh Bihar and Assam—have relatively high fertility with TFRs of 3 5 or higher Uttar Pradesh has by far the highest fertility of any state of India, with a TFR of 4 8, which is 42 percent higher than the national average A second group of nine states—Delhi, Himachal Pradesh, the Jammu region of Jammu and Kashmir, Punjab, Orissa, West Bengal, Gujarat, Maharashtra, and Karnataka—have fertility in the middle range, with TFRs of about three children per woman A third group of states, mainly in southern India, have low fertility The states of Andhra Pradesh and Tamil Nadu have TFRs of 2 6 and 2 5, respectively, and Goa and Kerala have TFRs of 1 9 and 2 0,

Table 3 Total fertility rate, by selected background characteristics

Total fertility rate for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

		Residence		Education			Religion			Caste/Tribe		
State	Total	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	3 39	2 70	3 67	4 03	3 01	2 28	3 30	4 41	2 70	3 92	3 55	3 30
North												
Delhi	3 02	3 00	3 30[a]	4 47	3 27	2 21	2 90	4 76	2 16	3 62	NC	2 97
Haryana	3 99	3 14	4 32	4 69	3 52	2 94	3 86	6 93	3 81	4 61	NC	3 76
Himachal Pradesh	2 97	2 03	3 07	3 63	3 12	2 27	2 90	(4 78)	(4 41)	3 10	4 22	2 86
Jammu region of J & K	3 13	2 13	3 36	3 69	3 45	2 42	3 01	3 88	2 71	3 49	NC	2 76
Punjab	2 92	2 48	3 09	3 69	3 02	2 17	2 91	(4 16)	2 89	3 39	NC	2 76
Rajasthan	3 63	2 77	3 87	3 88	3 33	2 31	3 66	4 00	2 10	4 26	3 87	3 38
Central												
Madhya Pradesh	3 90	3 27	4 11	4 31	3 17	2 82	3 92	4 18	2 67	4 71	4 05	3 76
Uttar Pradesh	4 82	3 58	5 19	5 36	4 16	2 97	4 75	5 28	3 34	5 56	5 89	4 66
East												
Bihar	4 00	3 25	4 15	4 28	3 77	2 62	3 79	5 18	3 35	3 95	3 42	4 06
Orissa	2 92	2 53	3 00	3 17	3 08	1 93	2 90	4 25	3 08	3 68	2 90	2 82
West Bengal	2 92	2 14	3 25	3 73	2 82	1 67	2 52	4 59	2 24	3 52	3 05	2 85
Northeast												
Assam	3 53	2 53	3 68	4 51	3 27	1 83	2 92	5 03	4 65	2 77	3 73	3 53
West												
Goa	1 90	1 80	1 99	3 00	1 83	1 75	1 90	2 20	1 84	3 78	2 70	1 84
Gujarat	2 99	2 65	3 17	3 59	2 83	2 27	2 96	3 34	3 17	2 98	3 34	2 93
Maharashtra	2 86	2 54	3 12	3 47	3 00	2 25	2 69	4 11	2 65	3 04	3 24	2 80
South												
Andhra Pradesh	2 59	2 35	2 67	2 97	2 23	1 96	2 60	2 88	1 81	2 61	3 74	2 52
Karnataka	2 85	2 39	3 09	3 39	2 57	2 14	2 72	3 93	2 22	3 15	2 15	2 85
Kerala	2 00	1 78	2 09	2 31	2 16	1 94	1 65	2 97	1 80	1 37	1 29	2 04
Tamil Nadu	2 48	2 36	2 54	2 84	2 49	2 17	2 45	2 47	2 78	2 79	NC	2 39

NC Not calculated because of an insufficient number of women on whom to base a rate

( ) TFR based on 125–249 unweighted woman years of exposure Unweighted woman years of exposure are calculated by summing denominators of seven age specific fertility rates (ASFRs) from 15–19 to 45–49

a ASFRs for 30–34 35–39 40–44 and 45–49 are based on fewer than 125 unweighted woman years of exposure

respectively Fertility in the latter two states is slightly below replacement fertility (Replacement fertility, which takes into account that some children die, is slightly above two births per woman)

Table 3 and Figure 2 also show fertility differentials by four major socioeconomic characteristics for which information was collected in the NFHS household questionnaire Those characteristics are residence, education, religion, and caste/tribe

By residence, the TFR is 2 7 in urban areas and 3 7 in rural areas of the country as a whole In relative terms, the urban TFR is 26 percent lower than the rural TFR The difference in TFR between urban and rural areas varies considerably by state In

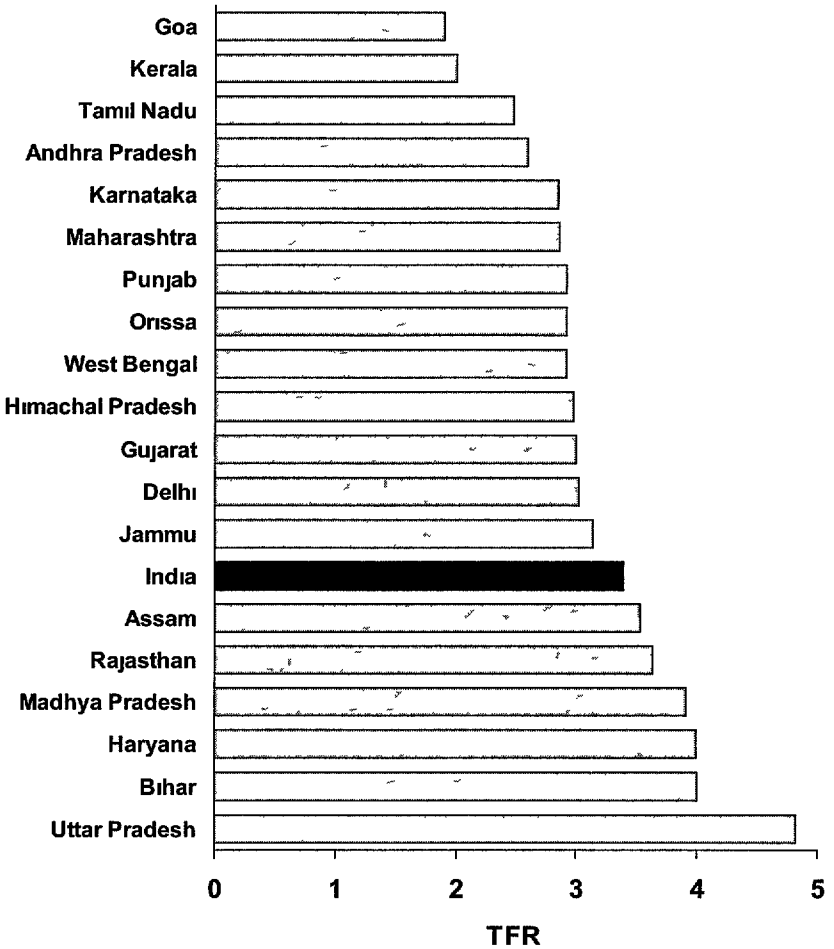

Figure 1 Conventional total fertility rate (TFR) for the three years before the survey, by state NFHS, 1992–93

the six states with comparatively high fertility (Haryana, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, and Assam), urban fertility is on average 27 percent lower than rural fertility, ranging from 20 percent lower in Madhya Pradesh to 31 percent lower in Uttar Pradesh and Assam In the nine states with medium fertility (Delhi, Himachal Pradesh, Jammu region of Jammu and Kashmir, Punjab, Orissa, West Bengal, Gujarat, Maharashtra, and Karnataka), urban fertility is on average 23 percent lower than rural fertility ranging from 9 percent lower in Delhi to 37 percent lower in Jammu In the four states with comparatively low fertility (Goa, Andhra Pradesh, Kerala, and Tamil Nadu), urban fertility is on average 11 percent lower than rural fertility, ranging from 7 percent lower in Tamil Nadu to 15 percent lower in Kerala These results are consistent with the well-known tendency for urban-rural differentials in fertility to diminish during the later stages of fertility transition as family planning spreads from urban to rural areas

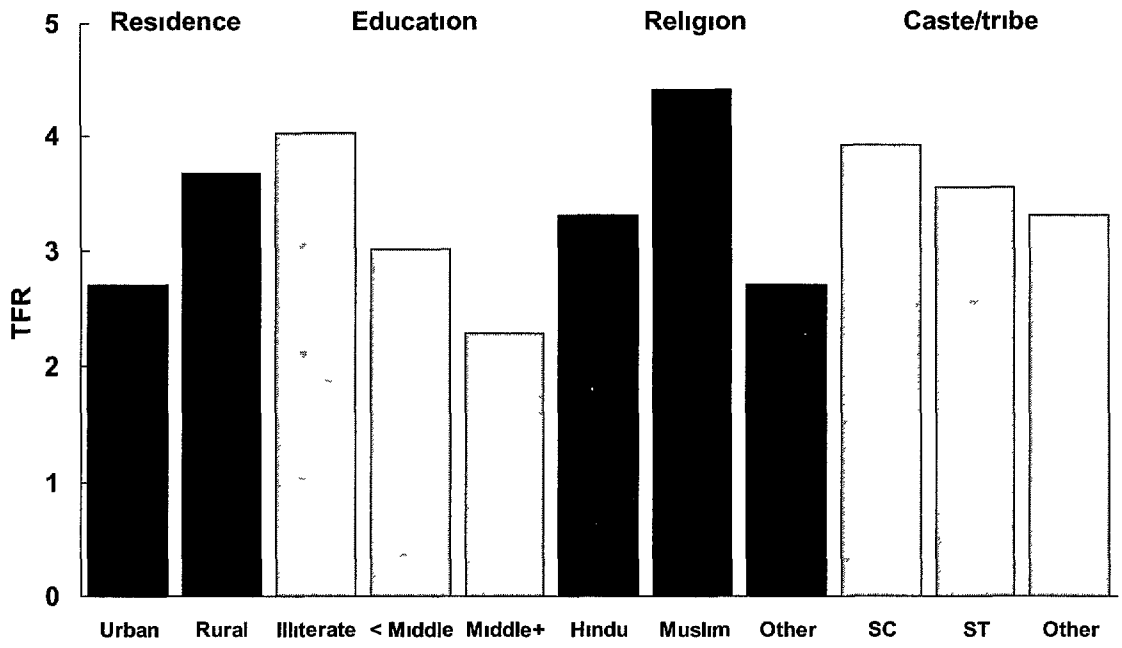

Figure 2 Conventional total fertility rate (TFR) for the three years before the survey, by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Fertility differentials by education are also substantial In the country as a whole, the TFR ranges from 4 0 among illiterate women to 2 3 among women who have completed middle school or more In relative terms, the TFR is 43 percent lower among women who have completed middle school than among illiterate women Again there is considerable diversity among states In the six high-fertility states, the TFR is on average 43 percent lower among women who have completed middle school than among illiterate women ranging from 35 percent lower in Madhya Pradesh to 59 percent lower in Assam In the nine medium-fertility states, the TFR among women who have completed middle school is on average 41 percent lower than among illiterate women, ranging from 34 percent lower in Jammu to 55 percent lower in West Bengal In the four low-fertility states, the TFR among women who have completed middle school is on average 29 percent lower than among illiterate women ranging from 16 percent lower in Kerala to 42 percent lower in Goa As in the case of urban-rural differentials, there is a tendency for fertility differentials by education to decline as the fertility transition progresses

Fertility differentials by religion are large as well In the country as a whole, the TFR is 3 3 among Hindu women, 4 4 among Muslim women, and 2 7 among women of all other religions combined (Christians, Sikhs Buddhists, Jains, and others) Unlike fertility differentials by residence and education fertility differentials by reli-

gion do not show a systematic pattern of variation from high-fertility states to low-fertility states (see also Kulkarni 1996) For example, although Muslims have higher fertility than Hindus in all the states, the Hindu-Muslim differential is comparatively small in Rajasthan, Madhya Pradesh, Uttar Pradesh, Goa, Gujarat, Andhra Pradesh, and Tamil Nadu It is comparatively large in Delhi, Haryana, Himachal Pradesh, Punjab Bihar, Orissa West Bengal, Assam, Maharashtra, Karnataka and Kerala The fertility of women of 'other' religions also varies considerably from state to state, in part because the religious composition of the 'other' religion category varies considerably from state to state The fertility of women of 'other' religions is lower than the fertility of either Hindu women or Muslim women in Delhi, Haryana, Jammu, Punjab, Rajasthan Madhya Pradesh Uttar Pradesh, Bihar, West Bengal, Goa, Maharashtra, Andhra Pradesh, and Karnataka In Himachal Pradesh and Assam, the fertility of women of 'other' religions is considerably higher than the fertility of Hindu women, but not as high as the fertility of Muslim women In Tamil Nadu, the fertility of women of 'other' religions is somewhat higher than the fertility of either Hindus or Muslims It is possible that religious differentials in fertility may be explained to some extent by socioeconomic differences among the religious groups We investigate this possibility in the section on multivariate analysis of the determinants of fertility

Fertility differentials by caste/tribe tend to be considerably smaller than fertility differentials by residence, education or religion In the country as a whole, the TFR is 3 9 among scheduled-caste women, 3 6 among scheduled-tribe women, and 3 3 among non-SC/ST women Although scheduled-caste women have higher fertility than scheduled-tribe women in the country as a whole, this is not true for all states The differential is reversed in Himachal Pradesh, Uttar Pradesh, Assam, Gujarat, Maharashtra, and Andhra Pradesh The TFR difference between scheduled-caste women and scheduled-tribe women is one child or greater in Himachal Pradesh, Goa, Andhra Pradesh, and Karnataka Variations among states in differential fertility by caste/tribe are difficult to interpret partly because the list of scheduled castes and scheduled tribes varies from state to state A caste that is on the schedule in one state may not be on the schedule in another state, and similarly for tribes Moreover within the scheduled-caste and scheduled-tribe categories the relative proportions of particular castes and tribes vary from state to state In some states there are no scheduled tribes As in the case of fertility differentials by religion part of the fertility differentials by caste/tribe may be explained by socioeconomic differences, a possibility we shall examine later

It is also of interest to examine differentials in cohort fertility, as measured by the mean number of children ever born to women age 40–49 at the time of the survey, who have mostly completed their fertility These differentials are shown in Table 4 and Figures 3 and 4 The first point to note is that cohort fertility is considerably

Table 4 Mean number of children ever born among women age 40–49, by selected background characteristics

Mean number of children ever born among women age 40–49 by selected background characteristics and state NFHS 1992–93

		Residence		Education			Religion			Caste/tribe		
State	Total	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	4 84	4 16	5 13	5 26	4 50	3 13	4 78	5 83	4 07	5 40	4 81	4 76
North												
Delhi	4 19	4 15	4 91	5 34	4 61	2 90	4 09	6 87	3 25	(5 14)	NC	4 12
Haryana	5 21	4 36	5 51	5 58	4 70	3 44	5 18	*	(4 29)	5 98	NC	4 97
Himachal Pradesh	4 42	3 41	4 54	4 74	4 03	3 18	4 43	*	*	4 37	4 79	4 42
Jammu region of J & K	5 05	3 89	5 37	5 60	4 39	3 18	4 94	6 27	(4 25)	6 03	NC	4 65
Punjab	4 18	3 92	4 29	4 50	3 90	3 25	4 20	*	4 17	4 82	NC	3 95
Rajasthan	5 00	4 12	5 21	5 15	4 47	3 66	4 94	5 94	*	5 36	5 01	4 88
Central												
Madhya Pradesh	5 22	4 58	5 42	5 36	5 27	3 56	5 18	5 87	(5 26)	5 69	5 02	5 24
Uttar Pradesh	5 97	5 18	6 19	6 24	5 38	4 08	5 93	6 43	(4 41)	6 51	7 40	5 86
East												
Bihar	5 23	4 59	5 36	5 39	5 06	3 71	5 11	6 08	(4 03)	5 46	4 80	5 26
Orissa	4 88	4 64	4 93	4 89	5 05	(3 91)	4 87	*		5 00	4 02	5 10
West Bengal	4 72	3 64	5 28	5 44	4 69	2 19	4 40	6 25		5 73	4 48	4 64
Northeast												
Assam	5 74	4 16	6 01	6 44	5 60	3 18	5 44	6 67		*	6 27	5 59
West												
Goa	3 74	3 56	3 93	4 33	3 85	2 53	3 94	(5 42)	3 14	4 13	*	3 72
Gujarat	4 42	4 01	4 64	4 81	4 21	2 98	4 46	4 32		(5 21)	4 27	4 40
Maharashtra	4 25	3 94	4 53	4 69	4 05	2 94	4 13	5 20	4 10	4 31	4 84	4 19
South												
Andhra Pradesh	4 05	3 88	4 12	4 23	3 76	3 28	4 00	4 60	(4 07)	4 32	(4 07)	4 00
Karnataka	4 65	4 03	4 99	5 17	4 38	2 83	4 57	5 82	(3 84)	4 79	5 42	4 59
Kerala	3 65	3 31	3 82	4 55	3 83	2 57	3 19	5 33	3 28	(3 60)	(3 74)	3 65
Tamil Nadu	4 21	4 09	4 27	4 45	4 30	3 18	4 17	5 37	3 83	4 99	NC	4 04

Note The table refers to all women regardless of marital status

NC Not calculated because there are no women on whom to base a mean

( ) Based on 25–49 unweighted women age 40–49

Mean not shown based on fewer than 25 unweighted women age 40–49

higher than period fertility, which pertains only to the three years immediately preceding the survey Higher cohort than period fertility is expected because fertility has been declining The mean number of children ever born for women age 40–49 in India is 4 8, which is 1 4 children higher than the TFR of 3 4, indicating that a substantial fertility decline has occurred in the country during the past three decades or so

In Figure 3, states are shown in the same order from top to bottom as in Figure 1 so that we can observe more easily any changes in the ordering of states from low fertility to high fertility when the measure of fertility is changed from the TFR to the mean number of children ever born A comparison of the two figures shows that, whereas Goa has the lowest period fertility, Kerala has the lowest cohort fertility The

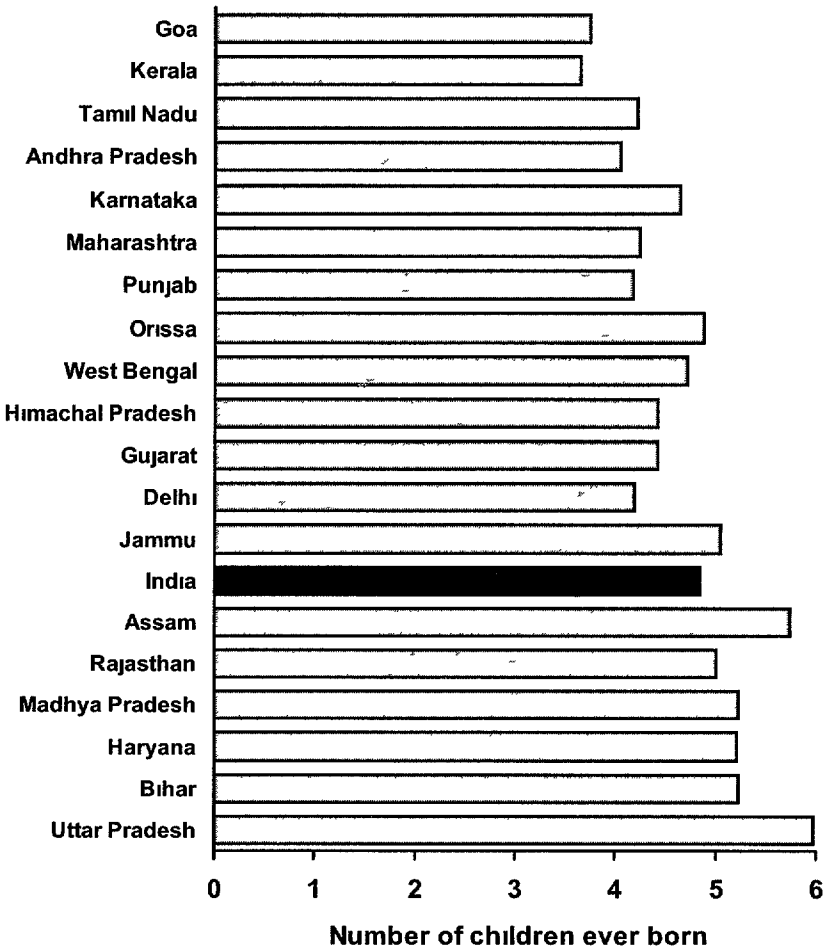

Figure 3 Mean number of children ever born among women age 40–49, by state NFHS, 1992–93

difference evidently stems from the fact that fertility has fallen more rapidly in Goa than in Kerala in recent years A comparison of the two figures also indicates that fertility has fallen more rapidly than average in recent years in Jammu Orissa, West Bengal, Assam Karnataka, and Tamil Nadu The pattern of differential cohort fertility by residence, education, religion, and caste/tribe is mostly similar to the pattern of differential period fertility, but at higher levels, as is evident from comparing Figures 2 and 4 for all India

As the above discussion suggests if there had been no change in fertility prior to the survey, the indicators of period and cohort fertility would be nearly identical, with differences due solely to the slightly incomplete fertility of women age 40–49 Because fertility has declined however current fertility is lower than cohort fertility, with larger differences generally indicating greater declines in recent decades Table 5 examines the differences between period fertility and cohort fertility more comprehensively by computing percentage differences between Table 3 and Table 4 with the

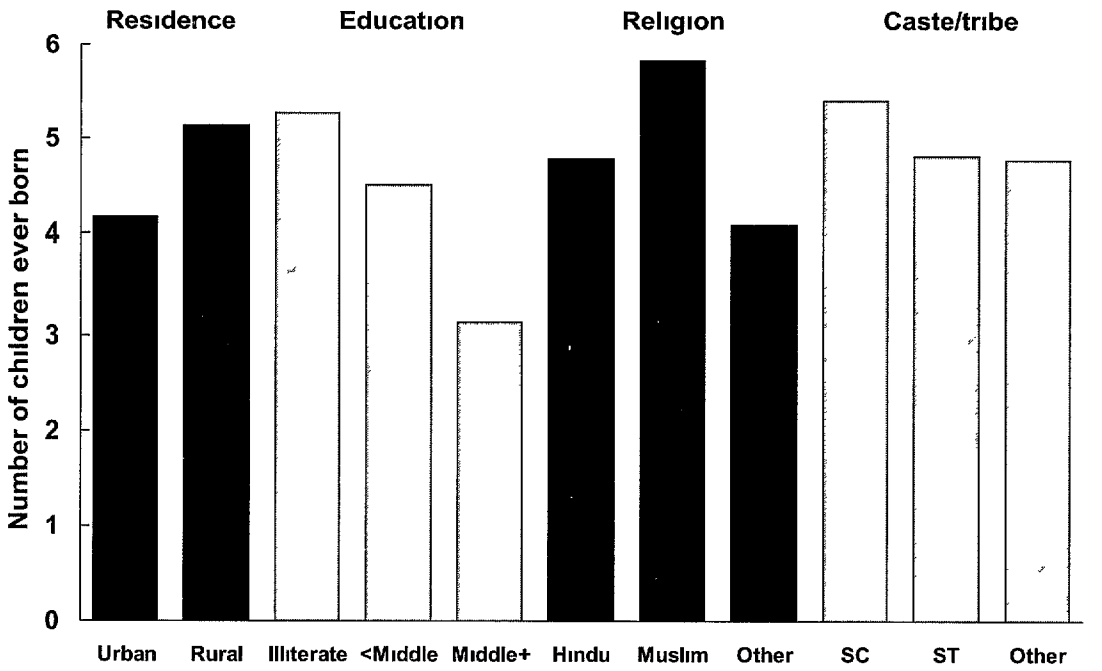

Figure 4 Mean number of children ever born among women age 40–49, by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

cohort values in Table 4 taken as the base of comparison For example, the value of 30 percent for all India in Table 5 is calculated as the difference between 4 84 and 3 39 taken as a percentage of 4 84 That is, the TFR during the three-year period immediately preceding the survey is 30 percent lower than the mean number of children ever born among women age 40–49 This percentage provides a rough indication of the extent of fertility decline in the country during the past three decades, under the assumption that period and cohort fertility were approximately the same three decades ago

The first column of Table 5 shows how states have varied in the extent of fertility decline during the past three decades Fertility has fallen comparatively slowly in most northern and central states Exceptions are Himachal Pradesh and Jammu, where fertility has fallen faster than in India as a whole, and Punjab, where fertility has fallen at about the same rate as in all India Fertility has fallen comparatively slowly in Delhi, probably because of large-scale inmigration from other areas with higher fertility In the East, fertility has fallen considerably faster than average in Orissa and West Bengal, but considerably slower than average in Bihar In the Northeast fertility has fallen rapidly in Assam Fertility has fallen faster than average in all western and southern states especially in Goa, Karnataka, Kerala, and Tamil Nadu

Table 5 Percentage difference between the mean number of children ever born among women age 40–49 and the total fertility rate, by selected background characteristics

Percentage difference between mean number of children ever born among women age 40–49 and the total fertility rate during the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

		Residence		Education			Religion			Caste/tribe		
State	Total	Urban	Rural	Illiterate	Literate < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	30	35	28	23	33	27	31	24	34	27	26	31
North												
Delhi	28	28	33	16	29	24	29	31	34	30	NC	28
Haryana	23	28	22	16	25	15	25	NC	11	23	NC	24
Himachal Pradesh	33	40	32	23	23	29	35	NC	NC	29	12	35
Jammu region of J & K	38	45	37	34	21	24	39	38	36	42	NC	37
Punjab	30	37	28	18	23	33	31	NC	31	30	NC	30
Rajasthan	27	33	26	25	26	37	26	33	NC	21	23	31
Central												
Madhya Pradesh	25	29	24	20	40	21	24	29	49	17	19	28
Uttar Pradesh	19	31	16	14	23	27	20	18	24	15	20	20
East												
Bihar	24	29	23	21	25	29	26	15	17	28	29	23
Orissa	40	45	39	35	39	51	40	NC	NC	26	28	45
West Bengal	38	41	38	31	40	24	43	27	NC	39	32	39
Northeast												
Assam	39	39	39	30	42	42	46	25	NC	NC	41	37
West												
Goa	49	49	49	31	52	31	52	59	41	8	NC	51
Gujarat	32	34	32	25	33	24	34	23	NC	43	22	33
Maharashtra	33	36	31	26	26	23	35	21	35	29	33	33
South												
Andhra Pradesh	36	39	35	30	41	40	35	37	56	40	8	37
Karnataka	39	41	38	34	41	24	40	32	42	34	60	38
Kerala	45	46	45	49	44	25	48	44	45	62	66	44
Tamil Nadu	41	42	41	36	42	32	41	54	27	44	NC	41

Note Calculated from Tables 3 and 4 For example the value of 30 percent for all India is calculated as the difference between 4 84 and 3 39 taken as a percentage of 4 84

NC Not calculated because of an insufficient number of cases

In most of the six states with comparatively high fertility (Haryana, Rajasthan, Madhya Pradesh Uttar Pradesh, Bihar and Assam), fertility has declined comparatively slowly The percentage by which current fertility is lower than cohort fertility ranges from 19 percent in Uttar Pradesh to 39 percent in Assam In the states with medium fertility (Delhi Himachal Pradesh Jammu Punjab Orissa West Bengal Gujarat, Maharashtra and Karnataka) this percentage ranges from 28 percent in Delhi to 40 percent in Orissa In the states with comparatively low fertility (Andhra Pradesh, Goa, Kerala and Tamil Nadu) this percentage tends to be larger, ranging from 36 percent in Andhra Pradesh to 49 percent in Goa

Table 6 Period parity progression ratios and PPPR-based estimates of the total fertility rate and the total marital fertility rate

Period parity progression ratios and PPPR-based estimates of the total fertility rate and the total marital fertility rate for the three-year period immediately preceding the survey by state NFHS 1992–93

State	B→M	M→1	1→2	2→3	3→4	4→5	5→6	6→7	7+→8+	TFR_p	$TMFR_p$
India	96	97	93	78	67	63	60	61	54	3 58	3 73
North											
Delhi	97	98	94	67	66	57	67	47	56	3 39	3 48
Haryana	99	99	98	83	64	55	67	53	51	3 92	3 96
Himachal Pradesh	96	99	97	76	54	43	58	45	19	3 26	3 39
Jammu region of J & K	97	99	96	79	64	51	52	59	44	3 56	3 66
Punjab	100	96	97	75	56	55	45	45	47	3 36	3 36
Rajasthan	93	97	93	83	70	63	61	52	53	3 60	3 86
Central											
Madhya Pradesh	99	97	94	86	73	69	61	60	56	4 20	4 22
Uttar Pradesh	99	98	97	90	84	77	75	75	59	5 19	5 27
East											
Bihar	100	94	95	84	78	74	63	64	55	4 25	4 26
Orissa	89	95	91	77	66	53	53	51	45	3 03	3 41
West Bengal	94	96	86	73	63	63	56	51	52	3 09	3 29
Northeast											
Assam	89	95	91	86	75	68	64	66	54	3 62	4 07
West											
Goa	89	96	89	58	44	34	34	27	30	2 34	2 64
Gujarat	98	97	93	74	60	59	51	51	41	3 31	3 40
Maharashtra	96	97	93	76	58	46	44	57	48	3 17	3 30
South											
Andhra Pradesh	96	93	91	75	51	44	46	38	46	2 87	2 99
Karnataka	95	98	94	71	54	52	54	52	52	3 13	3 30
Kerala	91	96	89	45	26	45	36	39	52	2 15	2 37
Tamil Nadu	96	95	91	63	43	43	31	32	35	2 61	2 73

Note PPPRs are expressed as percentages

In India as a whole, fertility has fallen somewhat faster in urban areas than in rural areas However, in Delhi fertility has fallen faster in rural areas than in the urban core, perhaps because most immigration of higher-fertility migrants has been to the urban core The rate of fertility decline has been approximately the same in urban and rural areas in West Bengal, Assam, Goa, Gujarat, Karnataka, Kerala, and Tamil Nadu

In India as a whole, fertility has fallen least rapidly among illiterate women, most rapidly among literate women with less than a middle-school education, and somewhat less rapidly among women who completed middle school This may indicate that, three decades ago, fertility had already declined to some extent among women who had completed middle school, as suggested by their cohort fertility of 3 13 at ages 40–49 at the time of the NFHS However, the pattern varies by state Fertility has fallen particularly quickly among illiterate women in Jammu, Orissa, Karnataka, Kerala, and Tamil Nadu It has also fallen particularly quickly among women who completed middle school in Rajasthan, Orissa, Assam, and Andhra Pradesh

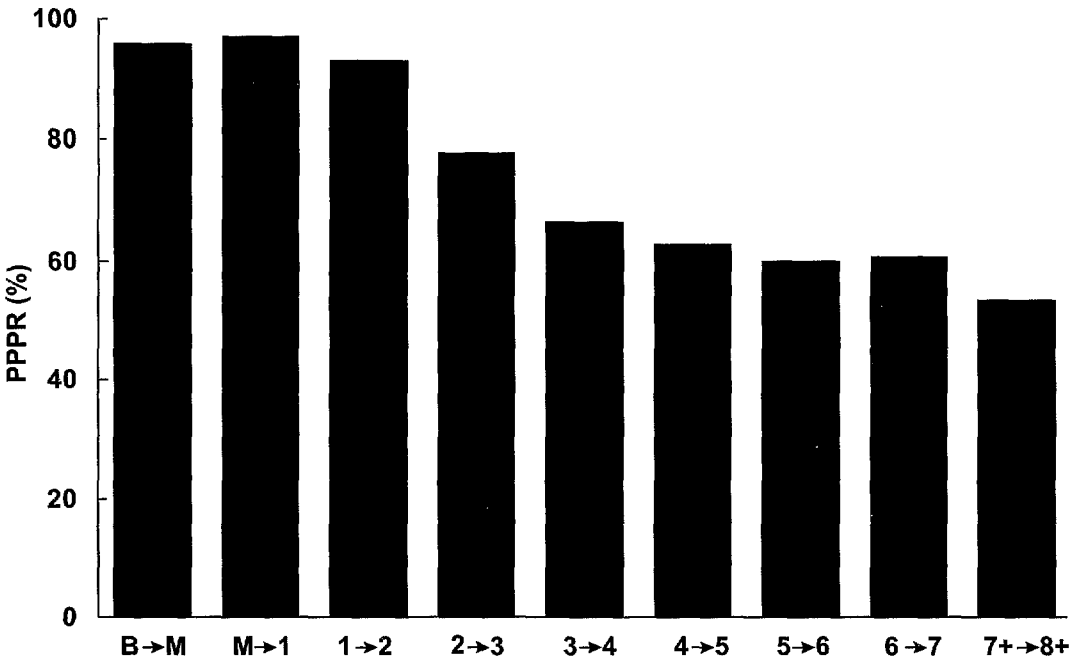

Figure 5 Period parity progression ratios (PPPRs) for all India NFHS, 1992–93

By religion in all India, fertility has fallen fastest among women of 'other' religions, somewhat more slowly among Hindus, and slowest among Muslims Even among Muslims, however, fertility has fallen by 24 percent Again there is considerable variation by state, as indicated by the fact that Muslim fertility has fallen faster than Hindu fertility in Delhi, Rajasthan, Madhya Pradesh, Goa, Andhra Pradesh, and Tamil Nadu

Fertility has fallen at about the same rate among scheduled-caste women and scheduled-tribe women, but somewhat more slowly in these two groups than among non-SC/ST women Again there are substantial variations by state Fertility has fallen considerably faster among scheduled-caste women than among scheduled-tribe women in Himachal Pradesh, Gujarat, and Andhra Pradesh, whereas fertility has fallen considerably faster among scheduled-tribe women than among scheduled-caste women in Karnataka

PERIOD PARITY PROGRESSION RATIOS

Table 6 and Figure 5 show period parity progression ratios for the three-year period immediately preceding the survey PPPRs are given for the transitions B→M (birth to marriage) M→1 (marriage to first birth), 1→2 (first to second birth) 2→3, , 6→7, and 7+→8+ (seventh or higher order birth to the next birth) Also shown in

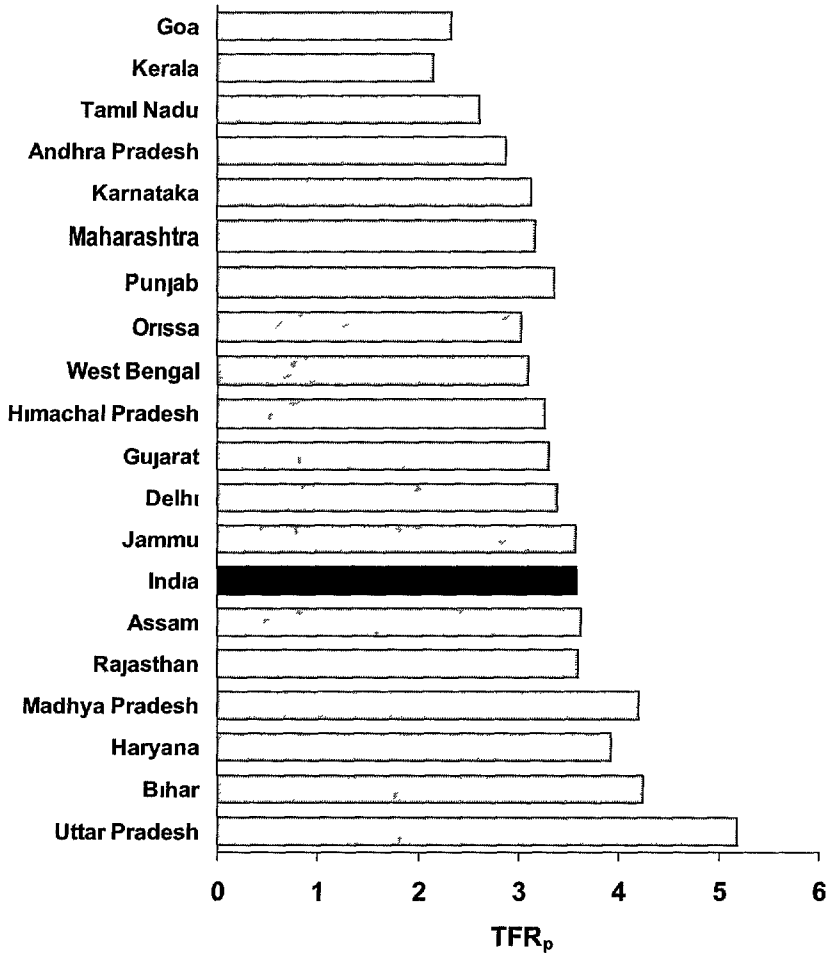

Figure 6 Period parity progression ratio based estimates of the total fertility rate (TFR_p) for the three years before the survey, by state NFHS, 1992–93

Table 6 are TFR_p (the total fertility rate calculated from PPPRs) and $TMFR_p$ (the total marital fertility rate calculated from PPPRs)

The values for all India indicate a fairly consistent decline in PPPRs as parity increases At current marriage rates the percentage of girls just born who will ultimately marry (p_B) is 96 percent Once married, the likelihood of progressing to a first birth (p_M) is 97 percent Among those who have a first birth, the likelihood of progressing to a second birth (p_1) is 93 percent Among those who have a second birth, the likelihood of progressing to a third birth (p_2) drops off substantially to 78 percent, indicating that many women stop at two children Among those who have a third birth, the likelihood of progressing to a fourth birth (p_3) drops off further, to 67 percent The progression ratios p_4, p_5, and p_6 are in the range of 60–63 percent and p_{7+} (for the open parity interval 7+→8+) drops off to 54 percent From these PPPRs, TFR_p is calculated to be 3 58, slightly higher than the conventional TFR of 3 39 $TMFR_p$ is 3 73 The difference between $TMFR_p$ and TFR_p is small because only 4 percent of women never marry

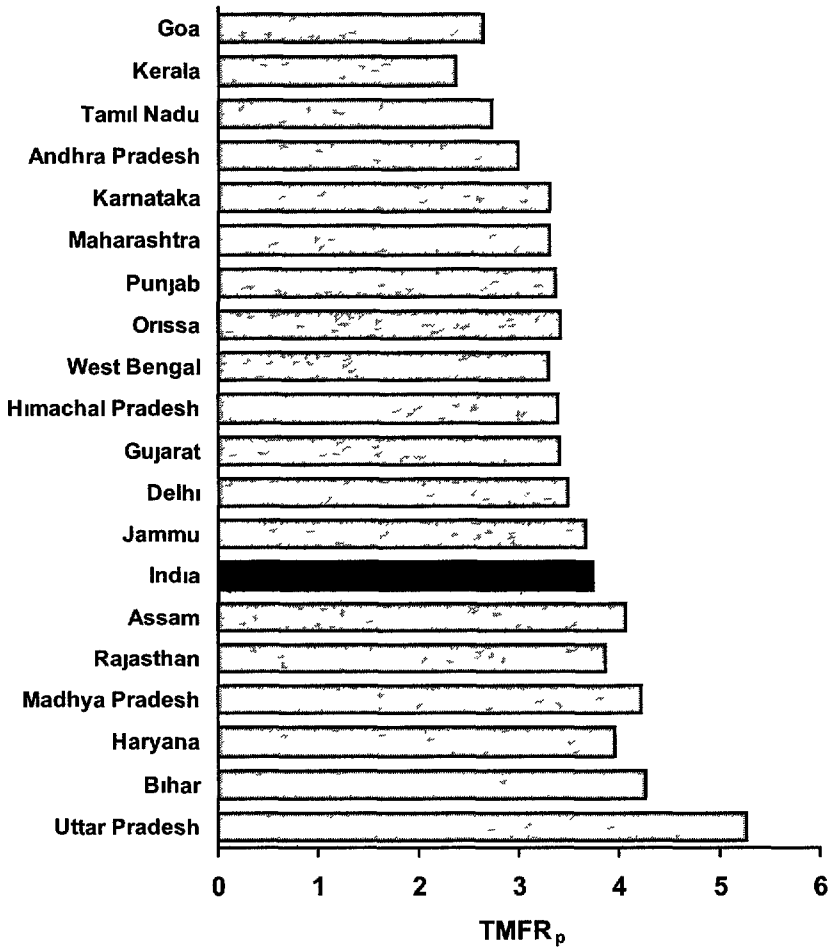

Figure 7 Period parity progression ratio based estimates of the total marital fertility rate (TMFR$_p$) for the three years before the survey, by state NFHS, 1992–93

From this set of PPPRs, it is also possible to calculate the implied distribution of completed family sizes The proportion who never marry is calculated as $1-p_B$ The proportion who marry but never have children is calculated as $(p_B)(1-p_M)$ The proportion who marry and stop at one child is $(p_B)(p_M)(1-p_1)$, and so on These formulae, when applied to the PPPRs for all India, imply that 4 percent never marry, 3 percent marry but have no children, 7 percent stop at one child, 19 percent stop at two children, 23 percent stop at three children, 17 percent stop at four children, 11 percent stop at five children, 7 percent stop at six children, and 10 percent have seven or more children The modal family size is three children The distribution is skewed somewhat toward higher family sizes, consistent with the value of 3 58 for TFR$_p$

Results for individual states are presented in Figure 6 as well as Table 6 Figure 6, which shows values of TFR$_p$ for states, can be compared with Figure 1, which shows values of the conventional TFR for states In these two figures, the states are listed in the same order from top to bottom in order to show more clearly any changes in the ordering of states from low fertility to high fertility when the measure of fertil-

Table 7 Period parity progression ratios for the transition from birth to marriage (p_B), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from birth to marriage (p_B) for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	95	97	97	95	96	96	96	97	100	94	96
North											
Delhi	97	(100)	97	(97)	98	98	(96)	(92)			97
Haryana	97	100	100	93	99	99	*	(98)	95	*	99
Himachal Pradesh	94	96	94	96	97	96	*	*	97		97
Jammu region of J & K	94	95	95	100	96	99	91	(90)	90	*	100
Punjab	100	95	98	98	100	100	*	96	93	*	100
Rajasthan	89	97	100	100	84	98	(100)		100	68	94
Central											
Madhya Pradesh	99	98	98	96	100	100	92		(96)	96	98
Uttar Pradesh	98	96	100	98	98	98	99	(100)	95		98
East											
Bihar	98	99	100	94	98	99	100	*	(100)	(99)	99
Orissa	100	89	88	95	95	89	*	*	(86)	81	100
West Bengal	84	97	97	92	87	92	100		100	*	93
Northeast											
Assam	90	89	100	68	78	85	87		*	78	89
West											
Goa	94	86	91	88	89	90	*	88	*		89
Gujarat	99	94	93	89	100	98	96	*	*	89	98
Maharashtra	94	96	94	97	100	97	88	100	(90)	(88)	97
South											
Andhra Pradesh	92	100	96	98	94	98	(84)		90	*	97
Karnataka	96	92	93	88	98	95	89	*	84	(88)	95
Kerala	86	93	(88)	86	93	89	94	92	*		92
Tamil Nadu	97	95	89	98	97	96	(100)	(98)	96	*	96

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of single women at risk of first marriage at each age from 0 to 39 years

PPPR not shown based on fewer than 25 unweighted cases

ity is changed from TFR to TFR_p Some changes in the ordering can be observed For example, when TFR_p is used, Kerala rather than Goa has the lowest fertility of any state, and Punjab and Madhya Pradesh move upward in the ordering of states from low to high fertility Overall, the values of TFR_p tend to be higher than the values of TFR, but the ordering of states remains mostly the same

Table 6 and Figure 7 show values of $TMFR_p$ for states The ordering of states is changed somewhat from that in Figure 6 because the proportion ever marrying is lower in some states than in others As shown in Table 6, the proportion ever marrying is comparatively low in Rajasthan, Orissa, West Bengal, Assam, Goa, and Kerala As a result, $TMFR_p$ exceeds TFR_p to a greater extent in these states than in the other states

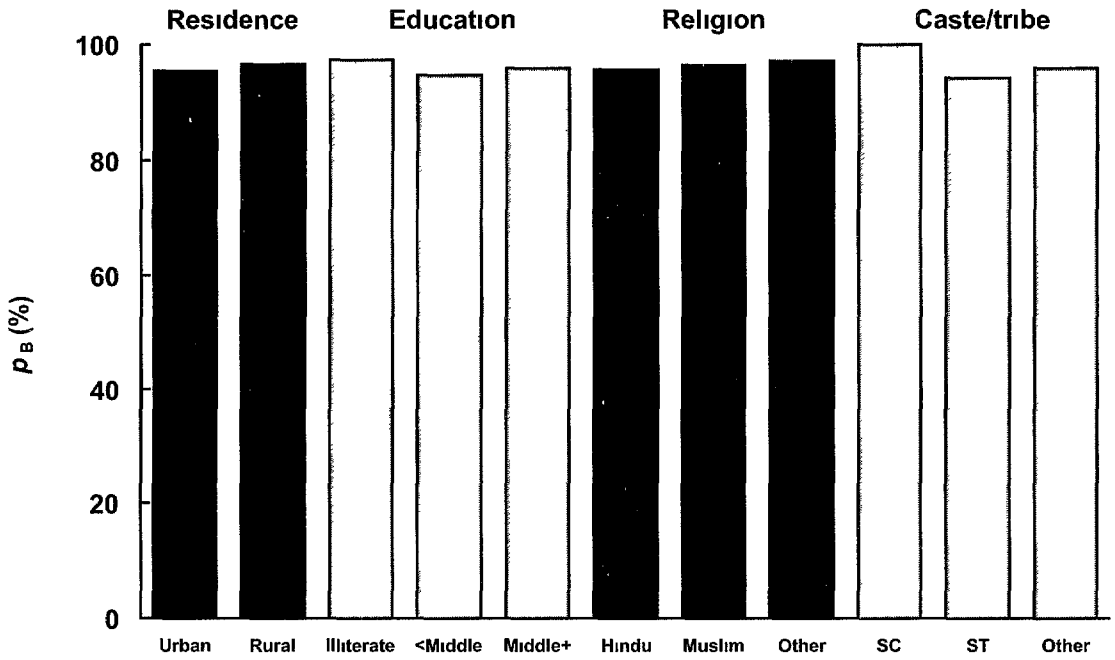

Figure 8 Period parity progression ratios for the transition from birth to marriage (p_B), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Among married women there is little variability by state in the PPPR for the transition from marriage to first birth Table 6 shows that p_M ranges from 93 percent in Andhra Pradesh to 99 percent in Haryana Himachal Pradesh, and Jammu There is slightly more variability by state in p_1 which ranges from 86 percent in West Bengal to 98 percent in Haryana States with values of p_1 lower than the all-India average of 93 percent include Orissa, West Bengal Assam Goa Andhra Pradesh, Kerala, and Tamil Nadu

There is considerably greater variability among states in p_2, which is expected because many women stop at two children in states in which the fertility transition is well underway Values of p_2 range from 45 percent in Kerala to 90 percent in Uttar Pradesh The majority of states have values of p_2 that are less than the all-India average of 78 percent States with values of p_2 higher than 78 percent include Haryana Jammu Rajasthan Madhya Pradesh Uttar Pradesh Bihar and Assam

It is noteworthy that in low-fertility states progression ratios do not necessarily drop off at higher-order transitions For example in Kerala p_3 is 26 percent but p_{7+} is 52 percent This pattern is not found in Goa, which has about the same level of overall fertility as Kerala Yet the value of TFR_p is similar in the two states because in both states there are very few women of parity 7+ and therefore very few births to these women

Table 7 and Figure 8 show PPPRs for the transition from birth to marriage (p_B) by residence education religion and caste/tribe and by state Figure 8 illustrates

Table 8 Period parity progression ratios for the transition from marriage to first birth (p_M), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from marriage to first birth (p_M) for the three year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	97	97	97	96	97	97	96	98	98	96	97
North											
Delhi	98	100	99	93	98	98	93	(100)	(99)		98
Haryana	100	99	100	98	98	99	*	100	99	*	99
Himachal Pradesh	97	99	99	99	99	99		*	99	*	99
Jammu region of J & K	99	100	96	100	100	100	94	(100)	97	*	100
Punjab	93	97	98	95	93	96	*	97	98		96
Rajasthan	95	97	96	100	96	97	97	(100)	97	95	97
Central											
Madhya Pradesh	98	97	97	91	98	97	93	(100)	96	97	98
Uttar Pradesh	99	98	98	95	97	98	98	100	99	(100)	98
East											
Bihar	97	94	93	98	97	94	95	(76)	93	98	95
Orissa	97	95	94	94	99	95		*	99	96	94
West Bengal	97	96	97	96	95	96	96	*	100	(81)	96
Northeast											
Assam	96	95	96	94	93	95	96		*	93	95
West											
Goa	94	97	96	94	98	94		99	*		96
Gujarat	96	98	96	99	97	97	95		(81)	98	97
Maharashtra	96	98	97	96	97	97	96	100	(96)	97	97
South											
Andhra Pradesh	93	93	93	91	95	93	92	(86)	92	(97)	93
Karnataka	97	98	97	98	99	97	100	(100)	97	(91)	98
Kerala	95	96	(90)	93	98	96	94	98	*		96
Tamil Nadu	93	95	92	97	95	94	97	98	93		95

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of first birth at each dura ion from 0 to 12 years since first marriage

PPPR not shown based on fewer than 25 unweighted cases

that, in all India, there is hardly any variation by these characteristics in the percentage of girls who will ultimately marry The greatest variation is by caste/tribe, where the percentage who will marry ranges from 94 percent for scheduled-tribe women to 100 percent (an upwardly rounded figure) for scheduled-caste women

The percentage of women who will marry varies considerably more by women's characteristics in the individual states By residence, Rajasthan, West Bengal, Andhra Pradesh, and Kerala stand out as having much lower values in urban areas than in rural areas In Orissa and Goa the reverse is true the percentage who will marry is much lower in rural areas than in urban areas In other states the urban-rural differ-

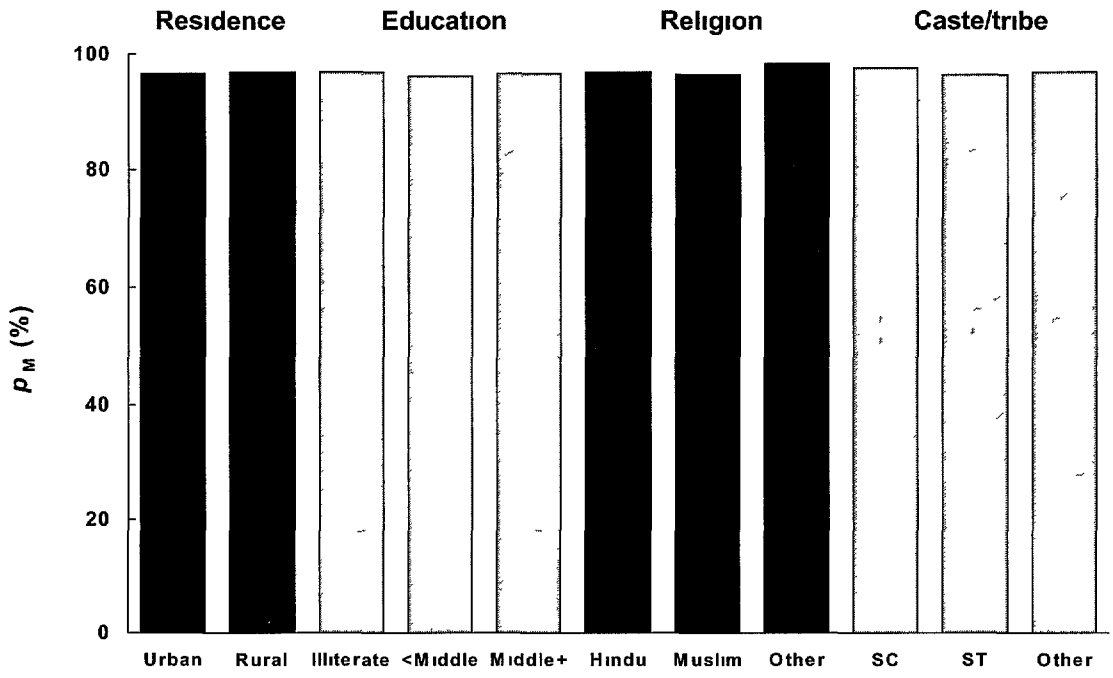

Figure 9 Period parity progression ratios for the transition from marriage to first birth (p_M), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste
ST Scheduled tribe

ence is small and inconsistent in direction [1] By education, Orissa, Kerala, and Tamil Nadu stand out as having a low percentage marrying among illiterates By contrast, 100 percent (again, an upwardly rounded figure) of illiterate women in Haryana, Rajasthan, Uttar Pradesh, Bihar, and Assam will eventually marry Assam, however, stands out as having a very low percentage marrying among literate women By religion, the percentage marrying is unusually low among Muslim women in Assam, Maharashtra Andhra Pradesh, and Karnataka and among Hindu women in Orissa, Assam, and Kerala The percentage marrying is unusually low among scheduled-caste women in Orissa and Karnataka, among scheduled-tribe women in Rajasthan, Orissa, Assam, Gujarat, Maharashtra, and Karnataka, and among non-SC/ST women in Assam and Goa

Table 8 and Figure 9 show PPPRs for the transition from marriage to first birth (p_M) There is even less variability in this transition than in the transition from birth to marriage The largest urban-rural difference is in Punjab, where p_M is only four percentage points lower in urban areas than in rural areas By education, Delhi and Madhya Pradesh have values of p_M that are noticeably lower for literate women who did not

[1]In some states (e g Uttar Pradesh) the value of p_B for the whole state does not fall between the value of p_B for urban and the value of p_B for rural This apparent inconsistency can occur because of the complex nature of the calculations and is not the result of calculation error

Table 9 Period parity progression ratios for the transition from first to second birth (p_1) by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from first to second birth (p_1) for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	91	94	94	93	90	93	94	91	94	91	93
North											
Delhi	95	83	96	97	93	93	100	92	100	*	94
Haryana	97	98	98	93	96	98	*	92	98	*	98
Himachal Pradesh	90	97	96	97	98	96	*	*	96	*	97
Jammu region of J & K	90	98	96	98	97	96	100	96	99	*	96
Punjab	97	96	96	95	97	96		97	100		96
Rajasthan	91	93	92	95	96	93	93	(88)	94	89	94
Central											
Madhya Pradesh	95	94	93	99	95	94	100	(100)	96	92	95
Uttar Pradesh	95	98	98	93	94	97	99	(100)	97	(100)	98
East											
Bihar	92	95	95	96	96	95	92	(100)	94	81	96
Orissa	90	92	91	92	87	91		*	95	91	91
West Bengal	80	88	91	92	72	84	94	*	93	84	85
Northeast											
Assam	91	91	93	92	84	91	93	*		96	91
West											
Goa	85	93	94	92	85	89	(98)	86	*	*	87
Gujarat	91	95	96	90	92	93	94	*	(91)	100	92
Maharashtra	93	94	95	88	94	94	91	84	94	95	92
South											
Andhra Pradesh	92	91	91	94	86	91	91	(81)	86	95	91
Karnataka	90	96	96	95	90	94	92	(100)	92	(100)	95
Kerala	84	91	93	89	88	87	93	92	(90)	*	90
Tamil Nadu	90	92	92	92	89	90	96	95	95	*	90

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

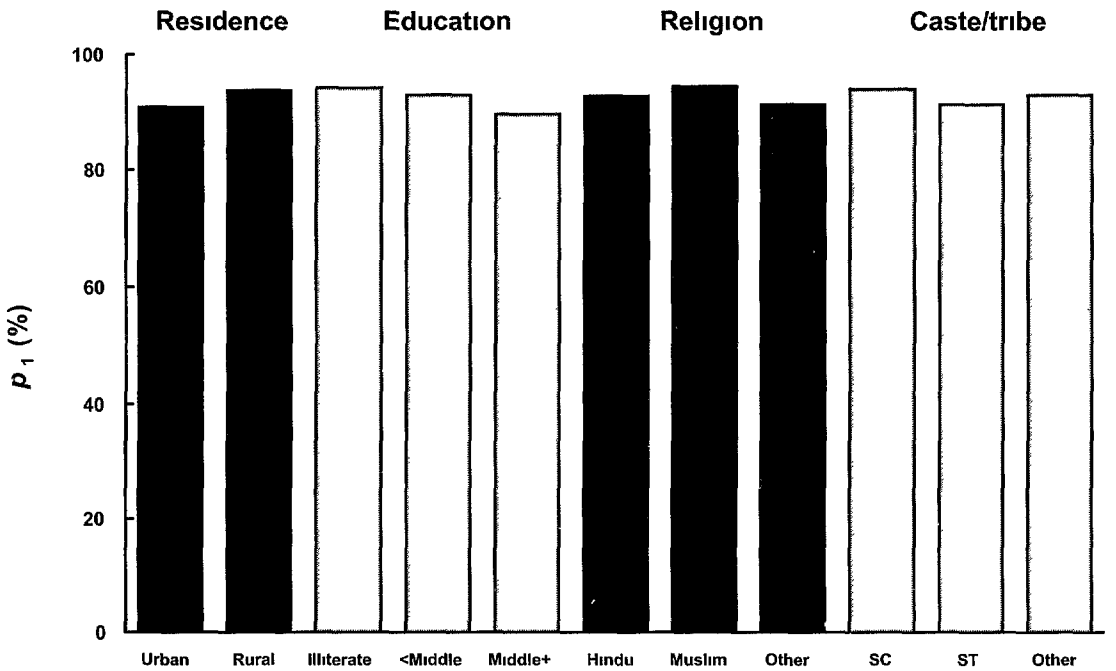

Figure 10 Period parity progression ratios for the transition from first to second birth (p_1), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste
ST Scheduled tribe

complete middle school than for women in the other two education groups By religion, Delhi Jammu and Madhya Pradesh have values that are noticeably lower among Muslim women than among Hindu women and women of other religions Scheduled-caste women in Gujarat and scheduled-tribe women in West Bengal have unusually low values of p_M

Table 9 and Figure 10 show PPPRs for the transition from first to second birth (p_1) For India as a whole p_1 is slightly lower in urban areas than in rural areas, which means that women who live in urban areas and have one child are slightly less likely to have a second child than are women with one child who live in rural areas The percentage going on to have a second birth decreases marginally as education increases It hardly varies at all by religion or by caste/tribe Some states show more variation than others however For example, in Himachal Pradesh, Jammu, West Bengal Goa, Karnataka, and Kerala, p_1 is substantially lower in urban areas than in rural areas In Delhi, however, the urban-rural differential goes the other way In West Bengal Assam, Goa, and Andhra Pradesh, p_1 is much lower for women who have completed middle school than for women with less education or no education In Delhi West Bengal Goa Kerala and Tamil Nadu p_1 is much lower for Hindu women than for Muslim women In Bihar and West Bengal it is much lower among

Table 10 Period parity progression ratios for the transition from second to third birth (p_2), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from second to third birth (p_2) for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	67	82	86	75	54	77	90	68	88	83	76
North											
Delhi	66	77	91	80	44	68	79	44	(92)	*	66
Haryana	74	87	89	88	62	82	*	(88)	95	*	78
Himachal Pradesh	53	79	85	77	58	76	*		79	(85)	74
Jammu region of J & K	53	83	86	90	63	78	90	(54)	86	*	75
Punjab	67	76	86	75	58	76	*	73	88	*	70
Rajasthan	74	86	86	83	52	83	(91)	(46)	91	85	79
Central											
Madhya Pradesh	78	89	90	87	73	87	85	(88)	97	91	83
Uttar Pradesh	77	93	94	91	70	89	94	90	95	(99)	89
East											
Bihar	67	88	90	88	58	82	97	(63)	90	88	83
Orissa	72	78	81	78	46	76		*	88	82	73
West Bengal	63	77	84	67	46	69	91	*	83	(80)	72
Northeast											
Assam	66	88	89	88	68	81	96	(94)	*	84	86
West											
Goa	53	64	74	65	46	62	(83)	42	*	*	57
Gujarat	64	78	85	67	54	73	82	(81)	(88)	82	71
Maharashtra	69	81	87	79	49	72	95	77	92	70	76
South											
Andhra Pradesh	72	76	82	65	53	74	87	(70)	87	(85)	73
Karnataka	62	76	79	69	51	69	94	(55)	69	(54)	71
Kerala	37	48	64	58	33	32	73	34	(31)	(49)	45
Tamil Nadu	56	68	74	62	45	64	47	71	81	*	58

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

scheduled-tribe women than among scheduled-caste women, but the reverse is true in Gujarat, Andhra Pradesh, and Karnataka

Table 10 and Figure 11 show PPPRs for the transition from second to third birth (p_2) In all India, p_2 is substantially lower for urban women than for rural women, meaning that urban women with two children are much less likely to have a third child than are rural women with two children The percentage going on to have a third birth falls off substantially with increasing education, especially for women who have completed middle school The percentage is substantially lower for Hindu women than for Muslim women, and it is lower still for women of other religions

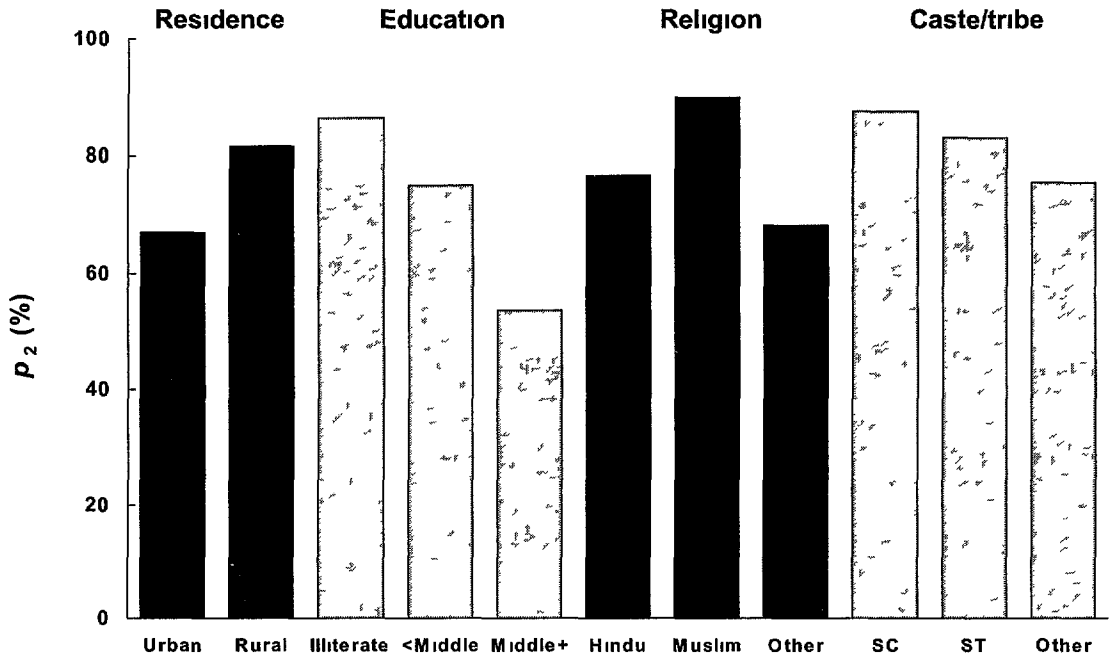

Figure 11 Period parity progression ratios for the transition from second to third birth (p_2), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Scheduled-tribe women who have already had two births are slightly less likely to have a third birth than are scheduled-caste women, and non-SC/ST women are still less likely to go on to have a third birth The direction of the urban-rural differential is consistent across states, although its magnitude is larger in some states than others The direction of education differentials is also consistent As education increases, p_2 falls in every state except Jammu, where it is slightly higher for literate women who have not completed middle school than for illiterate women By religion, p_2 is consistently higher for Muslim women than for Hindu women, except in Madhya Pradesh and Tamil Nadu where the differential is reversed The difference between Hindus and Muslims is especially large in Kerala By caste/tribe, p_2 is rather similar for scheduled-caste women and scheduled-tribe women across the states except in Maharashtra and Karnataka, where it is considerably lower for scheduled-tribe women than for scheduled-caste women and in Kerala, where it is considerably higher for scheduled-tribe women than for scheduled-caste women Non-SC/ST women generally have lower values of p_2 than either scheduled-caste women or scheduled-tribe women

Table 11 Period parity progression ratios for the transition from third to fourth birth (p_3), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from third to fourth birth (p_3) for the three year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	60	69	73	59	40	65	80	56	73	71	65
North											
Delhi	66	69	81	70	44	63	94	50	(59)	*	67
Haryana	57	66	73	45	49	64		(56)	77	*	59
Himachal Pradesh	36	56	64	52	30	53	*	*	63	(50)	51
Jammu region of J & K	29	70	76	51	47	60	87	(32)	77		59
Punjab	46	59	65	55	32	55	*	57	68	*	51
Rajasthan	64	71	71	73	55	70	(83)	*	82	72	65
Central											
Madhya Pradesh	75	73	77	68	51	73	77		68	78	71
Uttar Pradesh	76	87	88	81	58	84	88	(35)	89	(100)	83
East											
Bihar	74	79	82	72	51	76	94	(81)	88	79	77
Orissa	60	67	67	68	56	66	*	*	69	64	66
West Bengal	65	62	72	56	31	55	81	*	62	(63)	62
Northeast											
Assam	65	76	83	72	33	71	83	(88)	(72)	77	75
West											
Goa	41	47	71	31	26	46	(66)	31	*		42
Gujarat	59	61	67	56	30	59	71	*	(61)	55	61
Maharashtra	59	58	61	64	39	55	79	52	73	62	56
South											
Andhra Pradesh	47	52	57	31	37	52	41	(58)	49	71	49
Karnataka	48	57	57	56	38	51	77	*	62	(60)	53
Kerala	25	27	27	32	17	5	53	27	(14)	(0)	28
Tamil Nadu	29	48	56	29	22	44	(29)	(46)	52	*	41

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

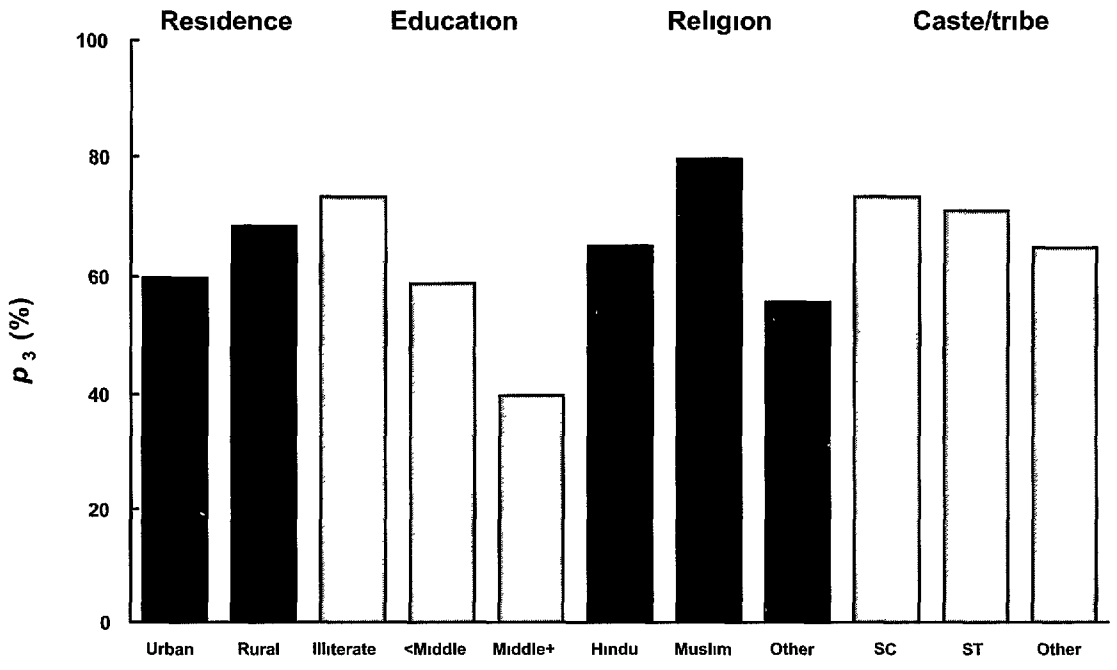

Figure 12 Period parity progression ratios for the transition from third to fourth birth (p_3), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Table 11 and Figure 12 show PPPRs for the transition from third to fourth birth (p_3) The pattern of differentials is much the same as for the transition from second to third birth at the all-India level and in most states Again rural values tend to exceed urban values Exceptions are found in Madhya Pradesh, West Bengal, and Maharashtra where there are slight reversals The urban-rural differential is especially large in Jammu In all states except Haryana, Rajasthan, Orissa, Maharashtra, Andhra Pradesh, and Kerala where there are minor departures from the general pattern, p_3 falls off as education increases The value of p_3 is greater for Muslim women than for Hindu women except in Andhra Pradesh, where the difference is reversed It is especially low for Hindu women in Kerala In Haryana, Himachal Pradesh, Jammu, Punjab, Rajasthan, Uttar Pradesh, Bihar Maharashtra, Andhra Pradesh, Karnataka, and Tamil Nadu p_3 is much lower for non-SC/ST women than for either scheduled-caste or scheduled-tribe women In Himachal Pradesh Rajasthan, Bihar, Gujarat Maharashtra, and Kerala, p_3 is much higher for scheduled-caste women than for scheduled-tribe women but in Madhya Pradesh, Uttar Pradesh, and Andhra Pradesh, this differential is reversed

Table 12 Period parity progression ratios for the transition from fourth to fifth birth (p_4), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from fourth to fifth birth (p_4) for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	54	65	67	51	44	61	76	56	70	67	61
North											
Delhi	56	(63)	65	57	27	53	75	(51)	(56)		56
Haryana	45	58	61	48	26	53	(83)	(38)	60	*	53
Himachal Pradesh	37	44	51	37	(3)	43	*	*	56		37
Jammu region of J & K	30	53	54	50	36	46	70	*	49		53
Punjab	45	58	59	47	33	58	*	54	60	*	53
Rajasthan	61	64	65	49	48	61	81		68	73	58
Central											
Madhya Pradesh	60	72	73	56	61	69	79	*	86	68	68
Uttar Pradesh	61	81	82	58	55	76	84	(81)	86	(100)	75
East											
Bihar	60	76	77	68	34	72	82	(85)	84	76	73
Orissa	37	57	54	54	(47)	54	*	*	67	48	54
West Bengal	61	64	69	53	(43)	54	83	*	64	(70)	63
Northeast											
Assam	47	69	73	58	54	55	85	*	(58)	68	68
West											
Goa	34	36	51	18	8	38	(28)	29	*	*	31
Gujarat	51	62	66	44	(10)	60	(47)	*	(87)	71	53
Maharashtra	47	45	48	40	50	43	58	(24)	(66)	59	42
South											
Andhra Pradesh	50	43	44	52	47	39	75	*	46	(49)	44
Karnataka	51	53	55	51	(34)	44	77		55	(50)	52
Kerala	39	47	63	50	7	29	65	(31)	*	*	46
Tamil Nadu	39	44	47	43	31	45	*	*	*	*	43

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

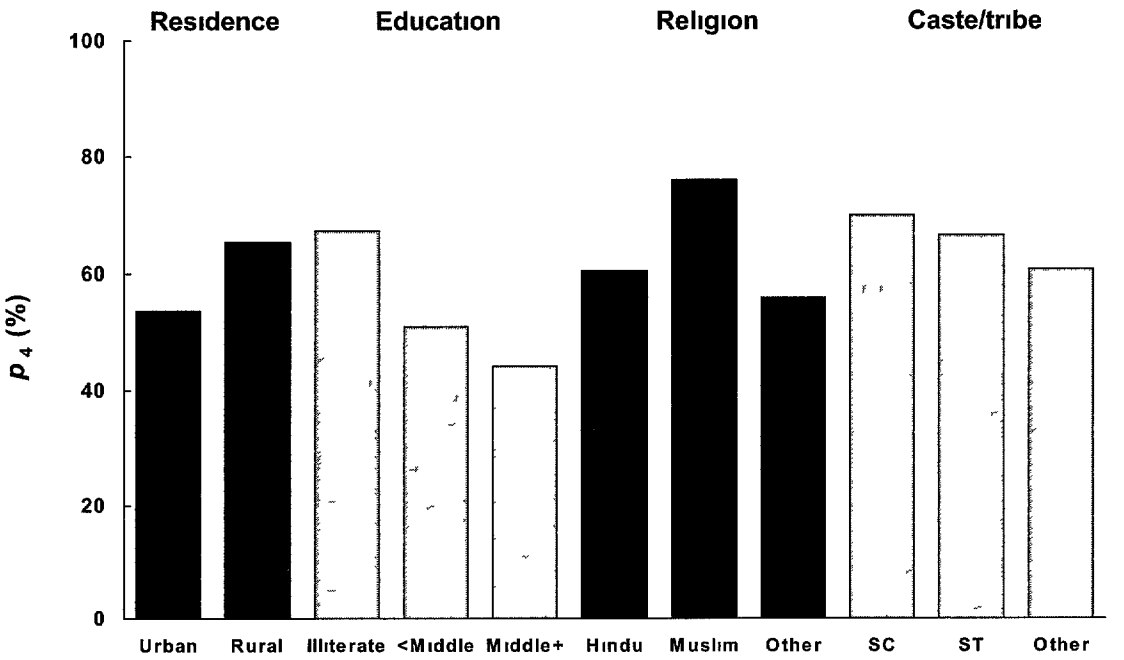

Figure 13 Period parity progression ratios for the transition from fourth to fifth birth (p_4), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Table 12 and Figure 13 show PPPRs for the transition from fourth to fifth birth (p_4) The pattern of differentials is much the same as for the transition from third to fourth birth In all states except Maharashtra and Andhra Pradesh, p_4 is higher in rural areas than in urban areas In all states except Madhya Pradesh, Maharashtra, and Andhra Pradesh where the pattern is marginally different p_4 decreases as education increases The value of p_4 is consistently higher among Muslim women than among Hindu women except in Goa and Gujarat and it tends to be somewhat higher among scheduled-caste and scheduled-tribe women than among non-SC/ST women, although there are some departures from this pattern

Table 13 Period parity progression ratios for the transition from fifth to sixth birth (p_5), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from fifth to sixth birth (p_5) for the three year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	54	62	63	49	47	58	71	49	66	53	60
North											
Delhi	67	*	75	(45)	(40)	62	88	*		*	69
Haryana	53	70	69	(50)	*	60	*	*	63	*	68
Himachal Pradesh	(35)	59	65	37	*	59	*	*	(49)	*	63
Jammu region of J & K	(24)	53	52	(64)	(26)	50	60	*	48	*	55
Punjab	27	49	50	(34)	(31)	50	*	37	56	*	40
Rajasthan	61	61	61	(49)	*	60	(68)	*	62	63	58
Central											
Madhya Pradesh	63	61	63	48	(63)	61	(63)	*	(71)	61	61
Uttar Pradesh	65	76	77	73	45	74	77	*	85	(74)	72
East											
Bihar	61	63	63	73	(52)	61	70		74	(43)	63
Orissa	62	52	61	35	*	53			*	47	55
West Bengal	47	58	55	57	*	44	79		(52)	(5)	60
Northeast											
Assam	58	65	69	54	*	53	77		*	(50)	67
West											
Goa	28	37	46	7	*	42	*	(14)	*	*	30
Gujarat	52	50	53	34	*	51	(61)	*	(44)	47	53
Maharashtra	49	42	50	30	*	39	65	*	(79)	(52)	40
South											
Andhra Pradesh	45	45	48	(14)	*	43	(61)	*	45	*	47
Karnataka	36	59	58	45	*	51	67		(54)		55
Kerala	(13)	44	(43)	37	*	(16)	49			*	38
Tamil Nadu	34	31	29	39	(17)	28	*	*	22	*	35

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

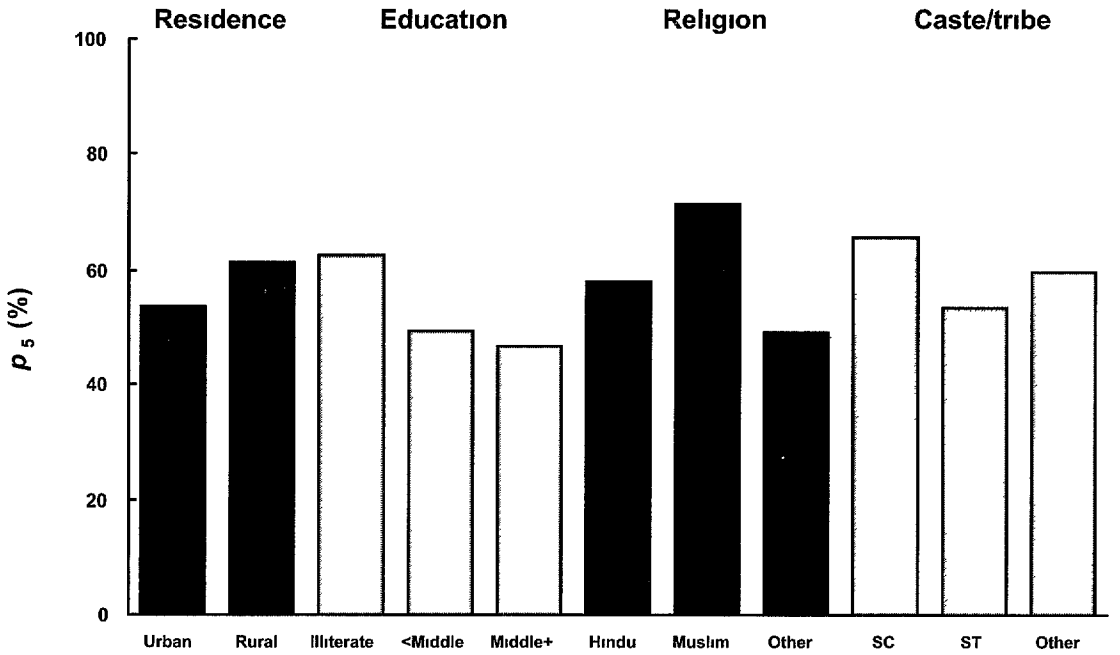

Figure 14 Period parity progression ratios for the transition from fifth to sixth birth (p_5), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Tables 13–15 and Figures 14–16 show PPPRs for the transition from fifth to sixth birth (p_5) sixth to seventh birth (p_6) and seventh or higher-order birth to next birth (p_{7+}) At the all-India level the pattern of differentials in these PPPRs mostly resembles the pattern of differentials in the PPPR for transition from fourth to fifth birth The results are somewhat less consistent, no doubt in part because they are based on many fewer women at these higher parities

Table 14 Period parity progression ratios for the transition from sixth to seventh birth (p_6), by selected background characteristics

Period parity progression ratios (PPPRs) for the transition from sixth to seventh birth (p_6) for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	51	63	62	53	58	59	71	54	64	58	60
North											
Delhi	44	*	49	*	*	40	(68)		*		51
Haryana	29	58	54	*	*	42	*	*	51	*	54
Himachal Pradesh	*	45	47	(50)	*	44		*	(64)		42
Jammu region of J & K	*	59	60	*	*	61	63	*	72	*	52
Punjab	(44)	47	52	*	*	43	*	48	59	*	36
Rajasthan	54	53	53	*	*	52	(49)	*	58	59	47
Central											
Madhya Pradesh	38	64	63	(37)	(32)	59	(68)	*	(87)	58	58
Uttar Pradesh	67	76	76	66	(77)	74	81	*	74		75
East											
Bihar	69	63	65	(41)	*	61	74	*	68	*	65
Orissa	35	54	55	41		50	*	*	(64)	(60)	46
West Bengal	(26)	55	57	37		41	64	*	(42)	*	51
Northeast											
Assam	52	67	65	69		62	70	*	*	(72)	65
West											
Goa	(59)	8	16	*	*	26	*	*		*	20
Gujarat	(45)	52	47		*	44	*	*		*	53
Maharashtra	55	57	48	(85)	*	53	(70)	*	*	*	62
South											
Andhra Pradesh	(33)	40	38	*	*	37	*		(55)	*	31
Karnataka	(42)	55	53	(50)	*	56	(40)	*	(63)	*	50
Kerala	*	35	(49)	(27)	*	(0)	(50)		*		40
Tamil Nadu	(29)	30	34	(29)	*	37		*	(62)	*	20

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

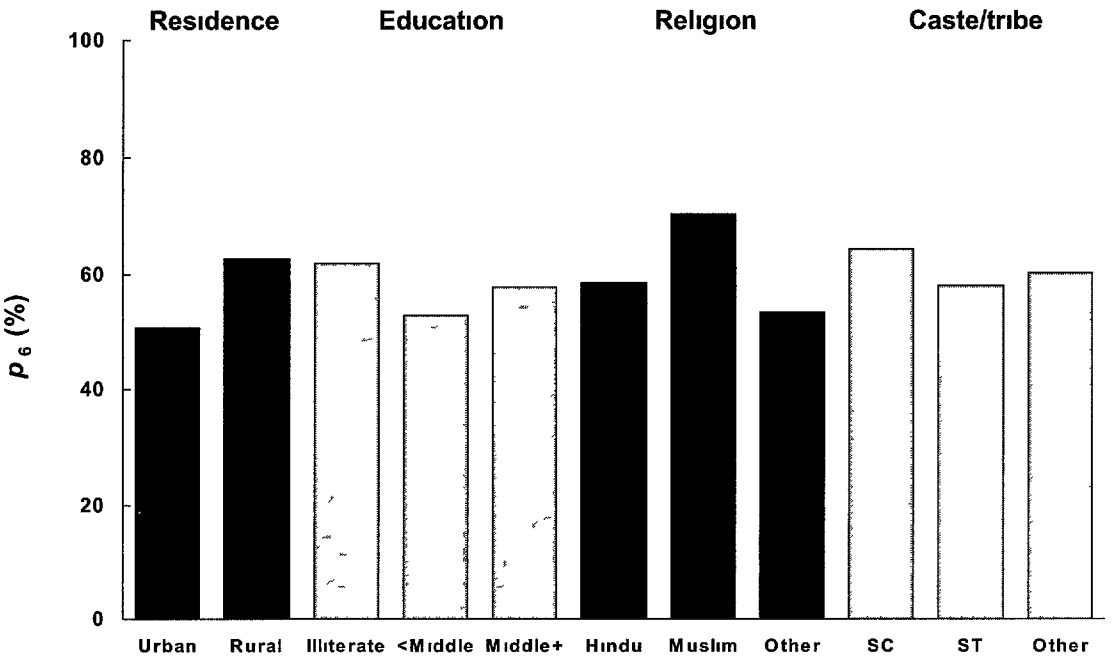

Figure 15 Period parity progression ratios for the transition from sixth to seventh birth (p_6), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

Table 15 Period parity progression ratios for the transition from seventh or higher-order birth to next higher-order birth (p_{7+}), by selected background characteristics

Period parity-progression ratios (PPPRs) for the transition from seventh or higher-order birth to next higher-order birth (p_{7+}) for the three-year period immediately preceding the survey by selected background characteristics and state NFHS 1992–93

	Residence		Education			Religion			Caste/tribe		
State	Urban	Rural	Illiterate	Literate, < middle complete	Middle school complete	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other
India	49	54	55	40	31	51	61	45	53	52	54
North											
Delhi	58	*	57	*	*	46	68	*		*	53
Haryana	(70)	48	52	*	*	52	(45)		60	*	45
Himachal Pradesh	*	18	16	*	*	20	*		(7)	*	22
Jammu region of J & K	(17)	45	47	*	*	38	58	*	57	*	25
Punjab	*	45	50	*	*	(42)		53	(38)	*	51
Rajasthan	61	53	54	*	*	53	(61)	*	60	55	50
Central											
Madhya Pradesh	41	58	56	49	*	55	59	*	49	52	58
Uttar Pradesh	56	59	60	44	(24)	57	65	*	59	(50)	59
East											
Bihar	42	56	56	(40)		46	69	*	30	*	58
Orissa	22	47	46	44	*	45	*	*	(45)	55	44
West Bengal	51	52	54	49	*	45	61	*	(46)	*	53
Northeast											
Assam	47	54	59	32	*	44	67	*	(30)	51	55
West											
Goa	(23)	34	36	(17)		39	*	*			35
Gujarat	42	40	39	(75)	*	42	(34)	*	*		42
Maharashtra	42	51	48	(39)	*	41	49		*	(53)	47
South											
Andhra Pradesh	(35)	50	49	*	*	50	(25)	*	(31)	*	39
Karnataka	52	52	55	*	*	51	62	*	78	(18)	47
Kerala	(67)	52	59	39	*	(76)	51	*	*	*	51
Tamil Nadu	(52)	30	42	(50)	*	36	*	*	(51)	*	20

Note PPPRs are expressed as percentages

( ) Based on 25–49 unweighted cases Number of unweighted cases is calculated by summing the initial numbers of women at risk of a next birth at each duration in parity from 0 to 9 years

PPPR not shown based on fewer than 25 unweighted cases

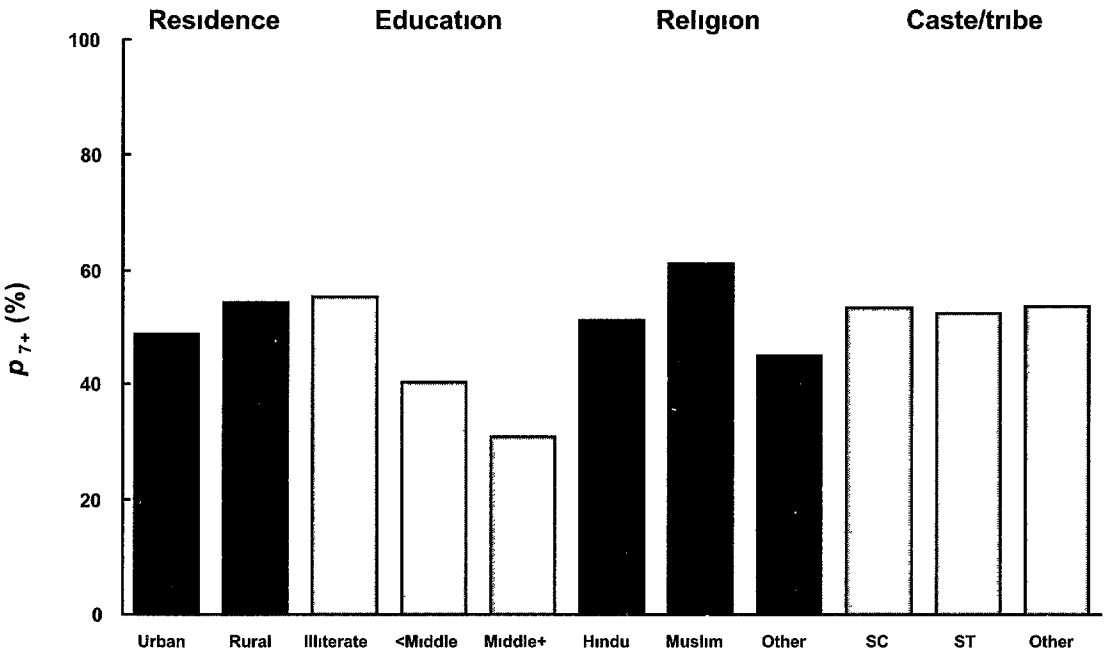

Figure 16 Period parity progression ratios for the transition from seventh or higher-order birth to next higher-order birth (p_{7+}), by selected background characteristics, for all India NFHS, 1992–93

SC Scheduled caste

ST Scheduled tribe

MULTIVARIATE ANALYSIS OF PARITY PROGRESSION RATIOS

In this section we examine the effects of selected demographic and socioeconomic variables on parity progression ratios (PPR) Inasmuch as progression from one parity to the next involves time elapsed since a starting event (which in this case is the birth corresponding to the starting parity), an appropriate multivariate method is hazard regression The following analysis makes use of proportional hazard models and, in the case of the effects of child mortality on parity progression, time-dependent hazard models (For an overview of these kinds of models, see Retherford and Choe 1993)

We focus on only one starting parity for the nation as a whole or a particular state because a multivariate analysis of all the various parity transitions would result in an excessive number of tables Our choice of a particular parity transition was governed by our desire to examine a transition in which a substantial proportion of women opt to stop having children, so that the estimated effects of the predictor variables on parity progression would be relatively large and easy to identify We also wished to examine a parity transition that would be of particular interest to policymakers and programme managers We accordingly determined the starting parity by rounding off the TFR for the three-year period immediately preceding the survey to the nearest whole number For example, in all India the TFR was 3 4 children per woman, which rounded to 3 as the starting parity In India as a whole, the transition 3→4 is a critical point for deciding whether to stop childbearing It is, so to speak, 'where the action is'

Because the TFR varies from state to state, the starting parity in our analysis also varies from state to state For three low-fertility states—Goa, Kerala, and Tamil Nadu—the starting parity is 2 For five high-fertility states—Haryana, Rajasthan, Madhya Pradesh, Bihar, and Assam—the starting parity is 4 and for Uttar Pradesh the starting parity is 5 For all other states, the starting parity is 3 Later in this section, when comparisons are made among states, it must be borne in mind that states are not entirely comparable because of this variation in starting parity by state

We restrict the analysis to currently married women still in their first marriage who reached the starting parity after 1 January 1980 The restriction to currently married women still in their first marriage effectively controls for variations in marital history and marital status, and the restriction to the period since 1 January 1980 guarantees that measured effects are not influenced by events in the more-distant past, which are of less interest to policymakers and programme managers

The set of predictor variables in the hazard regressions includes the number of dead children (0, 1+), number of living sons (0, 1, 2+), residence (urban, rural), woman's education (illiterate, literate but less than middle school complete, middle school complete or higher), husband's education (same categories as woman's education), religion (Hindu, Muslim, other), caste/tribe (scheduled

caste, scheduled tribe, other), exposure to electronic mass media (regularly exposed, not regularly exposed), and exposure to family planning messages on radio or television (heard a message, did not hear a message) Residence and education are included not only as principal predictor variables but also as control variables All characteristics pertain to women (Husband's education is also viewed as a characteristic of the woman)

The survey questions on general media exposure were 'Do you usually listen to a radio at least once a week?', 'Do you usually watch television at least once a week?', and 'Do you usually go to a cinema hall or theatre to see a movie at least once a month?' We classified women who answered 'yes' to any one of these questions as 'regularly exposed The questions on specific exposure to family planning messages on radio or television were 'In the last month, have you heard a message about family planning on the radio? On television?' We classified women who answered 'yes' to either of these two questions as 'heard a message'

Table 16 shows the distribution of the subsample (currently married women still in their first marriage who attained the starting parity after 1 January 1980) on the nine predictor variables used in the hazard regressions In India as a whole, about one-third of the women of starting parity 3 experienced at least one child death A large majority (84 percent) have at least one living son, and 44 percent have two or more living sons More than three-quarters of the women live in rural areas Sixty-nine percent are illiterate, 18 percent are literate but did not complete middle school, and 13 percent completed middle school Women are fairly evenly distributed by husband's education defined in terms of the same three education categories Eighty-one percent of the women are Hindu, 13 percent are Muslim, and 5 percent belong to other religions Women belonging to other religions are mainly Christians, Sikhs, Buddhists, and Jains Thirteen percent of the women belong to scheduled castes, 9 percent belong to scheduled tribes, and 77 percent do not belong to scheduled castes or tribes Forty-seven percent are regularly exposed to electronic mass media (radio television, or cinema), and 39 percent heard a family planning message on radio or television during the month before the survey The distribution of women on these characteristics varies considerably by state

In reporting the results of the hazard regressions, we do not present the underlying parameter estimates (i e , coefficients of predictor variables) Instead, we use multiple classification analysis to transform results from the hazard models into simple cross-tabulations of PPRs by the characteristics of interest Our tables and figures show unadjusted and adjusted PPRs for categories of each of the nine demographic and socioeconomic characteristics considered Both unadjusted and adjusted PPRs are predicted values calculated from the hazard regressions In the case of unadjusted PPRs the hazard regressions include only one predictor variable In the case of adjusted PPRs, the hazard regressions include not only the main predictor variable but

Table 16 Distribution of the sample on variables used in the hazard regression analysis

Percentage distribution of currently married women of specified starting parity on variables used in the hazard regression analysis of parity progression by state NFHS 1992–93

		No of dead children[a]		No of living sons[b]			Residence		Education			Husband's education		
State	Starting parity	0	1+	0	1	2+	Urban	Rural	Illiterate	Literate, <middle complete	Middle school complete	Illiterate	Literate, <middle complete	Middle school complete
India	3	67	33	16	40	44	23	77	69	18	13	37	27	36
North														
Delhi	3	76	24	16	41	43	92	8	49	19	32	17	20	62
Haryana	4	53	47	10	35	55	25	75	78	12	10	34	23	43
Himachal Pradesh	3	73	27	16	42	42	9	91	52	33	15	18	30	52
Jammu region of J & K	3	79	21	13	39	49	13	87	61	15	25	28	15	57
Punjab	3	79	21	14	41	45	27	73	57	22	21	40	19	42
Rajasthan	4	67	33	8	28	64	17	83	89	7	4	51	21	28
Central														
Madhya Pradesh	4	50	50	12	31	57	22	78	81	13	7	41	30	29
Uttar Pradesh	5	34	66	7	24	70	15	85	87	7	6	44	22	34
East														
Bihar	4	53	47	10	32	58	12	88	86	9	5	49	19	32
Orissa	3	61	39	17	39	44	16	84	67	27	7	34	40	26
West Bengal	3	66	34	18	39	43	22	78	61	28	11	37	36	27
Northeast														
Assam	4	47	53	12	32	56	8	92	68	26	7	39	39	22
West														
Goa	2	91	9	26	51	22	50	50	28	28	44	15	31	55
Gujarat	3	69	31	16	41	42	31	69	65	21	14	30	34	35
Maharashtra	3	76	24	15	42	43	35	65	55	29	16	26	34	40
South														
Andhra Pradesh	3	72	28	16	38	46	25	75	75	12	13	51	19	29
Karnataka	3	68	32	17	41	43	29	71	69	19	12	42	30	27
Kerala	2	93	7	26	49	24	28	72	11	36	53	8	42	49
Tamil Nadu	2	82	18	28	50	22	36	64	47	24	29	27	31	43

Note Tabulations pertain to all currently married women still in their first marriage at the time of the survey who reached the specified starting parity after 1 January 1980

a The distribution of the sample by number of dead children is calculated according to whether a previous child had died before either (1) the time point 10 years after the starting parity or (2) the survey date whichever came first

b In this table the number of living sons pertains to the time that the woman attained the starting parity and it includes the child born at that time if the child was a son

also two control variables—residence and education—except when residence or education is the principal predictor variable, in which case there is only one control variable When calculating adjusted PPRs, we hold the control variables constant by setting them to their mean values in the group of women for whom the hazard regression is run Thus 'adjusted' usually means adjusted for residence and education' (For further details on this mode of presenting results, see Retherford and Choe 1993)

Table 16 (continued) Distribution of the sample on variables used in the hazard regression analysis

Percentage distribution of currently married women of specified starting parity on variables used in the hazard regression analysis of parity progression by state NFHS 1992–93

		Religion			Caste/tribe			Exposure to radio television, or cinema		Exposure to family planning messages on radio or television	
State	Starting parity	Hindu	Muslim	Other	Scheduled caste	Scheduled tribe	Other	Regularly exposed	Not regularly exposed	Heard a message	Did not hear a message
India	3	81	13	5	13	9	77	47	53	39	61
North											
Delhi	3	81	13	6	7	1	92	83	17	77	23
Haryana	4	86	8	7	32	0	68	54	46	47	53
Himachal Pradesh	3	96	2	2	24	6	70	62	38	43	57
Jammu region of J & K	3	74	21	5	30	1	69	70	30	58	42
Punjab	3	42	2	57	29	0	71	60	40	56	44
Rajasthan	4	92	6	1	23	19	58	24	76	27	73
Central											
Madhya Pradesh	4	92	6	2	6	27	67	35	65	30	70
Uttar Pradesh	5	81	19	1	20	1	79	25	75	22	78
East											
Bihar	4	80	18	1	10	8	82	23	77	20	80
Orissa	3	97	2	2	10	19	71	39	61	26	74
West Bengal	3	72	26	2	11	6	83	53	47	29	71
Northeast											
Assam	4	62	33	4	4	17	79	31	69	21	79
West											
Goa	2	67	7	26	2	3	95	86	14	76	24
Gujarat	3	90	9	2	7	17	76	48	52	41	58
Maharashtra	3	76	15	9	7	10	83	58	42	48	52
South											
Andhra Pradesh	3	87	10	3	15	6	78	72	28	55	45
Karnataka	3	83	15	3	13	5	81	65	35	63	37
Kerala	2	55	24	21	3	3	94	80	20	57	43
Tamil Nadu	2	88	6	6	20	0	80	80	20	57	43

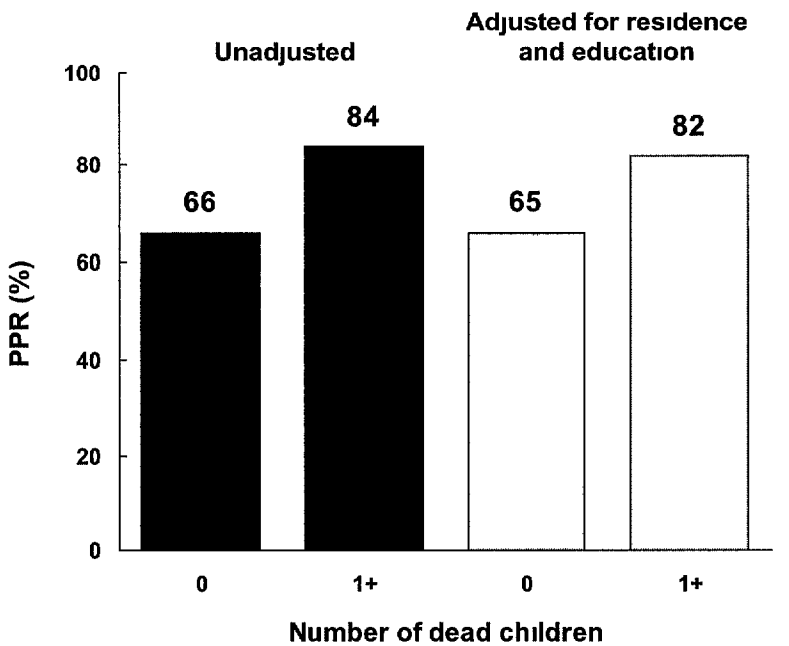

Figure 17 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by number of dead children, for all India NFHS, 1992–93

Figure 17 and Table 17 show unadjusted and adjusted effects of child mortality on parity progression in all India and in the selected states The unadjusted PPRs are calculated from hazard regressions of parity progression on the number of dead children The adjusted PPRs are calculated from hazard regressions that include not only the number of dead children as the main predictor variable but also residence and education as control variables In this table the hazard models are time-dependent, inasmuch as the number of child deaths (0, 1+) is treated as a time-dependent predictor variable The variable number of dead children, takes on the value of 1 if a woman experienced at least one child death, however, it takes on the value of 1 only for those values of time elapsed since the starting parity when the child death (or first child death if there was more than one) could potentially have an effect on the progression to the next parity Otherwise this variable has a value of 0

Figure 17 and Table 17 show that, for India as a whole, child mortality has a strong positive effect on the progression from third to fourth birth The PPR is 66 percent for women who experienced no child death and 84 percent for women who experienced one or more child deaths Controlling for urban/rural residence and education makes little difference in the effect of child mortality on the PPR The adjusted PPR is 65 percent for women who experienced no child death and 82 percent for women who experienced one or more child deaths

Table 17 Model estimates of parity progression ratios, by number of dead children

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity number of dead children and state NFHS 1992–93

		Number of dead children			
		Unadjusted		Adjusted for residence and education	
State	**Starting parity**	**0[a]**	**1+**	**0[a]**	**1+**
India	3	66	84*	65	82*
North					
Delhi	3	64	85*	64	81*
Haryana	4	57	74*	56	72*
Himachal Pradesh	3	52	80*	51	77*
Jammu region of J & K	3	68	87*	68	84*
Punjab	3	53	79*	52	77*
Rajasthan	4	61	76	61	76*
Central					
Madhya Pradesh	4	63	80*	64	79*
Uttar Pradesh	5	71	82*	72	81*
East					
Bihar	4	72	84	73	83*
Orissa	3	69	78	69	78*
West Bengal	3	63	79*	63	78*
Northeast					
Assam	4	71	82*	72	82*
West					
Goa	2	62	93*	61	86*
Gujarat	3	60	79*	59	75*
Maharashtra	3	54	80*	54	80*
South					
Andhra Pradesh	3	54	75*	53	74*
Karnataka	3	57	80*	56	77*
Kerala	2	50	87*	48	83*
Tamil Nadu	2	66	90*	66	87*

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who reached the specified starting parity after 1 January 1980 In this table the number of dead children is a time varying covariate

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

Table 17 also shows the effects of child mortality on parity progression for states In every state child mortality significantly increases the percentage progressing to the next birth These findings are consistent with the expectation that most parents will try to replace a dead child by having another one The effect of child mortality on parity progression tends to be greater in states with lower fertility This is also consistent with our expectation, because family planning is more widely practised in low-fertility states Women who practise family planning can consciously

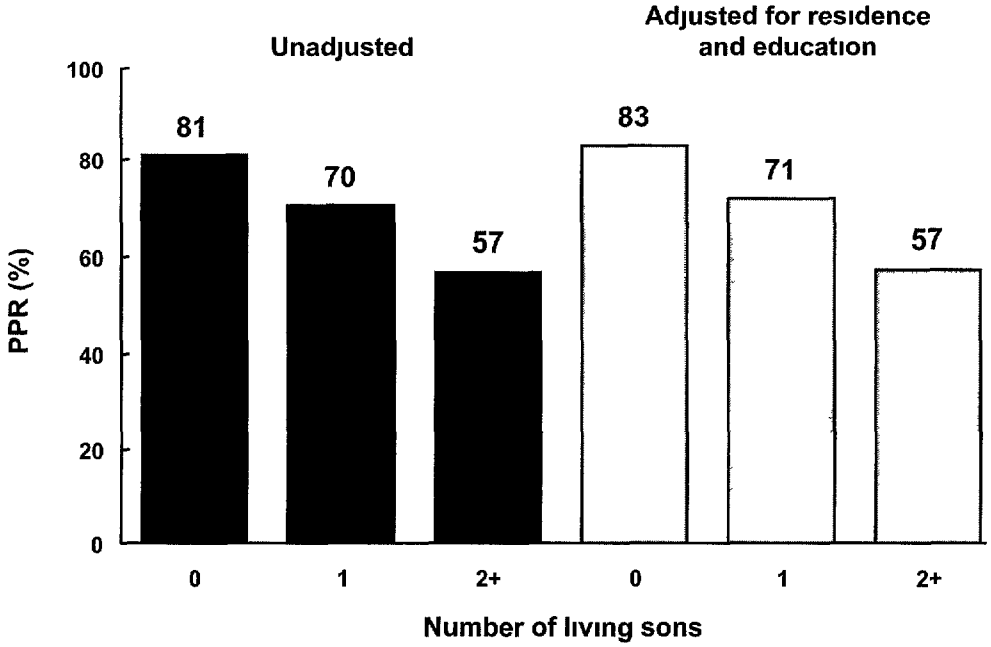

Figure 18 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by number of living sons, for all India NFHS, 1992–93

replace dead children (except in the case in which a child dies after one of the parents has been sterilized) and therefore have a higher rate of replacement of dead children than women who do not practise family planning Women who do not practise family planning at all will on average, still experience some replacement of dead children because a child death often cuts short breastfeeding, in which case amenorrhoea is also cut short and ovulation resumes sooner

Given the high degree of son preference in most parts of India we expect women with higher numbers of living sons to have lower PPRs Figure 18 and Table 18 confirm this expectation For India as a whole, 81 percent of women with three births but no living sons go on to have a fourth birth, compared with 70 percent of women with one living son and 57 percent of women with two or more living sons This large negative effect of number of living sons on parity progression remains virtually unchanged when residence and education are statistically controlled Thus the effect of the number of living sons on fertility operates largely independently of urban/rural residence and level of education

The negative effect of number of living sons on PPRs varies considerably by state (Table 18) The effect is largest in states in the North and West regions, which are characterized by an especially strong preference for sons—most notably Haryana

Table 18 Model estimates of parity progression ratios, by number of living sons

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity number of living sons and state NFHS 1992–93

		Number of living sons					
		Unadjusted			Adjusted for residence and education		
State	Starting parity	0[a]	1	2+	0[a]	1	2+
India	3	81	70*	57*	83	71*	57*
North							
Delhi	3	84	66*	55*	86	68*	51
Haryana	4	91	69*	45*	96	71*	42*
Himachal Pradesh	3	82	59*	28*	85	61*	29*
Jammu region of J & K	3	76	69	56*	84	75	57*
Punjab	3	82	63*	38*	79	64*	37*
Rajasthan	4	87	75*	54*	88	76*	54*
Central							
Madhya Pradesh	4	73	69	60*	75	69	59
Uttar Pradesh	5	74	78	69	77	79	68
East							
Bihar	4	89	76*	69*	89	77*	70
Orissa	3	85	73*	60*	86	75*	62
West Bengal	3	81	72	56*	81	71*	55*
Northeast							
Assam	4	83	75	68*	85	77	70
West							
Goa	2	71	57*	59*	71	56*	57*
Gujarat	3	88	71*	46*	90	70*	44*
Maharashtra	3	82	66*	38*	82	67*	37
South							
Andhra Pradesh	3	63	58	48*	64	57	48*
Karnataka	3	79	62*	45*	80	62*	43*
Kerala	2	56	43*	58	53	42*	56
Tamil Nadu	2	78	63*	61*	79	62*	61*

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who reached the specified starting parity after 1 January 1980 In this table the number of living sons includes the child born at the time the starting parity was achieved if this child was a son This table is based on women who reported having no child (up to and including the starting parity birth) who had died before (1) the time point 10 years after the starting parity or (2) the survey date whichever came first

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

Himachal Pradesh, and Punjab It is also large in Gujarat, Maharashtra, and Karnataka The effect tends to be greater in states in the middle of the fertility transition and smaller in states closer to the beginning or end of the transition For example the effect is quite small in Uttar Pradesh (where it is statistically nonsignificant) and in Kerala

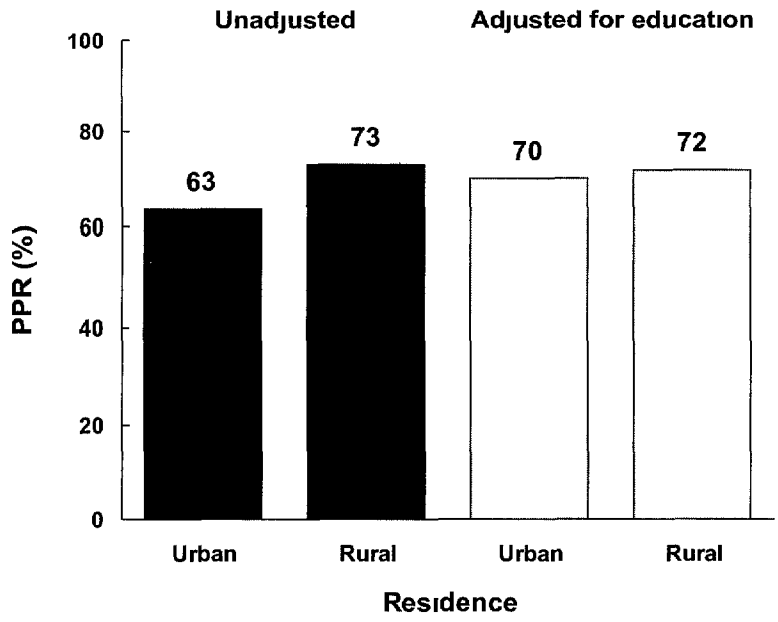

Figure 19 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by residence, for all India NFHS, 1992–93

Figure 19 and Table 19 show the effects of urban versus rural residence on parity progression Here the adjusted PPRs include only the control for woman's education In India as a whole, the unadjusted percentage progressing from a third to a fourth birth is 63 percent in urban areas and 73 percent in rural areas However, when education is statistically controlled, the urban-rural difference in PPRs almost disappears Evidently the effect of residence on parity progression is mostly indirect, through education

Table 19 additionally shows the effects of residence by state In most states, as in all India, the effect of residence on parity progression is greatly reduced when woman's education is controlled The adjusted rural-urban difference in PPRs is 8 percentage points or higher only in Himachal Pradesh, Jammu, Madhya Pradesh, Uttar Pradesh, and Assam In two of these five states (Himachal Pradesh and Assam) the difference is not statistically significant at the 5 percent level With education controlled, PPRs are actually higher in urban areas than in rural areas in West Bengal Goa, Maharashtra and Andhra Pradesh, but these differences are not statistically significant

Table 19 Model estimates of parity progression ratios, by residence

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity residence and state NFHS 1992–93

		Residence			
		Unadjusted		Adjusted for education	
State	Starting parity	Urban	Rural[a]	Urban	Rural[a]
India	3	63*	73	70*	72
North					
Delhi	3	66*	78	67	73
Haryana	4	55	64	60	62
Himachal Pradesh	3	43*	61	51	59
Jammu region of J & K	3	50*	77	61*	75
Punjab	3	48*	63	52	59
Rajasthan	4	55*	68	61	66
Central					
Madhya Pradesh	4	63	74	65*	74
Uttar Pradesh	5	68*	79	71*	79
East					
Bihar	4	70	79	77	78
Orissa	3	68	73	69	73
West Bengal	3	66	71	71	69
Northeast					
Assam	4	62*	78	66	79
West					
Goa	2	61	68	64	63
Gujarat	3	60*	68	65	65
Maharashtra	3	59	62	63	59
South					
Andhra Pradesh	3	56	60	63	58
Karnataka	3	57*	68	60	66
Kerala	2	46*	55	46	52
Tamil Nadu	2	62*	74	66	72

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include a control variable (education) For the calculation of adjusted PPRs the control variable is set at its mean value in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

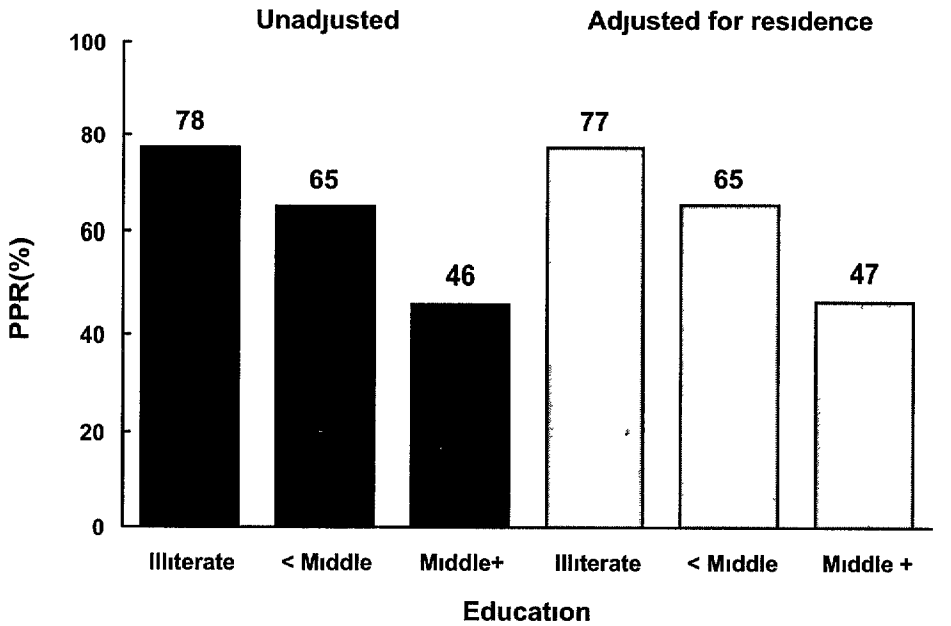

Figure 20 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth by education, for all India NFHS, 1992–93

Figure 20 and Table 20 show the effects of woman's education on PPRs As expected, education has a large, statistically significant, negative effect on parity progression In all India, the percentage progressing from a third to a fourth birth is 78 percent for illiterate women, 65 percent for literate women who did not complete middle school and 46 percent for women who completed middle school or higher This effect of education on PPRs remains virtually unchanged when urban/rural residence is statistically controlled, a finding that supports our earlier inference that the effects of residence are felt mostly through education

Table 20 additionally shows the effects of education on parity progression for the states Education has large, statistically significant, negative effects on PPRs in all states except Orissa Another exception occurs in Madhya Pradesh where a higher percentage (adjusted as well as unadjusted) of literate women who completed middle school have progressed from parity 4 to parity 5 than of literate women who did not complete middle school This finding is unexpected and the reasons for it are unclear

Table 20 Model estimates of parity progression ratios, by education

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity education and state NFHS 1992–93

		Education					
		Unadjusted			Adjusted for residence		
State	Starting parity	Illiterate[a]	Literate < middle complete	Middle school complete	Illiterate[a]	Literate <middle complete	Middle school complete
India	3	78	65*	46*	77	65*	47*
North							
Delhi	3	82	72*	44*	81	71*	44*
Haryana	4	67	47*	35*	67	48*	36
Himachal Pradesh	3	66	55*	32*	67	57*	34*
Jammu region of J & K	3	82	66*	48*	82	67*	52*
Punjab	3	68	54*	35*	67	54*	37*
Rajasthan	4	69	46*	36*	68	47*	38*
Central							
Madhya Pradesh	4	74	61*	64	74	62*	68
Uttar Pradesh	5	79	75	53*	79	75	55*
East							
Bihar	4	81	67*	48*	81	68*	49*
Orissa	3	72	74	61	72	75	63
West Bengal	3	78	65*	32*	78	64	32*
Northeast							
Assam	4	79	71*	50*	81	74	54*
West							
Goa	2	82	78	43*	83	78	43*
Gujarat	3	74	60	30*	74	60*	30*
Maharashtra	3	67	60	42*	67	60*	41*
South							
Andhra Pradesh	3	64	45*	42*	65	44*	40
Karnataka	3	68	65	40*	68	66	41
Kerala	2	73	62*	38*	73	62*	39*
Tamil Nadu	2	78	73	53*	77	73	54*

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include a control variable (residence) For the calculation of adjusted PPRs the control variable is set at its mean value in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

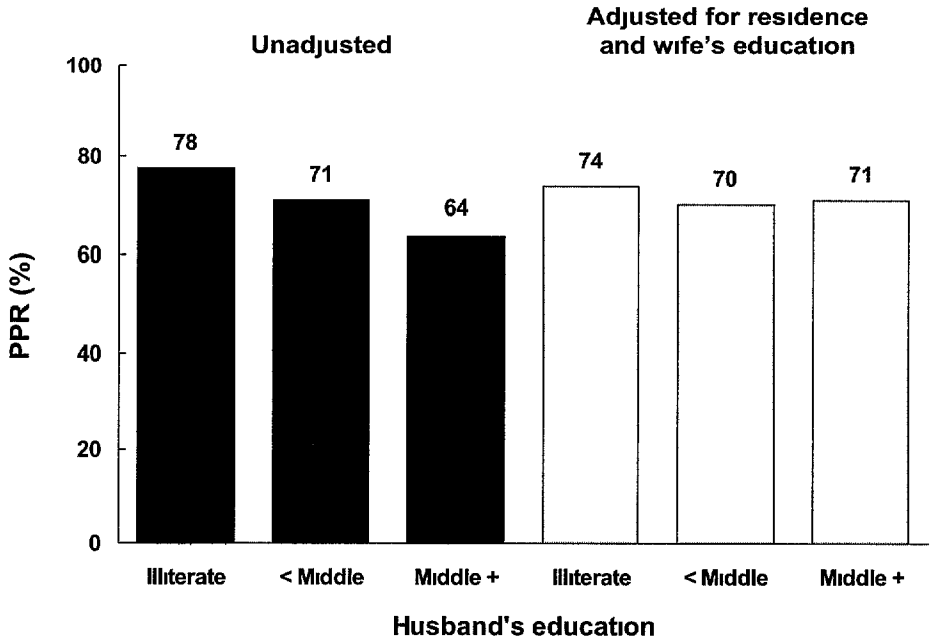

Figure 21 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by husband's education, for all India NFHS, 1992–93

Figure 21 and Table 21 show the effects of husband's education on PPRs The adjusted values in this figure and table control for both residence and woman's education In the unadjusted results for all India husband's education has a substantial negative effect on parity progression, as expected With residence and wife's education controlled, however the effect of husband's education on parity progression is greatly reduced These findings suggest that the unadjusted effect of husband's education is mostly spurious and stems from its correlation with wife's education

Controlling for residence and wife's education reduces the effect of husband's education on parity progression in most states as well The difference in the adjusted PPR between women with illiterate husbands and women whose husbands have completed middle school remains 10 percentage points or greater only in Delhi, Haryana Gujarat, Andhra Pradesh Karnataka, and Kerala

Table 21 Model estimates of parity progression ratios, by husband's education

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity husband s education and state NFHS 1992–93

		Husband's education					
		Unadjusted			Adjusted for residence and wife s education		
State	Starting parity	Illiterate[a]	Literate <middle complete	Middle school complete	Illiterate[a]	Literate <middle complete	Middle school complete
India	3	78	71*	64*	74	70	71
North							
Delhi	3	85	83	60*	75	76	63
Haryana	4	72	67	48*	69	66	51
Himachal Pradesh	3	64	60	51*	59	58	58
Jammu region of J & K	3	79	76	64*	73	76	73
Punjab	3	67	61	48*	60	58	54
Rajasthan	4	71	65	56*	68	64	61
Central							
Madhya Pradesh	4	77	69*	65	75	70*	68*
Uttar Pradesh	5	80	77	74	78	76	77
East							
Bihar	4	83	80	68	81	79	72
Orissa	3	70	74	71	70	74	74
West Bengal	3	78	70*	60*	69	66	72
Northeast							
Assam	4	78	76	66	79	78	75
West							
Goa	2	78	82	50	65	73	58
Gujarat	3	77	71	49*	72	67	57*
Maharashtra	3	68	63	54	65	60	58
South							
Andhra Pradesh	3	65	62	46*	63	61	51*
Karnataka	3	72	65*	54*	69	63	59*
Kerala	2	69	61	39*	58	56	44*
Tamil Nadu	2	76	77	61*	70	73	67

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and wife s education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

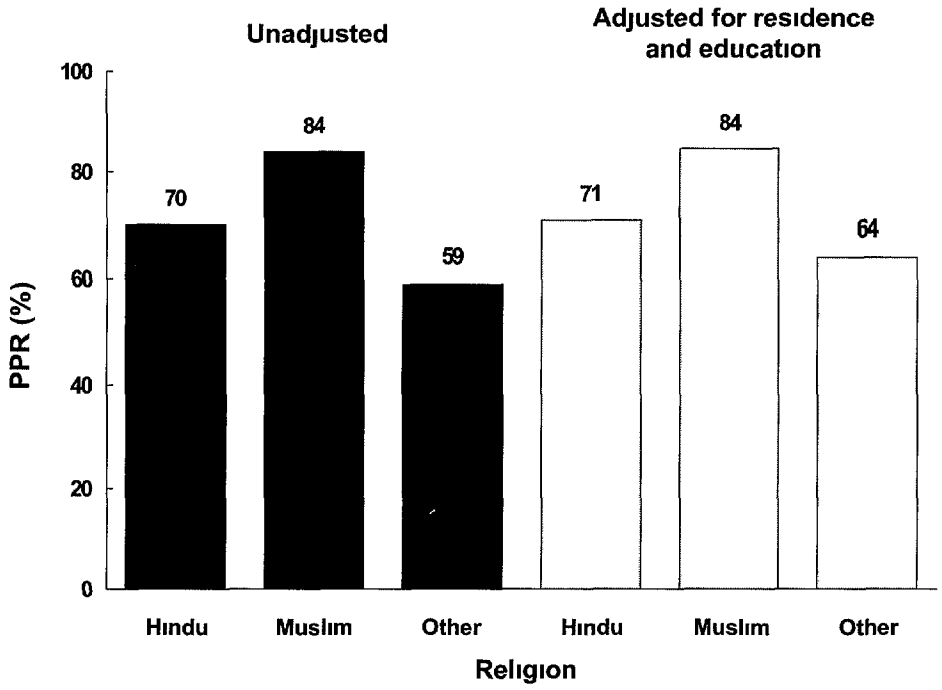

Figure 22 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by religion, for all India NFHS, 1992–93

Figure 22 and Table 22 show the effects of religion on PPRs In India as a whole, a considerably higher percentage of Muslim women progress from third to fourth birth than of Hindu women or women of 'other' religions Controlling for residence and education makes little difference to the Hindu-Muslim differential in the PPR, but it reduces somewhat the differential between Muslim women and women of 'other' religions Even when residence and education are statistically controlled, the PPR is 13 percentage points higher for Muslim women than for Hindu women and 20 percentage points higher for Muslim women than for women belonging to 'other' religions These findings indicate that religion has substantial independent effects on parity progression

Table 22 additionally presents the influence of religion on PPRs for individual states In all states except Madhya Pradesh, Muslim women have higher PPRs than either Hindu women or women of 'other' religions In Madhya Pradesh, women of 'other' religions have a higher PPR than either Hindu women or Muslim women The adjusted PPRs by religion resemble the unadjusted PPRs, again indicating that religion has substantial independent effects on parity progression The Hindu-Muslim differential in the adjusted PPR is especially large (15 percentage points or more) in Haryana, Himachal Pradesh, Punjab, West Bengal, Maharashtra, Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu However, this difference is not statistically significant in Punjab, probably because of the small number of Muslims in the sample for this state

Table 22 Model estimates of parity progression ratios, by religion

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity religion and state NFHS 1992–93

		Religion					
		Unadjusted			Adjusted for residence and education		
State	**Starting parity**	**Hindu[a]**	**Muslim**	**Other**	**Hindu[a]**	**Muslim**	**Other**
India	3	70	84*	59*	71	84	64*
North							
Delhi	3	67	85*	44	67	80*	51*
Haryana	4	59	88*	56	59	85*	60
Himachal Pradesh	3	54	89*	59	57	90*	70
Jammu region of J & K	3	69	81*	48*	73	77	63
Punjab	3	56	82*	59	59	74	56
Rajasthan	4	65	73	57	65	74	64
Central							
Madhya Pradesh	4	71	76	81	71	81*	84
Uttar Pradesh	5	76	84*	72	76	86	78
East							
Bihar	4	76	87*	55	77	87*	59
Orissa	3	72	83	77	72	84	78
West Bengal	3	63	86*	66	64	83*	67
Northeast							
Assam	4	69	85*	83*	73	86*	85
West							
Goa	2	68	88*	49	67	80*	51*
Gujarat	3	65	68	57	65	64	63
Maharashtra	3	58	83*	46*	58	83*	47
South							
Andhra Pradesh	3	58	76*	59	57	78	60
Karnataka	3	62	80*	64	61	80	71
Kerala	2	46	72*	47	45	66*	49
Tamil Nadu	2	70	80	66	69	85*	69

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

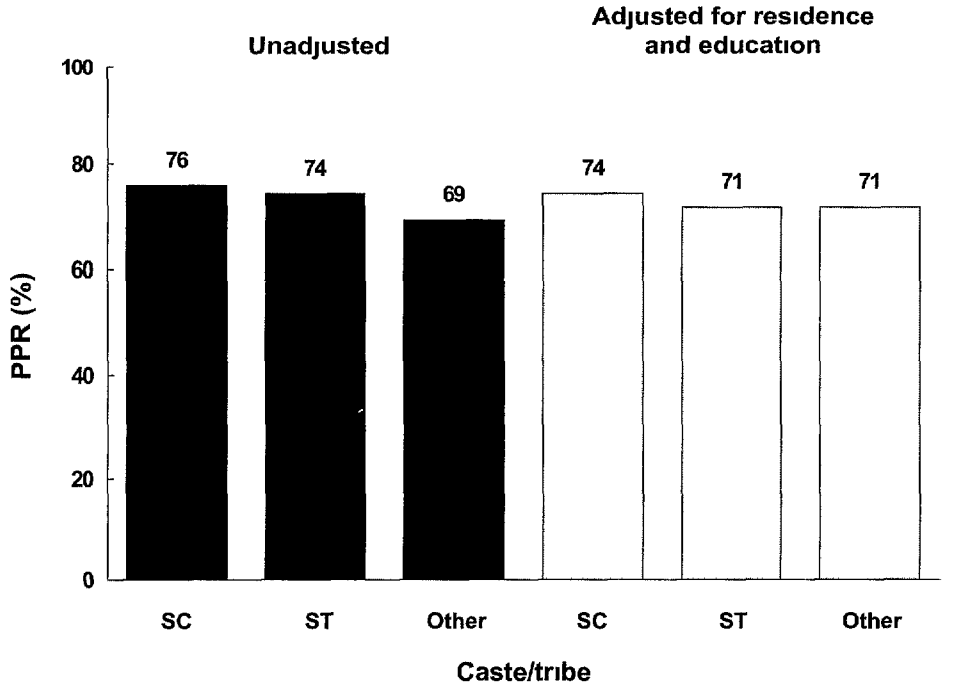

Figure 23 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by cast/tribe, for all India NFHS, 1992–93

SC Scheduled caste
ST Scheduled tribe

Figure 23 and Table 23 show the effects of caste/tribe on PPRs In the unadjusted results for all India, a somewhat higher percentage of scheduled-caste women progress from third to fourth birth (76 percent) than of scheduled-tribe women (74 percent) or non-SC/ST women (69 percent) A higher PPR for scheduled-caste and scheduled-tribe women compared with non-SC/ST women is consistent with expectation because scheduled-caste and scheduled-tribe women tend to have lower socioeconomic status than other women and poorer access to family planning services When residence and education are statistically controlled the difference between scheduled-caste women and non-SC/ST women is reduced by more than one-half, and the difference between scheduled-tribe women and non-SC/ST women completely disappears These findings suggest that the independent effects of caste/tribe on PPRs are small

Table 23 shows that differentials in PPRs by caste/tribe vary considerably by state In the adjusted column, the difference in the PPR between scheduled-caste women and non-SC/ST women is in the expected direction and statistically significant in Haryana, Punjab, and Tamil Nadu The difference in the PPR between sched-

Table 23 Model estimates of parity progression ratios, by caste/tribe

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity caste/tribe and state NFHS 1992–93

		Caste/tribe					
		Unadjusted			Adjusted for residence and education		
State	Starting parity	Scheduled caste	Scheduled tribe	Other[a]	Scheduled caste	Scheduled tribe	Other[a]
India	3	76*	74	69	74*	71	71
North							
Delhi	3	75	NC	68	68	NC	68
Haryana	4	73*	NC	56	70*	NC	58
Himachal Pradesh	3	60	70*	53	59	67	57
Jammu region of J & K	3	78	NC	66	77	NC	71
Punjab	3	69*	NC	54	64*	NC	55
Rajasthan	4	69*	72*	62	68	69	63
Central							
Madhya Pradesh	4	79	74	70	78	72	71
Uttar Pradesh	5	80	74	77	79	72	77
East							
Bihar	4	83	72	77	83	72	78
Orissa	3	70	71	72	71	72	73
West Bengal	3	78*	70	69	71	6[illegible]	69
Northeast							
Assam	4	71	78	74	77	78	77
West							
Goa	2	84*	94*	63	71	85*	63
Gujarat	3	74	66	65	73	59	66
Maharashtra	3	60	70*	59	59	67	60
South							
Andhra Pradesh	3	64	69	58	62	64	58
Karnataka	3	67	65	64	64	63	64
Kerala	2	48	50	52	45	40	51
Tamil Nadu	2	79*	NC	67	75*	NC	68

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

NC Not calculated because of insufficient numbers of scheduled tribe women In this case the hazard model excludes scheduled tribe women and the dummy variable representing scheduled tribe women

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

uled-tribe women and non-SC/ST women is in the expected direction and statistically significant in Goa None of the other adjusted effects of caste/tribe is statistically significant at the state level partly because of the small numbers of women in the scheduled-caste and scheduled-tribe categories in many states

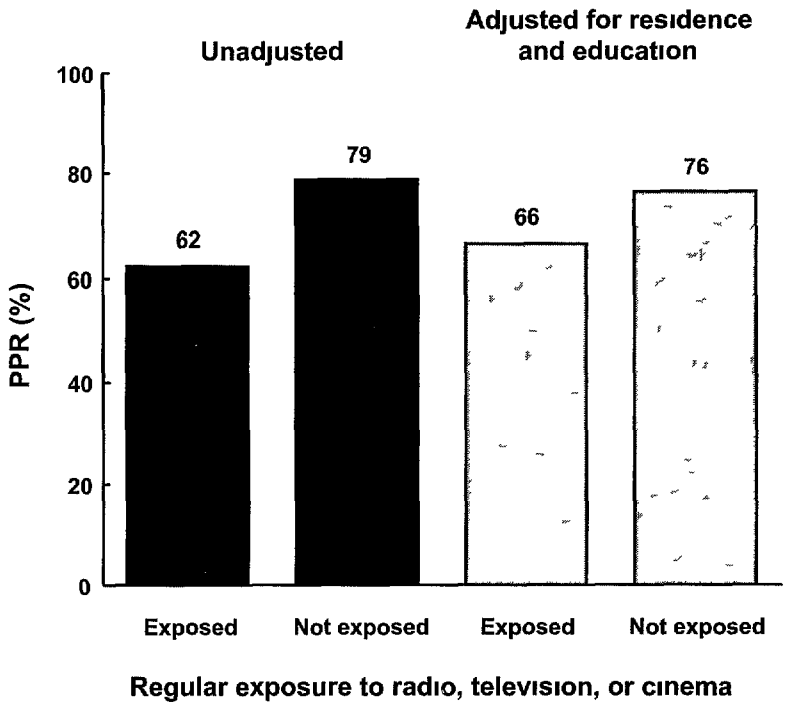

Figure 24 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by regular exposure to electronic mass media, for all India NFHS, 1992–93

Figure 24 and Table 24 show unadjusted and adjusted effects on PPRs of regular exposure to electronic mass media (defined as listening to radio at least once a week, watching television at least once a week, or going to a cinema hall or theatre at least once a month) The unadjusted results for all India indicate that women who are regularly exposed to electronic mass media are much less likely to progress from third to fourth birth (62 percent) than are women not regularly exposed (79 percent) Controlling for residence and education reduces this effect, but about three-fifths of the difference remains These findings indicate that regular media exposure has a substantial independent effect on parity progression

Media exposure has negative, statistically significant, unadjusted effects on PPRs in all states except Orissa Controlling for residence and education reduces the effect in all states, but to varying extents With residence and education controlled, the effect of media exposure on PPRs remains negative and statistically significant in

Table 24 Model estimates of parity progression ratios, by exposure to electronic mass media

Unadjusted and adjusted parity progression ratios (PPRs) by specified starting parity regular exposure to electronic mass media (radio or television at least once a week or cinema at least once a month) and state NFHS 1992–93

		Exposure to radio, television or cinema			
		Unadjusted		Adjusted for residence and education	
State	Starting parity	Regularly exposed	Not regularly exposed[a]	Regularly exposed	Not regularly exposed[a]
India	3	62*	79	66*	76
North					
Delhi	3	65*	85	67*	75
Haryana	4	55*	69	58	65
Himachal Pradesh	3	52*	67	56*	64
Jammu region of J & K	3	65	83	71*	80
Punjab	3	52	67	56	60
Rajasthan	4	51*	70	56*	68
Central					
Madhya Pradesh	4	63*	76	65*	75
Uttar Pradesh	5	71*	80	74	79
East					
Bihar	4	69*	80	74	79
Orissa	3	72	72	73	72
West Bengal	3	64*	77	67	72
Northeast					
Assam	4	65*	80	70*	81
West					
Goa	2	62*	76	63	63
Gujarat	3	58*	73	62	68
Maharashtra	3	54*	69	55*	68
South					
Andhra Pradesh	3	56*	67	57*	64
Karnataka	3	58*	77	58*	75
Kerala	2	48*	64	48*	55
Tamil Nadu	2	68*	78	69	72

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

Delhi, Himachal Pradesh, Jammu, Rajasthan, Madhya Pradesh, Assam, Maharashtra, Andhra Pradesh Karnataka and Kerala In all but two of the remaining states the effect of media exposure is in the expected direction but not statistically significant In Orissa and Goa media exposure has virtually no association with PPRs once residence and education are controlled

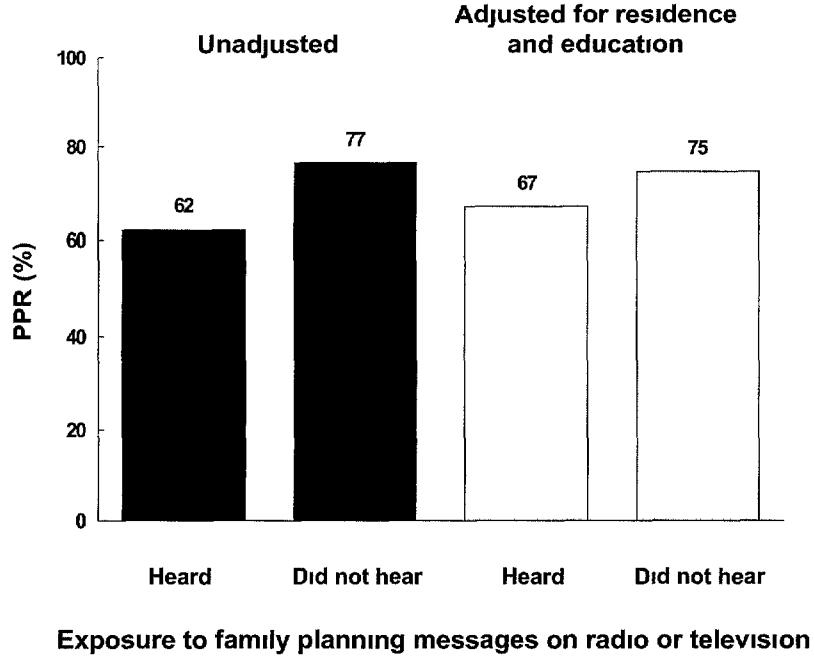

Figure 25 Unadjusted and adjusted parity progression ratios (PPRs) for the transition from third to fourth birth, by exposure to family planning messages on radio or television, for all India NFHS, 1992–93

Figure 25 and Table 25 show the effects on PPRs of exposure to family planning messages on radio or television during the month before the survey In the unadjusted results for all India, women who heard a message on radio or television are much less likely to progress from third to fourth birth (62 percent) than are women who did not hear a family planning message (77 percent) Controlling for residence and education reduces this effect by about one-half

Exposure to family planning messages on radio or television also has negative, statistically significant, unadjusted effects on PPRs in all states except Orissa When residence and education are controlled, exposure to family planning messages still has negative and statistically significant effects on parity progression in Delhi, Jammu Rajasthan Uttar Pradesh, Assam Gujarat, Maharashtra, Karnataka, and Kerala, constituting about one-half of all states included in this analysis As in the case of general media exposure, specific media exposure to family planning messages has virtually no adjusted effect on parity progression in Orissa and Goa Why the effects vary so considerably from state to state is unclear

The estimated effects of both general media exposure and specific media exposure on parity progression must be interpreted cautiously because in most cases the

Table 25 Model estimates of parity progression ratios, by exposure to family planning messages on radio or television

Unadjusted and adjusted parity progression (PPRs) by specified starting parity exposure to family planning messages on radio or television and state NFHS 1992–93

		Exposure to family planning messages on radio or television			
		Unadjusted		Adjusted for residence and education	
State	Starting parity	Heard a message	Did not hear a message[a]	Heard a message	Did not hear a message[a]
India	3	62*	77	67*	75
North					
Delhi	3	64*	82	65*	75
Haryana	4	56*	67	60	63
Himachal Pradesh	3	51*	61	57	60
Jammu region of J & K	3	63*	82	70*	79
Punjab	3	51*	68	55	61
Rajasthan	4	53*	70	58*	68
Central					
Madhya Pradesh	4	64*	75	67	73
Uttar Pradesh	5	69*	80	73*	79
East					
Bihar	4	67*	80	73	79
Orissa	3	70	73	72	73
West Bengal	3	64*	72	68	70
Northeast					
Assam	4	59*	79	65*	81
West					
Goa	2	60*	76	63	64
Gujarat	3	55*	73	60*	68
Maharashtra	3	54*	66	56*	65
South					
Andhra Pradesh	3	54*	64	56	62
Karnataka	3	58*	77	58*	74
Kerala	2	47*	59	48*	54
Tamil Nadu	2	66*	76	68	72

Notes PPRs are expressed as percentages Both unadjusted and adjusted PPRs are predicted values calculated from hazard regressions In the case of adjusted PPRs the hazard regressions include control variables (residence and education) For the calculation of adjusted PPRs the control variables are set at their mean values in the group of women for which the hazard regression was run This group of women for either all India or a specified state includes all currently married women still in their first marriage at the time of the survey who had reached the specified starting parity after 1 January 1980

a Reference category in the underlying hazard regression

The coefficient of the corresponding dummy variable in the underlying hazard regression differs significantly from zero at the 5 percent level

parity progression preceded the media exposure A causal interpretation is justified only to the extent that recent media exposure is a good proxy for past media exposure There is some, but not conclusive, evidence that this assumption is reasonable (Retherford and Mishra 1997)

CONCLUSION

In general, the findings indicate a great diversity in fertility levels and differentials among Indian states The variations by state raise many questions that remain unanswered and require further research

The total fertility rate, whether calculated conventionally from age-specific fertility rates or from period parity progression ratios, ranges from replacement-level fertility of about two children per woman in Goa and Kerala to about five children per woman in Uttar Pradesh Fertility tends to be higher among rural women, less-educated women, Muslim women, and scheduled-caste and scheduled-tribe women

Fertility has declined by about 30 percent in India over the past three decades, as indicated roughly by the percentage difference between the mean number of children ever born among women age 40–49 and the total fertility rate Fertility has declined faster among urban women, more-educated women Hindu women, and non-SC/ST women Not surprisingly, fertility has tended to decline more slowly in states that currently have high fertility In the six states with comparatively high fertility (Haryana, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, and Assam), the percentage by which current fertility is lower than cohort fertility ranges from 19 percent in Uttar Pradesh to 39 percent in Assam In the states with medium fertility (Delhi, Himachal Pradesh, Jammu Punjab, Orissa, West Bengal, Gujarat, Maharashtra, and Karnataka), this percentage ranges from 28 percent in Delhi to 40 percent in Orissa In the states with comparatively low fertility (Andhra Pradesh, Goa, Kerala, and Tamil Nadu), the percentage tends to be larger, ranging from 36 percent in Andhra Pradesh to 49 percent in Goa

Period parity progression ratios for the transition from birth to first marriage indicate nearly universal marriage, with 96 percent of women eventually marrying in India as a whole However, not all states conform to this pattern PPPRs for the transition from birth to marriage range from almost 100 percent in Punjab and Bihar to 89 percent in Orissa, Assam, and Goa, implying that 11 percent of women will never marry in these latter three states Progression from marriage to first birth is also nearly universal, at 97 percent Again there are exceptions, most notably Andhra Pradesh, where the PPPR from marriage to first birth implies that 7 percent of married women will not progress to a first birth In India as a whole, the progression ratio from first to second birth is also quite high, at 93 percent Progression ratios at higher parities fall off more rapidly How rapidly depends to a considerable extent on the general level of fertility in a particular state The pattern of differentials in parity progression ratios by socioeconomic characteristics tends to resemble the pattern of differentials in the total fertility rate although the pattern for parity progression ratios varies somewhat by parity

The multivariate analysis of parity progression indicates much lower parity progression ratios among women who have not experienced any child deaths than among women who have experienced one or more child deaths Parity progression ratios are also much lower among women who have one living son than among women who have no living son and much lower still among women who have two or more living sons Controls for urban/rural residence and education have hardly any effect on these results

Parity progression ratios tend to be higher among rural women than among urban women, but this difference virtually disappears when education is controlled On the other hand differentials by education persist when residence is controlled, indicating that urban women have lower fertility largely because they are more educated Differentials in parity progression ratios by husband's education largely disappear when residence and wife's education are controlled, indicating that wife's education is a considerably more important determinant of fertility than husband's education Differentials in parity progression by religion tend to be large and mostly unaffected by controls for residence and education, indicating that religion is an important determinant of fertility independent of urbanization and education levels On the other hand, parity progression ratio differentials by caste/tribe, which tend to be small to begin with, are reduced further by controls for residence and education

Parity progression ratios tend to be considerably lower among women who are regularly exposed to the electronic mass media than among women who are not so exposed, and this effect is reduced only partly by controls for residence and education Parity progression ratios also tend to be considerably lower among women who have recently been exposed to family planning messages on radio or television than among women who have not been so exposed Again, this effect is reduced only in part by controls for residence and education, indicating that the government's efforts to spread family planning through the electronic mass media are having some effect A causal interpretation of these results is justified only to the extent that recent exposure to electronic mass media, as measured by the NFHS is a good proxy for past exposure which could influence subsequent parity progression

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