Demography India
Vol24, No. 2 (1995), pp. 245-258

P.N.MariBhat*

On the Quality of Birth History Data Collected in National Family Health Survey, 1992-93**

Introduction

A FTER failing to participate in earlier world-wide efforts to collect comparative data on fertility, mortality and contraceptive use, India was finally persuaded to carry out a National Family Health Survey in 1992-93 with the financial assistance of USAID. As the survey was conducted with the guidance and active involvement of two other US agencies, the Micro International and East-West Centre, in design and content, it bears a close resemblance to the Demographic Health Surveys. With a sample size of about 90,000 ever married women designed to provide estimates for the rural and urban areas in 25 states, it is one of the largest demographic surveys ever undertaken. It also made a clean break from the past by making computerized data from the survey available to researchers within and outside the country at a nominal cost, overcoming the usual bureaucratic phobia about the possible missue and distortion of facts. Hence the collected data are likely to be utilized to a scale that was never previously been attempted on any Indian source.

Although the NFHS undoubtedly gained from the accumulated experience in conducting similar surveys in other developing countries, such received wisdom is not always sufficient to ensure high quality data in a country as vast and complex as India. Much depends on familiarity of the subject matter and capabilities of interviewers, supervisors and editors at the field-level and the quality of training imparted to them. Although Population Research Centres at various states were credited with assisting in field work and in writing the state-level reports, privately they were thought to be incapable of delivering the goods (as matter of fact the project was conceived by the USAID as a training activity to improve the research capabilities of the PRCs). So the actual field work was entrusted to the "Consulting Organisations" that had mushroomed at a short span of time, under the overall supervision

'Population Research Centre, Vidyagiri, Dharwad 580 004.
**This paper was.presented at the XIX Annual Conference of the Indian Association for the Study of Population, held at Baroda, February 26-28, 1996.

of the international Institute for Population Sciences, Bombay. Needless to say, the COs did not possess any long-term interest in demographic research and were clearly in the business to make profit, thanks to the Government of India's new-found zeal for privatisation. Under the circumstances, it is natural to suspect the quality of data collected in the NFHS.

One of the most important pieces of data that the survey had gathered information was on birth histories of women. While most previous studies in India confined themselves to asking a few simple questions on women's fertility such as total children ever-born, children surviving and births during a specified period before the survey, the NFHS, in the tradition of WFS and DHS, ventured to collect detailed reproductive histories of women. Such data collected in WFS and DHS have been extensively used in analysing levels and trends in fertility, birth intervals and child survival. But these analyses often make too heavy a demand on the retrospectively collected birth-history data from a largely illiterate society that does not have a custom of celebrating children's birth days. The possible omission of dead children and misreporting of event date in such data could lead to erroneous conclusions (see Potter 1977 and 1988). The object of this note is to investigate how far such errors were present in the data collected in the NFHS.

NFHS Birth History Data

Information on birth history in the NFHS was collected from all ever-married women in the age interval 13-49. Data were collected from usual residents as well as visitors who slept in the household in the night prior to the survey interview. Given the wide-spread practice of young women to visit the natal home for delivery and early post-natal care, inclusion of only usual residents present during the time of survey would have clearly resulted in a biased sample.

According to the procedure laid out in the *Interviewer's Manual* (International Institute for Population Sciences 1992), a birth history enquiry should begin with the listing of names of all children, dead or alive, in the chronological order, followed by a set of questions on the characteristics of each birth, starting with the first birth. Questions on month and year of birth, and child's age were to be asked separately and they were to be checked for internal consistency. To ensure complete coverage, there were also probing questions on children living away from parents, children who have died and their ages at death. While these safeguards seem impressive, the question is how often the instructions were actually followed in the field.

The All-India report of the survey asserts that in the birth history data, information on month of birth was missing only in less than 3 percent of the cases and virtually for all the births, year of birth was recorded (International Institute for Popu lation Sciences 1995). Even in the case of deceased children, information on date of birth was available for 92 percent of the cases. This is indeed a remarkable achievement. But in how many of the cases the supplied information, especially on the month of birth, could be deemed as accurate? Perhaps, one way to check this is to study the seasonality of births implied by the data, but the limited number of tables on data quality included in the survey report do not contain this information.

A factor that may have had some bearing on the reports of date of birth in the NFHS is the cut off period of4 years for births (January 1,1988 in the states where the survey was done in 1992 and January 1, 1989 in states where it was done in 1989) used for asking health questions on children. As this part of the questionnaire was quite lengthy, interviewers could have easily reduced their work load by 'aging' the children out of the eligible period. Although the writers of the national report were alert to this possibility, they dismiss too quickly the magnitude of age displacement this might have caused and its likely effect on the recent fertility estimates (p. 324). We have reasons to believe otherwise.

Date of Birth Misreporting

The misreporting of date of birth, or of age of the child is the most common type of error observed in the retrospective birth history data from developing countries. Older women who have to recall events that occurred long time ago, especially age reports on children who are not alive at the time of survey, are more susceptible to this kind of error. Unfortunately these errors tend to be systematic in nature rather than random. When the birth history enquiry begins with the first birth, the predominant tendency is to misplace the early births of older women to closer to the survey date, and the most recent births backward in time, resulting in concentration of births in the intermediate period of about 5-15 years from the survey date (Potter 1977; Goldman 1985). Thus the timing error results usually in overestimating fertility declines in the recent past.

There is strong evidence to suggest the presence of such' Potter effect' in the NFHS data. In Table 1, we have compared the age-specific fertility rates for all-India from the NFHS with estimates from the SRS for the corresponding dates. The NFHS reports present estimates of fertility from the birth history data by duration intervals 0-2,0-4,5-9,10-14 and 15-19 years preceding the survey. Approximately, these estimates refer to calender years 1990-92,1988-92,1983-87,1978-82, and 1973-77, respectively. As the data on birth histories were gathered only from women under age 50 at the time of survey, NFHS does not provide estimates for progressively more number of older age intervals as we go further back to the past.

It is evident from Table 1 that for the most recent periods (i.e., 0-2 and 0-4 years preceding the survey), the NFHS estimates of age specific fertility rates are substantially lower than the SRS estimates at older ages. However, for the age interval 15-19, the NFHS estimates are significantly higher. Although the overall total fertility rate forages 15-49 years is lower only by 8 to 9 percent in 1990-92 and 1988-92, fertility rates after age 30 are lower by as much as 30 percent. There is a clear indication that the level of underestimation increases with age.

Could it be that the SRS had been providing a grossly distorted age pattern of fertility in India whereas that indicated by the NFHS is more accurate? The all-India report of the NFHS contends that the lower fertility in the age interval 15-19 in the SRS could be because of its failure to get complete information on births to usual residents that occur outside the sample villages, but is silent on the discrepancies observed at older ages (p. 92). Even the explanation offered for the discrepancy at the age interval 15-19 is not all that convincing because there is a provision in the SRS to record events that occurred to usual residents outside the sample villages as well as to the visitors.

TABLE 1: ESTIMATES OF AGE-SPECIFIC AND TOTAL FERTILITY RATES DERIVED FROM THE NFHS AND 1981 CENSUS AND THEIR RATIOS TO SRS ESTIMATES FOR THE CORRESPONDING PERIODS

Age interval	*NFHS estimates for*					*Census estimates, 1980-81**	*Percent fall in fertility,! 978-82 to 1988-92, NFHS*
	1990-92	1988-92	1983-87	1978-82	1973-77		
1. Age-specific fertility rates							
15-19	116	121	162	172	166	69	30
20-24	231	234	289	292	288	195	20
25-29	170	172	220	241	250	182	29
30-34	97	97	131	159	[195]	132	39
35-39	44	43	69	[103]	—	84	[58]
40-44	15	15	[33]		—	43	—
45-49	5	[6]			—	17	—
TFR 15-49	3.39	3.44	_	_	_	3.61	_
TFR 15-30	2.59	2.64	3.36	3.53	3.52	2.23	25
TFR 30-49	0.81	0.81	—	—	—	1.38	—
	2. Ratios to corresponding SRS estimates						
15-19	1.49	1.50	1.83	1.90	1.82	0.78	2.78
20-24	0.98	0.97	1.13	1.19	1.17	0.79	7.87
25-29	0.88	0.87	0.99	1.04	1.03	0.79	2.02
30-34	0.83	0.80	0.88	0.96	[1.07]	0.80	1.49
35-39	0.65	0.61	0.80	[1.04]		0.84	[2.01]
40-44	0.48	0.46	[0.79]			0.98	—
45-49	0.42	[0.50]				0.85	—
TFR 15-49	0.92	0.91	_	_	_	0.81	_
TFR 15-30	1.02	1.02	1.18	1.24	1.21	0.79	2.95
TFR 30-49	0.71	0.68	—	—	—	0.84	—

[ ] Truncated, censored.

* Estimates for the year preceding the 1981 census adjusted for half-year displacement in ages of women.

Before passing adjusgement, it is worthwhile to examine whether the SRS rates show similar pattern of deviation when compared with estimates from other sources. Therefore in Table 1 we have also compared the SRS age-specific rates with those derived from the 1981 census data on births-last-year (India, Registrar General 1988). In all ages, the census estimates are lower by about 20 percent than the SRS estimates for 1980-81. In other words, though the 1981 census did undercount the births that occurred in the year preceding the census, the age pattern of fertility it had indicated was very similar to that of the SRS. If at all there was a deviation, the census estimates were relatively higher at older age groups, a pattern of deviation not all consistent with the NFHS. In the age interval 15-19 years too, the census based rate does not show a systematic deviation from the SRS figure, which calls into question the contention that a significant proportion of births to visiting usual residents are missed by the SRS.

This raises the suspicion that something is seriously wrong with the NFHS estimates. Interestingly, Table 1 reveals that for the periods greater than 5 years before the survey, the estimated fertility rates from the NFHS for younger ages are significantly higher than the corresponding SRS estimates. On an average, cumulated fertility rates up to age 30 implied by the NFHS are higher by 20 percent for the periods before 1988. Consequently, NFHS rates imply very large reductions in fertility in younger age intervals in recent years. For example, in the ten-year period between 1978-82 and 1988-92, the NFHS estimates imply that fertility rates at ages under 30 have fallen by an average of 25 percent whereas the SRS had indicated a decline of only 9 percent. Thus the NFHS evidence calls for a reinterpretation of Indian demographic trends.

TABLE 2: COMPARISON OF CUMULATED AGE-SPECIFIC FERTILITY RATES FROM NFHS AND SRS FOR MAJOR STATES OF INDIA, 1978-82 AND 1988-92

States	*National Family Health Survey*			*Ratio to SRS estimates*			*% decline in TFR 15-29 from 1978-82 to 1988-92*	
	1988-92		1978-82*	1988-92		1978-82*		
	TFR 15-49	TFR 30-49	TFR 15-29	TFR 15-49	TFR 30-49	TFR 15-29	NFHS	SRS
India Total	3.44	0.81	3.53	0.91	0.68	1.24	25	9
Rural	3.73	0.92	3.74	0.91	0.69	1.25	25	8
Urban	2.74	0.55	3.03	0.98	0.75	1.32	28	10
Andhra Pradesh	2:64	0.35	3.05	0.87	0.57	1.09	25	13
Assam	3.66	1.04	3.98	1.05	0.82	1.53	34	14
Bihar	4.14	1.20	4.24	0.85	0.61	1.34	31	9
Gujarat	2.96	0.52	3.39	0.89	0.60	1.09	28	20
Haryana	4.07	0.78	3.91	1.01	0.76	1.23	16	6
Karnataka	2.95	0.53	3.47	0.92	0.69	1.49	30	-4
Kerala	2.04	0.39	2.50	1.08	1.05	1.24	34	25
Madhya Pradesh	3.85	0.91	3.89	0.83	0.67	1.13	24	5
Maharashtra	2.94	0.40	3.39	0.92	0.63	1.29	25	2
Orissa	3.02	0.67	3.36	0.87	0.68	1.19	30	12
Punjab	2.88	0.45	3.37	0.89	0.56	1.37	28	2
Rajasthan	3.49	0.87	3.88	0.76	0.57	1.23	32	3
Tamil Nadu	2.52	0.40	2.80	1.07	0.90	1.16	24	20
Uttar Pradesh	4.89	1.60	4.09	0.94	0.74	1.26	20	6
West Bengal	2.99	0.58	3.08	0.92	0.60	1.20	22	10

* For Bihar and West Bengal SRS estimates are not available for 1977-82. Hence in their case, estimates for 1983-87 have been used for the comparison.

But there is likely to be an association between the underestimation of fertility at older ages in the recent years and its overestimation at younger ages in earlier periods, as they were derived from the reported experience of the same cohort of women. For example, for the cohort of women aged 35-39 at the time of NFHS, the estimates of fertility for 0-4, 5-9,10-14,15-19 years before the survey are 61, 88,104 and 117 percent of the SRS estimates for the corresponding periods. The pattern of distortion in the survey data is consistent with the hypothesis that older women have a tendency to misplace their most recent births backward in time resulting in overestimation of fertility in periods approximately 5-15 years before the survey. The age cut-off point of last 4 years used for asking health questions on children may have accentuated this normal tendency. However, the figures presented in Table 1 do not indicate that women tended to report their very early births to a more recent date as ferti 1 ity rates from the NFHS are uniformly higher than the SRS rates in the period 5-20 before the survey date. This may be because the SRS rates for the 1970s were indeed underestimates (i..e. for 10-20 years before the survey), though not to the extent suggested by the NFHS figures (see Bhat 1995).

Did this bias present uniformly in all the states? This aspect is examined in Table 2 where the NFHS total fertility rates have been compared with the SRS figures for 15 major states, and for rural and urban areas of All-India. *We* have, however, selected on *ly* two periods, 1988-91 (i.e., 0-4 years before the survey) and 1978-82 (i.e., 10-14 years before the survey) for this comparison. The underestimation of fertility in 0-4 years before the survey at ages 30 and over seems to have occurred in both rural and urban areas but the downward bias was lower in the latter (25 percent) than in the former (31 percent). This is natural because, being more literate, urban women would have reported their children's dates of birth more accurately. But, according to our hypothesis, underestimation in the more recent period would be compensated by overestimation of fertility at younger ages in earlier times. Table 2, however shows that the excess fertility at ages 15-29 years in 1978-82 was relatively more in urban areas than in rural areas. This could be explained as arising from greater level of underestimation of fertility in urban areas than in rural areas before the switching of SRS sampling units to the 1981 census frame (see Bhat 1995).

At the state-level, large deficits of fertility at ages 30 and over in the period 0-4 years before the survey are found in all the states except Kerala and Tamil Nadu. These are again two states that rank high on female literacy. Although Assam too shows relatively moderate deficit in ages 30 and over, it shows a large excess of fertility in ages 15-29 years for the period 10-14 years before the survey. Surprisingly, at the state-level, the deficit of fertility at ages 30 and over for the period 0-4 years before the survey is not strongly related with the excess of fertility at ages 15-29 for the period 10-14 years before the survey (correlation being only 0-12). This may be because (i) the SRS was genuinely underestimating fertility rates in 1970s in some states (e.g., Assam, Karnataka, Rajasthan), and (ii) in some states deficit of fertility in 0-4 years before the survey resulted perhaps only in its overestimation at 5-9 years before the survey. At any rate, the NFHS rates imply that fertility rates in younger ages have declined by 20 to 30 percent in the ten-year period between 1978-82 and 1988-92 in almost all the

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states. The NFHS rates show no significant difference between the northern and southern states in the patterns of decline and are poorly related to the geographical patterns of change indicated by the SRS (correlation is 0.20).

Coverage of Live Births

Another error that typically plague the data on fertility from developing countries is the ommission of children, especially those not alive at the time of the survey. The attempt to collect complete birth histories of women, such as the one made in the NFHS, should reduce the susceptibility of the data to this kind of error. Nonetheless, it is worthwhile to check how free the NFHS data are from such errors. One way to do this to compare the NFHS estimates of average parities with those from other sources. This has been done in Table 3 for all-India.

TABLE 3. AVERAGE NUMBER OF CHILDREN EVER-BORN TO WOMEN BY AGE FROM VARIOUS NATIONAL SURVEYS, ALL-INDIA, 1970 TO 1993

Age interval	ORG survey 1970	SRS Survey 1972	SRS survey 1979	ORG survey 1980	/98/ census		ORG Survey 1988	NFHS 1992-93
					Unadjusted	*Adjusted**		
15-19	0.22	0.17	0.12	0.14	0.21	0.18	0.23	0.24
20-24	1.36	1.21	1.00	1.15	1.24	1.16	1.40	1.34
25-29	2.89	2.65	2.43	2.52	2.52	2.46	2.74	2.66
30-34	4.09	3.79	3.63	3.64	3.56	3.54	3.63	3.62
35-39	4.82	4.60	4.48	4.45	4.37	4.40	4.30	4.18
40-44	5.50	5.06	4.89		4.83	4.89	4.92	4.65
45-49	—	5.07	5.01	5.15	5.13	5.24	—	5.07

* Adjusted for parity-not-stated women using El-Badry technique, and for under-c«i>on«vfc of female chidlren, assuming a sex-ratio at birth of 106.

Sources: Qpexrtions Research Group (1971, 1983, 1990);
India, Registrar General (1976, 1980, 1988);
International Institute for Population Sciences (1995).

It is clear from Table 3 that at younger ages, the NFHS average parities are generally the highest ever-recorded for the respective intervals, whereas at older ages they tend to be the lowest ever-recorded. The NFHS being the most recent survey, low values at older ages are to be expected because of the secular fall in fertility. It is the high values at younger intervals that puzzle us. They clearly rule out the large reductions in fertility the NFHS birth history data had recorded at younger intervals. It is possible to argue that because only the NFHS had enquired about birth histories of women, its coverage of children was better than any previous survey. But the world-wide experience is that relatively simple questions on the number of children surviving and the number who are dead could give reasonably accurate information on average parities among younger women. Further, as our adjustment for the

1981 census data show, some of the earlier estimates of average parities at younger ages would have to be adjusted *downward as* they were probably not corrected for the excess of zero parity women among those for whom parity information was not recorded.

A rigours way to check the consistency of NFHS average parities with those from earlier surveys is to project the latter to the NFHS survey date using the SRS estimate of age-specific fertility rates for the inter-survey period. This is done in Table 4 where we have compared the NFHS parities with those projected from the average parities recorded in the ORG and SRS surveys and the 1981 census, when the women were younger. In order to take care of the problems of non-linearities in the age curve of fertility, and survey intervals that were not in multiples of five, projection was done in single-year of age and time interval by interpolating the initial average parities and annual age-specific fertility rate from the SRS using the Brass relational-Gompertz model (United Nations 1983). In doing so it was ensured that the recorded values for the five-year age intervals remained unaltered.

TABLE 4: TESTING THE CONSISTENCY OF CHANGES IN AVERAGE PARITIES BETWEEN EARLIER SURVEYS AND NFHS 1992-93 WITH SRS AGE-SPECIFIC FERTILITY RATES IN INTER-SURVEY PERIOD

Age interval	Observed average parities, NFHS 1992-93	Expected average parities in 1 992-93 with SRS age-specific fertility rates and initial parities as per				Ratio of observed to expected parities, 1992-93			
		ORG survey 1970	SRS survey 1972	1981 census (adjusted)	ORG survey 1988	ORG survey 1970	SRS survey 1972	1981 census (adjusted)	ORG survey 1988
15-19	0.24	0.15	0.15	0.15	0.16	.64	1.64	1.64	1.50
20-24	1.34	1.00	1.00	1.00	1.12	.34	1.34	1.34	1.20
25-29	2.66	2.19	2.19	2.20	2.55	.21	1.21	1.21	1.04
30-34	3.62	3.06	3.06	3.13	3.55	.18	1.18	1.16	1.02
35-39	4.18	3.75	3.70	3.84	4.14	.11	1.13	1.09	1.01
40-44	4.65	4.33	4.32	4.35	4.63	.07	1.08	1.07	1.00
45-49	5.07	4.91	4.80	4.75	5.05	.03	1.06	1.07	1.00

Source: Same as Table 3.

The comparison of projected average parities with the observed values in 1992-93 show that average parities reported by women aged 40 and over in the NFHS are consistent with the average parities reported in earlier surveys when they were younger and subsequent fertility recorded by the SRS. In fact, when the projections are based upon the average parities reported in the surveys conducted in the 1970s (ORG survey of 1970, SRS survey of 1972 and also 1981 census), the expected parities of women aged 40 years and over in 1992-93 tend to be somewhat lower (by about 7 percent) than those recorded by the NFHS. This is probably because these projections employed SRS rates for the 1970s which are suspected to be underestimates.

At ages under 25 years, projected average parities are substantially lower (25 to 60 percent) than the corresponding NFHS estimates. For these cohorts the projected parities are exclusively based upon SRS fertility rates for recent periods as they were too young to have children at the time of earlier surveys. While this evidence is consistent with ear Her observed discrepancy between the NFHS and SRS fertility at ages 15-19, the difference is too large to be attributed to the underestimation fertility in the SRS. Our guess is that this discrepancy arise out of differences in age misreporting of women in the NFHS vis-a-vis that of the SRS. We shall differ the discussion on this to a later stage.

Our discovery that reporting of children-ever-born to older women in the NFHS was very nearly complete suggests an alternative way to assess fertility trends from the NFHS data. The completed family size reported by women at the fag-end of the reproductive span in the NFHS (i.e., cohort fertility) could be located to an approximate time period in past, and it may then be compared with the estimate of TFR for the most recent period, from ejther the survey or the SRS, to assess the trends in fertility. This is done in Table 5 by using the average parities of women aged 40-49 at the time of NFHS. If we assign all the births of this cohort to their mean age of childbearing (approximately 27-28 years), they would be reflecting the level of TFR around 1975-76. This is borne out by the fact that at the All-India level, the average parity reported by women aged 40-49 (4.8) is very close to the estimate of TFR derived from the 1981 census for the mid 1970s. Rele(1987), using the child-woman ratios, had estimated the average TFR to be 5.0 for 1971-80. By reverse-surviving the population 0-6 years of the 1981 census we have estimated the level TFR for 1974-80 as 4.9 (Bhat 1995). In comparison, if the NFHS cohort fertility estimate seems somewhat lower, it could be attributed to the fact that it is an approximation to the level of TFR up to the age 45, rather than upto age 50.

At the state level too, there is a strong agreement between the NFHS estimates of completed family size and estimates of TFR derived for the 1970s from the 1981 census. The overall correlation between the NFHS average parities and state-level estimates of TFR derived by Rele for 1971-80 is as high as 0.90. The correlation of the former with reverse-survival estimates for 1974-80 is also quite satisfactory (0.89). Only in Rajasthan the NFHS cohort fertility estimate seems to significantly understate the level of total fertility that prevailed in the mid 1970s. In mis state, current estimates of TFR from the survey (i.e., for 1990-92) also differs significantly from the SRS estimate. Thus the NFHS data from Rajasthan seem to suffer from ommission of children as well as displacement of date of birth.

By comparing the average parities of women aged 40-49 with the Survey estimate of TFR for 1990-92 we obtain alternate estimates of fertility reduction, roughly during the period 1976-91. These may be compared with the fertility reductions implied by Rele's estimates for the middle of 1970s and the SRS estimates for 1990-92. At the All-India level, the cohort and current estimates of fertility from the NFHS suggest a reduction of 30 percent in TFR in the 15-year period, 1976-91. This compares favourably with the reduction of 27 percent suggested by the combination of Rele's estimate for the mid 1970s and the SRS rate for 1990-92. At the state-level too, there is good correspondence since the two sets of estimates of fertility reduction show a correlation of 0.86 (see Table 5). Both sets of estimates

TABLE 5: COMPARISONS OF ESTIMATES OF COMPLETED FAMILY SIZE FROM THE NFHS WITH ESTIMATES OF TOTAL FERTILITY RATES FOR THE 1970s AND IMPLIED FALL IN FERTILITY FROM MID 1970s TO EARLY 1990s

Major states	Average parities of women aged40-49 NFHS, 1992-93	Total fertility rate, 15-49		Percent fall in TFR, 1976-91	
		Rele's estimates from 1981 census for 1971-81*	Reverse-survival estimates from 1981 census for 1974-80	With NFHS estimates of CEBfor40-49 and TFR, 15-44 for 1990-92	With Rele's estimates fore. 1976and SRS estimates for 1990-92
	(/)	*(2)*	*(3)*	*(4)*	*(5)*
India Total	4.8	5.0	4.9	30	27
Rural	5.1	5.3	5.2	29	24
Urban	4.2	4.2	4.0	36	35
Andhra Pradesh	4.1	4.8	4.3	36	39
Assam	5.7	—	—	39	—
Bihar	5.2	5.9	5.3	24	21
Gujarat	4.4	4.7	4.3	33	31
Haryana	5.2	5.6	5.1	24	31
Karnataka	4.7	4.8	4.3	39	36
Kerala	3.7	3.5	2.9	45	48
Madhya Pradesh	5.2	5.5	5.5	26	17
Maharashtra	4.3	4.5	4.1	33	32
Orissa	4.9	5.1	4.5	40	34
Punjab	4.2	4.5	4.2	31	30
Rajas than	5.0	5.9	6.0	28	23
Uttar Pradesh	6.0	6.0	6.3	20	14
West Bengal	4.7	4.7	4.0	39	33
Correlation coefficient (r)	0.901	0.964	0.893	0.885	
Columns	(1 & 2)	(2 & 3)	(1 & 3)	(4 & 5)	

NA - Not available.
• Averge of his estimates for 1971-76 and 1976-81.
Sources: International Institute for Population Sciences (1995), Rele (1987) and Bhat (1995).

TABLE 5: COMPARISONS OF ESTIMATES OF COMPLETED FAMILY SIZE FROM THE NFHS WITH ESTIMATES OF TOTAL FERTILITY RATES FOR THE 1970s AND IMPLIED FALL IN FERTILITY FROM MID 1970s TO EARLY 1990s

Major states	*Average parities ofwomen aged40-49 NFHS, 1992-93*	*TotalfertUityrate, 15-49*		*PercentfallinTFR, 1976-91*	
		*Rele's estimates from 1981 censusfor 1971-81**	*Reverse-survival estimates from 1981 censusfor 1974-80*	*With NFHS estimates of CEBfor40-49 andTFR, 15-44 for 1990-92*	*With Rele's estimates fore. 1976and SRS estimates forl990-92*
	(I)	*(2)*	*(3)*	*(4)*	*(5)*
India					
Total	4.8	5.0	4.9	30	27
Rural	5.1	5.3	5.2	29	24
Urban	4.2	4.2	4.0	36	35
Andhra Pradesh	4.1	4.8	4.3	36	39
Assam	5.7	—	—	39	—
Bihar	5.2	5.9	5.3	24	21
Gujarat	4.4	4.7	4.3	33	31
Haryana	5.2	5.6	5.1	24	31
Karnataka	4.7	4.8	4.3	39	36
Kerala	3.7	3.5	2.9	45	48
Madhya Pradesh	5.2	5.5	5.5	26	17
Maharashtra	4.3	4.5	4.1	33	32
Orissa	4.9	5.1	4.5	40	34
Punjab	4.2	4.5	4.2	31	30
Rajas than	5.0	5.9	6.0	28	23
Tamil Nadu	4.2	3.8	3.5	41	41
Uttar Pradesh	6.0	6.0	6.3	20	14
West Bengal	4.7	4.7	4.0	39	33
Correlation coefficient (r)	0.901	0.964	0.893	0.885	
Columns	(1 & 2)	(2 & 3)	(1 & 3)	(4 & 5)	

NA - Not available.
• Averge of his estimates for 1971-76 and 1976-81.
Sources: International Institute for Population Sciences (1995), Rele (1987) and Bhat (1995).

suggest that south India had experienced much rapid fertility declines during 1976-91 (40 percent) than north India (20-25 percent). They also indicate that fertility decline during this period was slightly faster in urban areas than in rural areas.

Misreporting of Mother's Age

The age-wise comparison of NFHS estimates with other sources carry an implicit assumption that age misreporting patterns in different sources are similar. There are, however, reasons to suspect that age misreporting patterns in the NFHS were quite different from the SRS. In most fertility surveys there is a tendency to move women out of the eligible age range (13 to 49 years in the NFHS) to reduce the workload of the interviewers. But in the NFHS there is a irregular dip in the age interval 50-54, which the survey takers attribute to overcompensation that resulted from the warnings issued to enumerators against such a practice (p. 39). However, a careful examination of the NFHS age data suggests the presence of continuous underreporting of age in the age range 10-45 that resulted perhaps from a tendency of transferring women out of the lower-end of the eligibility range. To demonstrate this, in Table 6 we have compared the proportions of female population reported above each age in the NFHS and the SRS. In reproductive ages, the proportion of female population reported above any age is consistently smaller in the NFHS than the SRS. This pattern is observed irrespective of whether the comparison is based upon the *de facto* or *de jure* population of the NFHS. The deficit of females at higher ages in the NFHS indicates that there was a net downward transfer of females across the age in the survey. The estimates of net downward transfer of females can be converted into approx imate estimates of net understatement of age on the basis of population density around the age, as follows:

$$A_x = \frac{C_x - C_x}{10^C x - 5} \times 10$$

where C_x is the population above age x in the NFHS, C_x is the population above age x in the SRS, $10^C x - 5$ is the population in ages $x - 5$ to in $x + 5$ in the SRS. Essentially, the estimated value is a measure of how much the age scale of the SRS ought to be shifted in order to equalize the cumulative populations at a given age in the two sources.

The average age difference so estimated show that in the reproductive ages, the NFHS women at a given age are older by about a year than the SRS women reported at that age. Because, the NFHS women are older, they have higher parities than the SRS women at the same reported age. Although the estimated age difference may seem small, it could still be critical at younger ages because of the steepness of the fertility function at these ages. Our computations based upon single-year age-specific fertility rates show that a one-year age difference can cause an excess of 70 percent in average parities at ages 15-19 and 25 percent difference in 20-24 years. Similarly, if the NFHS fertility rate forages 15-19 years actually refers to ages 16-20, it could easily explain a 50 percentrise in fertility. There would, however, be hardly any difference in fertility rates of the age intervals 20-24 and 21-25 years.

TABLE 6: COMPARISON OF CUMULATED AGE DISTRIBUTION OF FEMALE POPULATION FROM THE NFHS WITH THE SRS, ALL INDIA

Age x	*Percentage of female population in ages x and above*			*Difference from the SRS age distribution*		*Implicit average difference in reported ages**	
	NFHS, 1992-93		*SRS*	*NFHS*	*NFHS*	*NFHS*	*NFHS*
	dejure	*defacto*	*1992*	*dejure*	*defacto*	*dejure*	*defacto*
0	100.0	100.0	100.0	0.0	0.0	—	—
5	87.7	87.7	87.0	0.7	0.7	0.28	0.28
10	74.5	74.5	75.2	-0.7	-0.7	-0.31	-0.31
15	62.6	62.6	64.2	-1.6	-1.6	-0.75	-0.75
20	52.6	51.9	54.0	-1.4	-2.1	-0.70	-1.04
25	43.1	42.1	44.1	-1.0	-2.0	-0.56	-1.11
30	34.7	34.0	36.0	-1.3	-2.0	-0.86	-1.32
35	28.0	27.4	28.9	-0.9	-1.5	-0.68	-1.14
40	22.2	21.8	22.8	-0.6	-1.0	-0.54	-0.90
45	17.8	17.4	17.8	0.0	-0.4	0.00	-0.42
50	13.9	13.8	13.3	0.6	0.5	0.73	0.61
55	.11.0	10.9	9.6	1.4	1.3	2.06	1.91
60	7.5	7.5	6.5	1.0	1.0	1.85	1.85
65	4.5	4.5	4.2	0.3	0.3	0.71	0.71
70	2.7	2.7	2.3	0.4	0.4	0.95	0.95

* Positive value shows the amount of age exaggeration in NFHS relative to that in SRS; negative value shows the amount age underreporting (in years).

It is to be granted that the above calculations cannot unequivocally show which source is in error. But it is to noted that the SRS rates are based on a longitudinal design and as such ages reported at younger ages are not contingent upon woman's marital status or the number of children ever-born to her. There is more scope for the age reporting to be influenced by such considerations in a one-shot survey such as the NFHS. Therefore, we are inclined to rule in favour of the SRS in this case.

Conclusions

The comparison of age-specific fertility rates from the Sample Registration System with those derived from the NFHS birth history data suggests that older respondents in the survey tended to misplace their most recent births backward in time resulting in exaggeration of fertility declines in the recent period. This is evident from the fact that for 1988-92, the NFHS

fertility rates (i.e., for 0-4 years before the survey date) are lower from the corresponding SRS rates by as much as 30 percent in ages 30 and over whereas the survey rates for under age 30 derived from the responses of the same cohorts of women for the periods before 1988 (i.e., for 5 or more years before survey) are 20-25 percent higher than the SRS rates, consequently, for the 10-year period between 1978-82 and 1988-92, the NFHS estimates imply an average decline of 25 percent in fertility rates at ages under 30 while the SRS had shown only a reduction of 9 percent in these ages for the same period. As there is no evidence to support a large fall in fertility in younger ages in recent years, we suspect this to have occurred from the backward displacement of births of older women in the NFHS. While such a 'Potter-effect' is seen in many survey data from development countries, it could have been accentuated in the NFHS owing to the decision to ask health questions to children under 4 years of age. A disaggregated analysis suggests that th is bias was present in al 1 the major states, except Kerala and Tamil Nadu.

However, various checks show that the NFHS data on the total number of children ever born to women appear to be nearly complete, except in Rajasthan. As such, comparison of estimates of average parities of older women from the survey with estimates of current fertility appear to provide more plausible levels of fertility declines in most states. Some of the discrepancies at younger ages could be explained from the differences between the NFHS and the SRS in age misreporting patterns among women. In particular, it is suggested that there is about one-year difference in the reported ages of women in the SRS and the NFHS, which affects the comparison of estimates of fertility and average parities at younger ages.

A resurvey now being contemplated may help further in clarifying some of contradictions regarding fertility trends in India. In the second round of NFHS, a suggestion of Potter (1977) to begin the birth history enquiry from themost recent birth may be worth considering, especially, for comparative purposes, in half the sample. But even a resurvey is unlikely to improve the quality of data on birth intervals. For obtaining a more accurate description of demographic changes in the country, and for understanding their determinants, in our opinion it is essential to establish a system for collection of demographic and related data through a prospective (panel) design in selected areas of the country. While such a need is often recognised, it has seldom been given a serious consideration because of the belief that it is costly to maintain, arduous to analyze and calls for long-term commitment. While these are legitimate bottlenecks, they are not difficult to overcome. For example, continuous maintenance of population and related data through periodic visits to a selected villages could be made a permanent activity of Population Research Centres in the country. As long as the study area is kept within manageable limits (5-6 villages for each PAR), there is no reason why it would prove costly. Only what is need is the bureaucratic will to implement should no more be a difficult task. In this computer age, maintenance and analysis of panel data such a scheme. Unfortunately, the easy availability of survey data, and ready international assistance for undertaking more such surveys, come in the way of development of a permanent, and more reliable system.

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