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Gender Differentials in Adult Mortality in India - With Notes on Rural-Urban Contrasts

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Abstract

This paper is a preliminary exploration of the trends and spatial variation in gender differentials in adult mortality in India, as also of the related rural-urban differentials. We pay particular attention to female mortality in the two prime reproductive age groups 15-29 and 30-44. The data for the study are taken from the Sample Registration System, available on an annual basis since 1970.

Gender differentials, as well as rural-urban differentials, have narrowed down considerably over the period from 1970, but both types of differences persist still. On the whole, the rural-urban differences over this period seem to be much larger than the gender differentials so that rural females still suffer from the double disadvantage of being female and belonging to rural areas.

Of the correlates we considered, all the three, viz., total fertility rate, safe motherhood indices and health care supply are strongly correlated with female mortality especially in the 15-29 age group. What is significant is that these variables are highly correlated within themselves. For instance, in states like Kerala and Punjab where health care provision is good, the variables relating to safe motherhood are also satisfactorily high and fertility levels correspondingly low. In contrast, in states like Bihar and Uttar Pradesh all these indicators are poor. Surprisingly, a poor correlation is observed between male mortality and health supply indices.

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1. Introduction

The sex ratio in the Indian population fell steadily from 972 (females per 1000 males) in 1901 to 930 in 1971. As the population grew in numbers – at fairly high rates since Independence – female deficits were increasing both in absolute and relative terms, over close to three-quarters of the twentieth century. After 1971, the sex ratio has been fluctuating within narrow limits. It improved marginally to 934 in 1981, only to fall to the all-time low of 927 in 1991. But it rose slightly, once again, to 933 in 2001.

The decline in the sex ratio that characterised the greater part of the 20th century attracted much attention and professional research. The consensus among demographers is that the deficits are the result of higher female death rates up to the age of 45 or so; and that discrimination against girls and neglect of women are responsible for the higher rates [Visaria (1971), Mitra (1979)]. The fluctuations in the sex ratio after 1971 have likewise attracted much scrutiny, but the related studies have been concerned mainly with sex ratios among children, which indeed have steadily worsened. It has been suggested that the sex ratio at birth is getting more masculine, altered by the increasing practice of female foeticide [Sudha and Rajan (1999)]. Even as the debate continues on the magnitudes of female foeticide and infanticide, it is necessary to note that the marginal improvements in the sex ratio recorded towards the end of the last century are the outcome of a narrowing gap in gender differentials in adult mortality. Trends and variations in this gap constitute the theme of this paper.

2. Trends and Spatial Variations

Estimates of age-specific death rates based on the Sample Registration System (SRS) are being published from the 1970s. They are of course subject to sampling errors which, designed to be small at the all-India and State levels, can be large at lower levels of aggregation such as for a given age group, and more so in reference to the rural or the urban part of a particular state. However, the quality of data under the system has been improving and demographers recognise the data as a useful means for making broad comparisons over space and time. Fuller discussions

of the SRS data, especially on their reliability for analysis appear in Dyson (1988) and Mari Bhat and Navaneetham (1991).

This paper is concerned with adult mortality. Accordingly, estimates are derived for the two prime adult age groups (15-29) and (30-44), which for women cover practically the whole reproductive period. Thus the corresponding five-year age intervals in SRS data are collapsed here into fifteen-year groups, using appropriate population weights. Further, instead of the annual death rates as they are given, three-year moving averages are computed. For example, the data for 1981 presented below refer to the averages of the SRS estimates for 1980, 1981 and 1982. Both these procedures, collapsing age intervals and taking three-year averages, reduce sampling errors and make the data more reliable for statistical analysis.

Table 1: Age-Specific Mortality Rates – All-India

Age Group/ Year	Urban Male	Urban Female	Rural Male	Rural Female
Age Group (15-29)				
1971	1.73	2.65	3.10	4.62
1981	1.61	2.06	2.40	3.75
1991	1.74	1.89	2.40	3.21
1997	1.64	1.73	2.14	2.71
% Decline 1971-97	5.21	34.72	30.97	41.35
Age Group (30-44)				
1971	4.42	4.29	5.92	6.35
1981	3.94	3.00	5.04	4.74
1991	3.46	2.43	4.41	3.89
1997	3.54	2.16	4.43	3.47
% Decline 1971-97	19.81	49.65	25.17	45.35

Note: The data are three-year averages. Thus the 1971 figures represent the average for the years 1970, 1971 and 1972; and so on.
Source: Sample Registration System, various issues.

Table 2: Mortality Differentials (Ratios)

Age Group/ Category	1971	1981	1991	1997
Age Group (15-29)				
Female/Male (Rural)	1.49	1.56	1.34	1.27
Female/Male (Urban)	1.53	1.28	1.04	1.05
Rural/Urban (Female)	1.74	1.82	1.70	1.57
Rural/Urban (Male)	1.79	1.49	1.38	1.30
Rural Female/Urban Male	2.67	2.33	1.84	1.65
Age Group (30-44)				
Female/Male (Rural)	1.07	0.94	0.88	0.78
Female/Male (Urban)	0.97	0.76	0.70	0.61
Rural/Urban (Female)	1.48	1.58	1.60	1.60
Rural/Urban (Male)	1.34	1.28	1.27	1.25
Rural Female/Urban Male	1.43	1.20	1.12	0.98

Note: Derived from Table 1.

Table 1 presents the SRS estimates of mortality rates for the age groups (15-29) and (30-44) for India as a whole. They are given separately for urban males, urban females, rural males and rural females; and for the years 1971, 1981, 1991 and 1997 (the latest one for which data are available). The contrasts in levels of mortality are sharp and easily seen. For the age group (15-29), death rates among urban males are the lowest and those among rural females the highest. This is not an unexpected finding. It signifies the double disadvantage rural women suffer from: being women and residing in rural areas. The first of these arises from gender discrimination in matters of nutrition and health care (especially in the case of pregnant women and nursing mothers) and the second from the fact that rural India is grossly neglected in the provision of health services.

However, for the same age group, i.e. (15-29), the death rates have declined (over the period 1971-97) impressively, more for women than for men, and more in rural regions than in urban ones. Death rates for urban males, the class with all the advantages, were already low in 1971, so they do not exhibit much change; for all other classes the declines have been quite prominent.

The story is somewhat different, even better in terms of narrowing differentials, for the (30-44) age group. It may be recalled that the mortality picture in India till the 1960s is characterised by higher death rates among females up to age 45 (or so); it is only beyond that age

that a 'normal' pattern of higher female life advantage asserted itself. Table 1 shows that the normal pattern has taken root from 1981, or perhaps a little earlier, for the (30-44) group, with lower female death rates both in rural and urban India. This means that the range over which the gender disadvantage in death holds grip has now narrowed down: earlier it was from childhood up to age 45 or so; now it perhaps does not extend beyond 30.

It should be noted that the gender gap and the rural-urban divide persist. Table 2 recasts the all-India data to exhibit this fact. Concentrating on the (15-29) age class, it can be seen that mortality rates for females are still (in 1997) 27 per cent higher than for males in rural areas. In urban areas, however, the gender ratio in mortality has reduced remarkably from 1.53 in 1971 to 1.05 in 1997. Table 2 tells us also that the rural-urban differences are far wider than gender differences. By far the sharpest contrast thus is the one between rural females and urban males. This double gap has also been narrowing, but still quite high: the 1997 death rates among rural women are 67 per cent higher than those for urban men.

That is how things stand in all-India terms. But the countrywide averages conceal much variation across regions. For example, Kerala, Punjab and Gujarat are far ahead of the laggards such as Bihar, Madhya Pradesh and Uttar Pradesh in the provision of health services. These stark differences are amply reflected in mortality variations across the 15 major states of the Indian Union. They are presented in the form of box-plots in Figures 1 and 2. The boxes in the figures mark the three quartiles, the median being the middle bar, that is the halfway mark with half of the cases each below and above. The height of the box is the inter-quartile range within which the middle half of the observations lie; this gives us a good idea about how spread out the death rates are about the median value. The box-plots clearly exhibit the contrast between urban males and rural females for the age group (15-29). Urban male death rates are not only among the lowest; they are also compactly spread across the states, unlike the widely scattered rural female death rates. Even in states with poorly developed health infrastructure, it is possible that urban males have the best access to medical facilities; this could explain the relative narrow variation in the corresponding mortality rates.

Figure1: Mortality Variation Across 15 Major States, Age Group (15-29)
(From left to right: Urban Males, Urban Females, Rural Males and Rural Females)

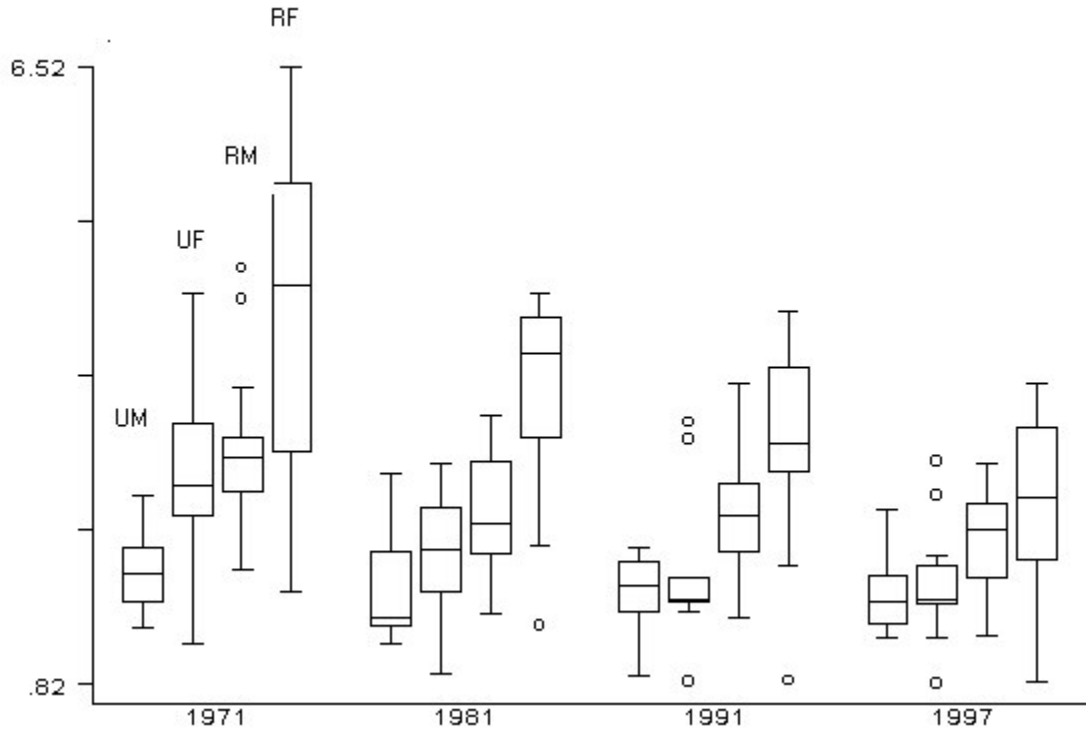
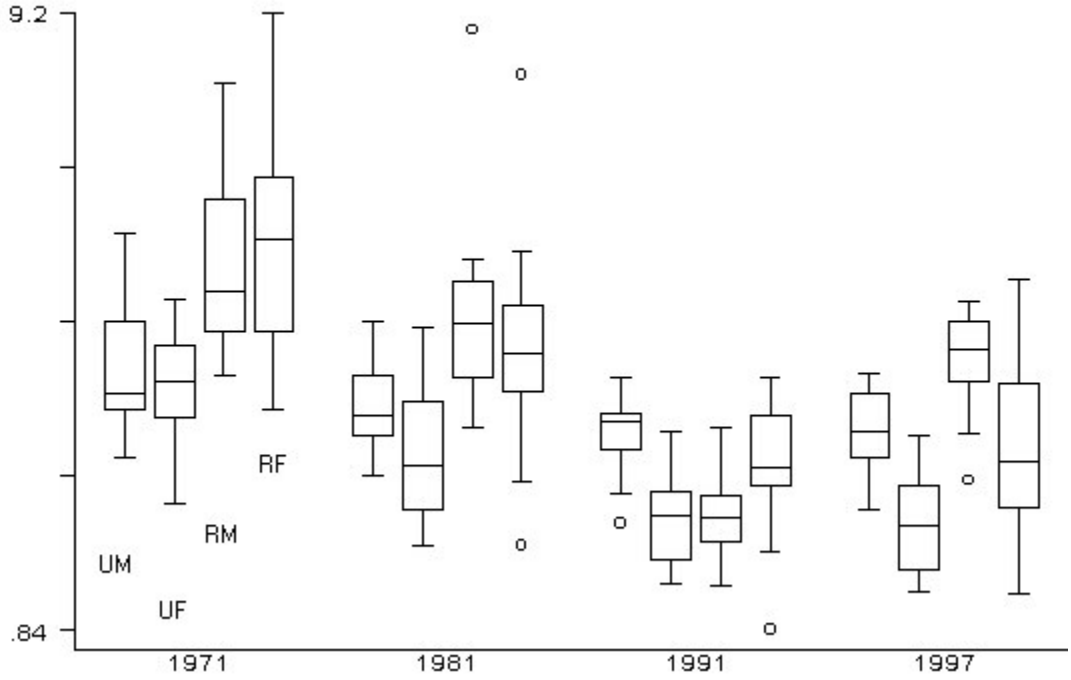


Figure2: Mortality Variation Across 15 Major States, Age Group (30-44)
(From left to right: Urban Males, Urban Females, Rural Males and Rural Females)



Analysis of Variance

How big are the magnitudes and relative importance of the gender and the rural-urban gaps? To answer the question, the other types of variation already noted, namely over time and space (states), have to be eliminated. In other words, the effects of the observed declining trends, and of state-specific factors, which lie behind much spatial variation, must be separated to see whether gender and location differences persist and if so in what proportions. This is done through an analysis of variance (ANOVA) of the death rates, with location (rural/urban), gender (female/male), year (1971, 1981,1991 and 1997) and states (15 major ones) as the four main factors in a simple linear model. There are 8 missing observations, data not being available for some states in given years. The ANOVA based on the 232 observations breaks up the total variance into the relevant components (Tables 3 and 4, respectively for the age groups 15-29 and 30-44). The variance that remains after the main factors are accounted for is regarded as 'residual', attributed to left over and random factors. For each of the main factors (listed under the first column as source of variation) the columns that follow refer to degrees of freedom (df), sum of squares (SS), mean square (MS) and the F statistic. The mean square measures the net variance attributable to each factor, after the elimination of the effects of other factors. The relative magnitudes of location and gender effects can be judged by the corresponding mean squares. For the age group (15-29), the rural/urban MS is 60.35, three times as large as the MS for female- male differences (20.04). In respect of the age group (30-44), the location MS is almost six times the gender mean square.

The ANOVA gives us a fair idea about the relative importance of the location and gender differentials in death rates. But it is customary in mortality analysis to exhibit such differences in terms of 'odds' ratios. If the probability of death for any given category of the population is P, the related odds of death are defined as P/(1-P). The odds of death for two different categories, such as for females and males, can then be compared through the ratio of the corresponding odds. To compute the odds ratios of interest here, a logit analysis (of variance) is carried out, logits defined as the natural logarithms of the odds. The underlying transformation is also necessary because working directly with probabilities in statistical analysis leads to inferential problems of a technical nature.

Table 3: Analysis of Variance of Mortality Rates (15-29)
(Across 15 Major States)

Source	df	SS	MS	F
Location (Rural / Urban)	1	60.35	60.35	185.62
Gender (Female / Male)	1	20.04	20.04	61.64
Years (1971,81,91,97)	3	28.97	9.66	29.70
States	14	48.80	3.49	10.72
Residual	212	68.93	0.33	
Total	231	227.09	0.98	

Table 4: Analysis of Variance of Mortality Rates (30-44)
(Across 15 Major States)

Source	df	SS	MS	F
Location (Rural / Urban)	1	113.18	113.17	203.03
Gender (Female / Male)	1	19.64	19.64	30.10
Years (1971,81,91,97)	3	81.40	27.13	49.88
States	14	86.72	6.19	11.39
Residual	212	115.33	0.54	
Total	231	416.27	1.83	

Table 5: Analysis of Variance of Mortality Logits
(Expressed in Regression Form)

Variables	Age (15-29)			Age (30-44)		
	Coeff.	t	Odds Ratio	Coeff.	t	Odds Ratio
Constant	-6.50	-107.83		-5.67	-102.61	
Location: Rural	0.42	15.26	1.52	0.36	14.32	1.43
(Urban dropped)						
Gender: Female	0.20	7.16	1.22	-0.19	-7.73	0.83
(Male dropped)						
Year 1971	0.37	9.23	1.45	0.34	9.31	1.40
1981	0.17	4.49	1.18	0.15	4.29	1.16
1991	0.10	2.60	1.10	-0.05	-1.40	0.95
(1997 dropped)						
States						
Assam	0.02	0.26	-	0.19	2.84	1.21
Bihar	0.07	0.87	-	0.01	0.09	-
Gujarat	-0.07	-1.02	-	0.04	0.58	-
Haryana	-0.16	-2.21	0.85	-0.22	-3.26	0.80
Karnataka	-0.16	-2.24	0.85	-0.06	-0.92	-
Kerala	-0.70	-9.45	0.49	-0.42	-6.22	0.66
Maharashtra	-0.17	-2.30	0.84	-0.12	-1.76	-
Madhya Pradesh	0.20	2.78	1.22	0.02	0.32	-
Orissa	0.06	0.76	-	0.11	1.61	-
Punjab	-0.19	-2.63	0.83	-0.21	-3.17	0.81
Rajasthan	-0.07	-0.96	-	-0.10	-1.51	-
Tamil Nadu	0.08	1.33	-	0.02	0.26	-
Uttar Pradesh	0.19	2.53	1.21	0.07	1.06	-
West Bengal	-0.17	-2.02	0.84	-0.23	-3.12	0.79
(Andhra Pradesh dropped)						
R squared	0.70			0.73		
No.of Obs	232			232		

Note: Odds ratios are computed only for variables for which the regression coefficients are significant (at 5 percent level).

The results of the logit analysis, involving only the categorical variables being discussed here thus far, for the two adult age groups, are in Table 5. For the age group (15-29) the rural-urban odds ratio turns out to be 1.52, while the female to male odds ratio is 1.22. For women in the (30-44) age category as well, the rural odds of death are over 40 per cent higher than the urban odds, but in their case the gender odds ratio (female-male) is less than unity – in conformity with the simple exhibitions of the data in Tables 1 and 2 which show the turn-around in gender differentials after 1971, and the emergence of a distinct female life advantage beyond age 30.

Table 5 presents also estimates of odds ratios for different states, obtained after the elimination of trends (changes over the years), as well as the rural-urban and gender variations. These refer to Andhra Pradesh (AP) as the base, that is, they tell us how odds of death in a given state compare with the odds in AP. Of course, the odds ratios could be computed with Kerala as the base, but in that case they would all be larger than unity and conceal fine differences. For example, Uttar Pradesh and Madhya Pradesh are far too distant from Kerala, a rank outlier in many senses: with an 'average performer' like AP as the base, comparisons can be in a broader relief, more informative. Table 5 suggests that for women in ages (15-29), the odds of death are significantly higher (than in AP) by over 20 per cent in Madhya Pradesh and Uttar Pradesh; in Haryana, Karnataka, Maharashtra, Punjab and West Bengal, they are about 15 per cent lower; in other states, namely, Assam, Bihar, Gujarat, Orissa, Rajasthan and Tamilnadu, they are on par with odds in Andhra Pradesh. The odds in Kerala, not unexpectedly, are only about half of what they are in AP. The results in the right half of Table 5 show that inter-state variation in the odds ratio is much narrower in the case of the (30-44) age group. It should be repeated that these estimates of odds ratios refer to probabilities of death obtained after the elimination of the location, gender and trend effects, which are large in both age classes.

3. Correlates

Apart from generally declining trends, both rural-urban and female-male differences thus contribute much to the observed variation in mortality rates. An additional inference from the foregoing analysis is that some inter-state variation remains even after accounting for the factors just mentioned. There are of course causes intrinsic to each type of variation and not all of them

are easily identifiable. For example, the relative underdevelopment of health care is at the heart of higher rural death rates; the culturally deep-rooted discrimination against women is responsible for higher rates of death among adult women in the reproductive age span. All this is true, but to go beyond the obvious, a detailed study of disease and death, and the underlying location and gender-specificities is needed. Such a study is not attempted here. However, some speculations about the changing patterns of disease and death may be noted. The relative stagnation of male adult mortality, documented here, is sometimes attributed to the rising incidence of cardio-vascular disease, diabetes and so on, said to result from changing life styles. While small-scale epidemiological studies and expert opinions suggest such possibilities, worthwhile data on a big scale are lacking. However, in the case of death rates among women some analysis is possible on the basis of readily available data.

Fertility:

Fertility reduction is often cited as an important reason behind the remarkable decline in female death rates noticed in this paper. A decrease in fertility rates reduces the time women spend in pregnancy and childbirth, and reduces thus the exposure to risks of maternal deaths. But the latter constitute only a small fraction of all deaths among adult women. Perhaps the release of women from childbearing and nursing leave them less prone to disease, for physiological and social reasons. As in the case of male adults, we have such areas of darkness about female deaths.

Table 6: Coefficients of Correlation Between Female Mortality Rates and Total Fertility Rates

Place of Residence	1971	1981	1991	1997
Rural (15-29)	0.16	0.68*	0.69*	0.61*
Rural (30-44)	-0.11	0.30	0.46	0.44
Urban (15-29)	0.24	0.67*	0.69*	0.57*
Urban (30-44)	0.00	0.44	0.66*	0.58*

For what they are worth, correlations across the 15 major states between death rates and total fertility rates (TFR) are presented in Table 6. The correlations are poor for the year 1971. This may be because fertility levels began to decline significantly only much later. However, for

rural as well as urban areas, the correlations between mortality rates among women in the (15-29) ages and TFR are significantly high for the rest of the period of study: 1981-97. For the age group (30-44), the rural correlations are all insignificant, but in the case of urban areas, the correlations are significant for 1991 and 1997. The meaning of high correlations is obvious: low (high) levels of adult female mortality are associated, across the Indian regions, with low (high) levels of fertility.

Table 7: Health Indicators

State	SMI U92	SMI R92	SMI T92	SMI U98	SMI R98	SMI T98	HCSI 92	HCSI 98
Madhya Pradesh	59	22	30	59	26	33	30	32
Bihar	50	17	21	50	18	20	30	22
Haryana	59	37	42	61	32	38	34	33
Utar Pradesh	50	20	25	43	15	20	35	23
Orissa	55	28	32	67	44	46	37	35
Andhra Pradesh	80	50	58	87	63	69	43	52
Rajastan	40	15	19	55	23	30	43	40
Assam	61	22	26	61	22	26	48	44
Karnataka	76	52	59	85	58	66	53	57
West Bengal	72	43	50	87	56	62	57	47
Maharastra	79	48	60	86	55	67	66	57
Tamil Nadu	93	69	78	95	84	88	66	63
Gujarat	72	45	53	78	54	63	73	76
Punjab	64	53	55	73	49	55	78	72
Kerala	96	91	92	99	95	96	100	100

Note: SMIU92, SMIR92 and SMIT92 stand respectively for Safe Motherhood Index for urban, rural and total for 1992; the next three columns referring to the same indices for 1998. The last two columns refer to Health Care Supply Index respectively for 1992 and 1998. See the text for details about the construction of these indices based on NFHS data.

Safe Motherhood

Antenatal care, safe deliveries with medical or paramedical personnel in attendance and post-partum monitoring are the main factors behind safe motherhood. Data on the first two of these aspects are available at the state level from the National Family Health Surveys in 1992 and 1998. The data on post-partum care are not found to be usable because they refer to deliveries conducted in institutions only, bypassing deliveries at home that constitute by far the

bigger proportion, especially in rural areas. The data considered for the analysis are presented in Appendix-1.

The proportions of pregnant women receiving antenatal care (at least twice) and those who have had deliveries under medical attention are highly correlated. Accordingly a safe motherhood index (SMI) is constructed for each state by taking the simple average of these two proportions, separately for rural and urban areas.

Health Care Supply

For computing a health care supply index (HCSI), to reflect the vast regional variation in this respect, the following variables are considered: per capita expenditure on health, and the supply of doctors, hospitals and beds, each as a ratio of population. All these four variables refer only to the public domain; in the absence of the relevant data for the private sector, we have to make do with them in this exploratory study. Each of these variables (that is, the corresponding numbers for the states) is first transformed so that the variance across states is unity, making them scale-free. Then the values of the first principal component of the four transformed variables are computed; they in turn are expressed as percentages of the value of Kerala, so that indices with Kerala=100 are obtained. These indices refer to states as a whole; the relevant data are not available separately for rural and urban areas.

Table 7 presents the two health indicators so constructed for safe motherhood and health care supply. The first of these is relevant to maternal deaths and the second to health care in general. The states in Table 7 are arranged according to a ranking by the health care supply index (HCSI) in 1992. As suggested earlier, the leaders in this respect are Kerala, Punjab, Gujarat and Tamilnadu, Kerala an outstanding one, and the laggards are Madhya Pradesh, Bihar, Haryana and Uttar Pradesh. Other states have middle ranks. First we look at the correlations among the three correlates of adult mortality considered here, namely, TFR, SMI and HCSI (Table 8).

Table 8: Correlations Among Health Indicators (Rural and Urban combined)

Variables	1991	1997
(TFR, SMI)	-0.90*	-0.92*
(TFR, HCI)	-0.78*	-0.79*
(SMI, HCI)	0.81*	0.83*

Note: TFR: Total Fertility Rate, SMI: Safe Motherhood Index, HCSI: Health Care Supply Index.
* indicates significant at 5 percent level.

The results are remarkable. All the three variables are themselves highly correlated. This only means that the leaders push ahead and the laggards fall behind in all respects. Clearly, regions with well-developed health care facilities in the public sphere have also managed to bring down levels of fertility and promote safe motherhood simultaneously.

Indeed, that all good things go together can be seen from Tables 9 and 10, which set out the correlations between mortality rates and the two health indicators. It is quite remarkable that female mortality rates are generally highly correlated with the health care and safe motherhood indices. Equally remarkable are the poor correlations between health care supplies and male mortality. As suggested before, this may be due to the relatively low male mortality even during the 1970s, which moreover exhibits a low regional variation. Needless to say, this observation as well the relative stagnation in male mortality merit further study.

Table 9: Coefficients of Correlation Between Mortality Rates and Safe Motherhood Indices

Location/ Age-Group	1991	1997
Rural (15-29)	-0.88*	-0.69*
Rural (30-44)	-0.70*	-0.59*
Urban (15-29)	-0.54*	-0.68*
Urban (30-44)	-0.50	-0.61*

Note: * indicate significant at 5 percent level.

Table 10: Correlations at State Level (Rural and Urban Combined) Between Mortality Rates and Selected Factors

Year/Variable	F (15-29)	F (30-44)	M (15-29)	M (30-44)
1992				
TFR	0.75*	0.56*	-	-
SMI	-0.85*	-0.71*	-	-
HCSI	-0.87*	-0.70*	-0.40	-0.39
1997				
TFR	0.68*	0.52*	-	-
SMI	-0.76*	-0.71	-	-
HCSI	-0.87*	-0.76*	-0.59*	-0.41

Note: * indicate significant at 5 percent level.

4. Concluding Remarks

It is easy enough to understand why rural-urban differentials in mortality are large and persistent. The prospect for their further narrowing down hinges on the rapidity with which rural health infrastructures develop in regions such as Madhya Pradesh, Bihar, Rajasthan and Uttar Pradesh. However, the patterns of change in gender differentials are puzzling in many respects that require further study.

Fertility declines seem to have brought out, over space and time, remarkable reductions in the death rates among women in the reproductive period. The reductions seem, moreover, to be associated with the development of health care facilities. How lower burdens of childbearing improve the survival chances overall of women in the reproductive ages requires further clarification, because deaths directly associated with pregnancy and delivery are only a small fraction of deaths from all causes. What is more puzzling is the relative stagnation of mortality rates among adult men.

This brings us to issues of the so-called ‘health transition’, a concept developed from the experience of the advanced western countries. While ‘demographic transition’ is the passage from high fertility and mortality rates to low ones, ‘health transition’ refers to

a radical change in the morbidity patterns: from infectious diseases to degenerative diseases. The control of infections is surely a part of the processes of reduction in death rates; so, as survival chances improve, degenerative diseases tend to dominate morbidity patterns. However, the division of the transition process into two separate ones, a health transition following a completed demographic transition appears very artificial and inconsistent with history. The Indian experience suggests, for example, that fertility declines possibly alter morbidity patterns among adult women. Likewise, diabetes, cardio-vascular diseases and others of a similar type among men may gain ascendancy during a phase when women experience rapid declines in fertility and mortality. What is suggested is that the pace and pattern of mortality reduction is gender specific.

All this is in curious contrast to the recently documented changes in gender differentials in mortality in the western countries. There also, the differences are sinking, but with women steadily losing the life advantage they traditionally enjoy. Tobacco is named as a culprit in the context [Pampel (2002)], but perhaps it has more to do with the ever-increasing entry of women into work of all types, and the consequent changes in life styles and disease patterns.

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Appendix- I
Data used for the analysis

States	Percentage of births three years preceding the survey by two or more antenatal check-ups						Percentage of delivery assisted by trained health personnel						Per-capita health and family expenditure at 1993-94 prices.	
	1992-93			1998-99			1992-93			1998-99			1990-91	98-99
	U	R	T	U	R	T	U	R	T	U	R	T	T	T
Andhra Pradesh	90.6	79.8	82.5	95.3	86.1	88.4	78.3	39.7	49.3	85.2	58.5	65.3	67	100
Assam	72.7	36.8	40.0	-	-	-	56.8	14.1	17.8	64.6	18.9	21.5	-	-
Bihar	57.6	25.5	29.7	59.2	23.0	26.2	52.0	14.0	18.9	51.9	20.6	23.3	51	50
Gujarat	81.4	66.0	70.8	86.7	76.0	79.8	65.7	32.0	42.6	74.2	41.6	53.5	83	128
Haryana	81.5	62.6	66.7	74.3	48.5	54.5	52.5	24.1	30.3	66.1	34.7	42.1	72	109
Karnataka	84.9	78.0	79.9	92.1	76.7	81.6	77.2	40.3	50.9	86.3	46.9	59.1	75	114
Kerala	97.3	96.0	96.3	99.4	98.3	98.5	95.7	87.6	89.7	99.4	92.8	94.1	103	131
Maharasthara	85.3	69.9	75.9	91.6	76.2	82.2	77.8	37.6	53.1	84.1	43.6	59.5	86	91
Madya Pradesh	68.9	37.3	43.7	69.6	39.8	46.2	61.1	22.1	30.0	61.5	20.9	29.6	58	98
Orissa	70.3	47.3	50.7	79.2	68.0	69.1	48.7	15.6	20.5	61.1	30.3	33.4	60	81
Punjab	91.0	83.8	85.5	89.5	66.4	71.7	60.1	44.7	48.4	77.8	58.1	62.5	113	157
Rajasthan	46.0	22.4	26.1	61.7	32.0	38.1	45.2	17.4	21.8	62.4	29.1	35.8	79	114
Tamil Nadu	96.0	90.1	92.2	97.9	96.3	96.8	91.8	59.7	71.2	94.9	78.0	83.7	95	136
Uttar Pradesh	65.3	33.3	38.8	49.2	19.0	24.0	44.2	11.6	17.2	51.7	16.7	22.4	66	57
West Bengal	77.2	64.8	67.6	93.5	80.8	83.1	66.5	23.1	33.0	81.7	35.8	44.1	92	105
INDIA	77.3	49.9	56.2	79.7	50.7	57.1	65.3	25.0	34.2	73.3	33.5	42.3	75	95

STATE	Total Fertility Rate												Hospital (H) Bed (B) and Doctor (D) per one lakh population					
	1971			1981			1991			1997			1990-92			1996-97		
	U	R	T	U	R	T	U	R	T	U	R	T	H	B	D	H	B	D
Andhra Pradesh	3.8	4.8	4.6	3.0	4.2	4.0	2.5	3.1	3.0	2.1	2.6	2.5	2.8	40.3	29.5	4.1	63.7	38.3
Assam	4.3	5.8	5.7	2.6	4.2	4.1	2.1	3.6	3.5	2.1	3.4	3.2	1.2	56.5	46.8	1.1	50.9	53.5
Bihar	-	-	-	4.8	5.8	5.7	3.5	4.5	4.4	3.1	4.5	4.4	0.4	33.7	30.5	0.3	29.2	30.8
Gujarat	4.7	5.9	5.6	3.4	4.6	4.3	2.9	3.2	3.1	2.5	3.2	3.0	5.7	142.8	54.2	5.4	135.9	60.9
Haryana	4.6	7.3	6.7	3.5	5.3	5.0	3.0	4.3	4.0	2.7	3.6	3.4	0.5	42.7	3.9	0.4	37.6	4.8
Karnataka	3.4	4.8	4.4	3.0	3.8	3.6	2.5	3.3	3.1	2.1	2.7	2.5	0.7	84.3	73.0	0.6	77.7	102.2
Kerala	3.8	4.2	4.1	2.4	2.9	2.8	1.7	1.8	1.8	1.8	1.8	1.8	7.0	265.3	66.9	6.6	251.4	83.5
Maharasthra	3.9	4.9	4.6	3.0	4.0	3.6	2.5	3.4	3.0	2.3	3.0	2.7	3.9	100.0	62.5	3.5	88.5	74.5
Mandya Pradesh	4.7	6.1	5.6	3.9	5.5	5.2	3.4	4.9	4.6	2.5	4.3	4.0	0.5	27.4	16.9	0.5	24.3	22.1
Orissa	4.3	4.8	4.7	3.7	4.3	4.3	2.3	3.4	3.3	2.2	3.1	3.0	0.9	45.8	35.0	1.2	43.0	38.6
Punjab	4.4	5.5	5.2	3.4	4.1	4.0	2.8	3.2	3.1	2.2	2.9	2.7	1.1	72.3	131.3	1.0	65.6	129.1
Rajasthan	5.4	6.4	6.3	4.2	5.5	5.2	3.7	4.9	4.6	3.0	4.5	4.2	0.5	46.5	31.9	0.4	41.5	36.2
Tamil Nadu	3.3	4.2	3.9	2.7	3.7	3.4	2.0	2.3	2.2	1.8	2.1	2.0	0.7	87.3	83.1	0.7	81.9	99.6
Uttar Pradesh	4.9	6.9	6.6	4.1	6.1	5.8	3.7	5.4	5.1	3.7	5.0	4.8	0.5	34.0	23.8	0.5	29.7	24.2
West Bengal	-	-	-	2.4	4.8	4.2	2.1	3.6	3.2	1.8	2.9	2.6	0.6	80.0	61.3	0.5	73.5	63.0
INDIA	4.1	5.4	5.2	3.3	4.8	4.5	2.7	3.9	3.6	2.4	3.6	3.3	1.6	70.4	46.5	1.6	65.7	53.4

Note: U=Urban, R=Rural and T=Total.

Source: Source: Data on antenatal Check-up and Place of delivery are taken from National Family Health Survey reports, 1992-93 and 1998-99 for each state. Per-capita health expenditure estimates are from the data available from Reserve Bank of India Bulletins. Total fertility rates come from Sample Registration System, various years and Hospital, Bed and Doctors data are from Health Information of India, Central Bureau of Health Intelligence, Director of Health Services, various years and Statistical Abstract of India, Central Statistical Organisation, Government of India, various years.