Selective Discrimination against Female Children in Rural Punjab, India

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South Asia is well known as being a region of the world where the normally higher number of females than males in the total population is reversed. Among the Indian states, historically Punjab[1] in the Northwest has had the most imbalanced sex ratios (Visaria, 1969: 3). The excessive mortality of females that this reflects is commonly hypothesized to be due to discrimination against females, particularly female children, relative to males, in the allocation of food and health care within the household.

A number of studies have found evidence of such sex bias. For example, in the Matlab Project area in Bangladesh, D'Souza and Chen (1980) found that female child mortality was higher than male after the neonatal period, and Chen et al. (1981) found pronounced sex differentials in the food and health care received by children. A study of two villages in West Bengal found that girls consistently had poorer nutritional status than boys among all socioeconomic strata, as defined by landholding and mother's education (Sen and Sengupta, 1983). Several other studies also have presented quantitative evidence of sex bias in patterns of child nutrition and health care (Wyon and Gordon, 1971; Levinson, 1972; Kielmann et al., 1983). Dyson and Moore (1983) found that sex differentials in child mortality are much higher in North than in South India, and they related this difference to variations between the North and South in kinship systems and female autonomy.

While documenting the existence of sex bias, these studies leave us with little understanding of the dynamics of sex discrimination at the household level and its relationship to family-building strategies. All the studies cited seem to be based on the assumption that there is a generalized tendency to give preferential treatment to boys over girls that is rooted in the low value placed on females in South Asian societies. Nothing in these studies suggests that parents may discriminate selectively against some of their daughters rather

than in a generalized way against all their daughters. An implication of generalized sex bias is that discriminatory behavior need not occur at a conscious level. Parents in a society may simply have internalized certain norms that lead them to give better care to their sons than their daughters, and excess female mortality may be an unintended consequence.

Yet we know that innumerable surveys in South Asia have found that parents state clearly that they want to have more boys than girls. That parents act on these preferences is revealed by the common finding that the decision to terminate childbearing is strongly related to the number of surviving sons couples have. This raises the possibility that parents may realize their desire to have fewer girls than boys by discriminating particularly heavily against some of their daughters.

This article examines the hypothesis that discrimination against girls is not generalized, but rather is closely related to individual parents' family-building strategies. It goes on to explore the mechanisms—allocation of food, clothing, and medical expenses—whereby these differentials in mortality are brought about. Finally, it examines the reasons why son preference is so strong in Punjab society.

To anticipate the findings, the data support the hypothesis that sex bias is not generalized, but focused on higher birth order girls. Sex differentials by birth order are far stronger than those by socioeconomic status. Moreover, these differentials show a remarkable persistence in the face of socioeconomic development, mortality decline, and fertility decline. In fact, fertility decline appears to heighten such selective discrimination. Interestingly, women's education is associated with reduced child mortality but stronger discrimination against higher birth order girls. This strong underlying preference for sons appears to be the outcome of women's structural marginalization in this culture, which results in their being of low value to their parents.

Data sources

The data used in this study were obtained from a restudy of the 11 villages in Ludhiana District, Punjab, that were originally surveyed in the 1950s in the Khanna Study (Wyon and Gordon, 1971). The Khanna Study was the first large, intensive field study of fertility behavior in a developing country, and had a major impact on our understanding of such issues as birth interval components and the determinants of child mortality. The present study began in 1984 and covers a wide range of demographic variables. Data used in this article draw on (1) a baseline census of the population of the 11 villages in 1984; (2) complete maternity histories collected from all ever-married women aged 15–59 in the study population; and (3) data on the intrafamilial distribution of various consumption items, collected from 400 households in a random sample drawn from six of the 11 study villages.

This last set of data was compiled by surveying the sample households every two months for a period of one year. The households included about 2,400 individuals, comprising approximately one-eighth of the total population.

Data were collected on the amount spent on clothing, education and medical care, leisure, and so on, for each individual in the household for a reference period of the previous two months. Additional data covered the allocation of food within the household, based on 24-hour recall of the day before the interview. The interviewers first recorded what was cooked the previous day and then the amounts of each item (cereals, milk, etc.) consumed by the household as a whole. They next recorded how much was consumed by each person. For example, they would record the fact that *chapattis* (bread) were cooked and eaten, move on to ask how many kilos of flour were used for this, then the number of chapattis made, and finally who ate how many chapattis at various points in the day. The total number of chapattis cooked was finally tallied against the number consumed by household members, guests, laborers, cattle, and dogs.[2]

The study area

The study region has for some time been the most prosperous in India. Punjab State has a well-developed infrastructure, including canal and tubewell irrigation systems, roads, transport, electrification, health services, and schools. Almost all villages today are interconnected by modern transport and have electricity as well as access to medical facilities and schools. The Green Revolution has transformed the countryside, and both small- and large-scale industries have appeared in urban centers, providing off-farm employment for many.

Within Punjab, Ludhiana District has prospered the most in terms of both agriculture and industry. The relative affluence achieved in the past two decades has touched not only the landowners but also the landless, for whom employment opportunities and wage rates have been improving steadily. While the gap between rich and poor remains, absolute levels of living have increased for both. This is reflected in gains in diet, clothing, expenditures for illness and other contingencies, and generation of savings that can be used to improve economic status.

The area had levels of fertility and child mortality in the 1950s that were fairly high by Indian standards (Wyon and Gordon, 1971). Both fertility and mortality have been falling. The crude birth rate in rural Punjab has fallen from around 35 per thousand per year in 1971 to around 30 per thousand in 1984 (Sample Registration Scheme, 1985), while the infant mortality rate has fallen from 129 per thousand live births in 1972 to 66 per thousand in 1984 (Registrar General, 1981: 28; Sample Registration Scheme, 1985). The pace of decline of both fertility and mortality in Ludhiana District has been a little faster than in the state as a whole, as would be expected given its higher level of development. The crude birth rate in 1984, based on births in the past 12 months in the study population, is 28 per thousand. The infant mortality rate derived from births between 1979 and 1984 is 62 per thousand. Thus the area is well into the third stage of the demographic transition.

Son preference and child mortality

Strong son preference is reflected in women's statements regarding the number of children of each sex that they would like to have beyond those they already have (Table 1). On average, younger women in Khanna in 1984 want to have somewhat fewer than two sons and half a daughter. Educated women preferred even fewer sons and daughters than this.

Desired numbers of additional children of each sex fall as the age of the woman rises, presumably because women tailor their aspirations to what they have already achieved and their reduced future time for reproduction. Thus a 28-year-old woman with no sons and two daughters may settle for one son, although ideally she might have preferred to have two. In this context, it is notable that the desired number of daughters falls much more sharply with age than the desired number of sons. This is especially marked in the case of educated women, who by the age of 25–29 want virtually no daughters, even if they have no living daughters.

Sex differentials in infant and child mortality are evident in Table 2. To ensure that the number of deaths in each cell is large enough to provide robust estimates, the data in the top panel of this table are based on live births in Khanna over the past two decades.

These data show that during the neonatal period, male mortality is higher than female mortality. This is what we would expect, given that biological factors are preponderant among deaths in this age group. After the first month

TABLE 1 Additional numbers of sons and daughters wanted, by number of living sons and daughters, Khanna, 1984

Age and education of woman	Number of women	Additional sons wanted by number of living sons			Additional daughters wanted by number of living daughters		
		Number living			Number living		
		0	1	2+	0	1	2+
No education							
15–19	50	1.83	1.00	—	1.00	0.17	—
20–24	235	1.64	0.87	0.19	0.57	0.04	0
25–29	287	1.26	0.75	0.08	0.37	0.02	0.01
All ages, 15–29	572	1.48	0.81	0.10	0.49	0.03	0.01
One or more years education							
15–19	64	1.38	1.00	—	0.43	0.14	—
20–24	356	1.23	0.86	0.06	0.45	0.03	0
25–29	386	1.10	0.48	0	0.18	0	0
All ages, 15–29	806	1.18	0.65	0.01	0.32	0.01	0
All educational levels							
15–19	114	1.57	1.00	—	0.67	0.15	—
20–24	591	1.39	0.87	0.15	0.50	0.04	0
25–29	673	1.16	0.58	0.04	0.26	0.01	0.01
All ages, 15–29	1,378	1.29	0.71	0.06	0.39	0.02	0

TABLE 2 Infant and child mortality rates (deaths per 1,000 live births) by age at death, Khanna 1965–84, Khanna 1957–59, and Matlab Thana, Bangladesh, 1974–77

	Age at death (months)[a]					
	<1	1–11	0–11	12–23	24–59	0–59
Khanna, 1965–84						
Males	50.7	27.1	77.7	9.4	8.2	95.3
Females	43.0	51.3	94.3	18.5	12.6	125.4
Total	47.0	38.6	85.6	13.8	10.3	109.6
Male/female	1.18	0.53	0.82	0.51	0.65	0.76[b]
Khanna, 1957–59[c]						
Total	73.5	82.7	156.2	72.2[d]		
Male/female			0.86	0.44[d]		
Matlab Thana, 1974–77[e]						
Total	73.0	58.2	131.2			
Male/female	1.16	0.82	1.00			

[a] Female mortality is probably higher than estimated here, because the sex ratio at birth indicates that female live births are underreported by approximately 5 percent. Many of these females are likely to have died, perhaps at early ages.

[b] The male/female ratio in the 0–4 year mortality rate in Khanna, 1965–84, is similar to that for Punjab State, 1971–75 and 1975–80 (Dyson, 1987).

[c] From Gordon et al., 1965.

[d] Rate calculated per 1,000 population in that age group.

[e] Matlab Project, Matlab Thana, Bangladesh; see D'Souza and Chen, 1980.

of life, environmental and care-related factors that are susceptible to societal manipulation come into play. We find that for all ages from one to 59 months, female mortality rates are far higher than male rates. Between one and 23 months, when a large proportion of total childhood deaths takes place, the female rates are nearly *twice* those of males. In fact, for females postneonatal mortality is considerably higher than neonatal mortality, whereas for males it is only about half the level of neonatal mortality. All of these findings clearly indicate that behavioral factors raise the mortality rates of female children.

The ratios of male to female infant mortality are similar to those found in 1957–59 in the original Khanna Study (Gordon, 1965) and presented in Table 2, although the mortality rates prevalent at that time were considerably higher. Results from the Matlab Study in Bangladesh for the period 1974–77, given in the table, show a similar male/female ratio of neonatal mortality, but there appears to be much greater inequality in male and female postneonatal mortality in Khanna. Consequently, sex differentials in infant mortality are greater in Punjab than in Bangladesh.

The data on sex differentials in child mortality by birth order show a steep rise in the mortality of girls at birth order four and higher (Table 3). This is consistent both with attitudes about family size (Table 1) and with achieved family sizes (Table 5). Fourth and higher births appear to be geared toward achieving the desired quota of boys. This finding provides clear evidence of the role of behavioral factors in raising the mortality of girls. It also

TABLE 3 Child mortality by birth order and sex, Khanna, based on all births to women aged 15–49 (deaths 0–4 years per 1,000 live births)

	Birth order (not disaggregated by sex)			
Sex of child	**1**	**2**	**3**	**4+**
Male	126.8	96.7	100.9	99.3
Female	95.7	119.1	116.1	152.7
Total	112.1	107.5	108.1	124.5
Male/female	1.32	0.81	0.87	0.65

NOTE: The birth order 1 data for males and females do not reveal son preference, but follow the usual pattern. The combined sex figures on mortality by birth order show the typical J-shaped curve: mortality for the first birth is a little higher than that for the second and the third, after which it rises again.

indicates that the burden of excessive mortality falls most heavily on girls at higher birth orders.

The fact that only a particular subset of female children is subject to excessive mortality is revealed in sharper focus when one analyzes sex differentials in child mortality by the number of living children of that sex at the time of birth of the indexed child. The data for the total sample (women aged 15–59) in the top panel of Table 4 show that boys born when the mother already has one or more surviving sons have slightly higher child mortality than boys born to mothers with no surviving sons. Girls born to mothers with no surviving daughters experience child mortality rates that fall between the two rates for the boys. However, there is a sudden jump in the mortality of girls born to mothers who already have one or more surviving daughters. This subset of girls experiences 53 percent higher mortality than the other children (column 5).

It appears that the trend over time is for the excessive female mortality to concentrate increasingly sharply on girls born to mothers who already have one or more surviving daughters. Among older women (aged 30–59), this subset of daughters has 45 percent higher mortality than their siblings, but this gap increases to 71 percent among the children of younger women (aged 15–29). A remarkable feature of this table is that while there has been substantial decline in the child mortality experienced by younger women, the mortality level of this subset of daughters is almost unchanged.

The increase over time in the relative mortality of these girls is especially surprising in view of the fact that their mothers' levels of education have been rising steadily over time. The study census shows that while only 15 percent of women aged 45–49 had received any education, 97 percent of females aged 10–14 have had some schooling. The proportion of total births contributed by women with some education rises from 25 percent among women aged 30–59 to 50 percent among women aged 15–29.

This contradicts the popular hypothesis that increases in levels of female education result in better care of children (Cochrane et al., 1980), irrespective of their sex. The contradiction is further highlighted by the data on differentials in child mortality by mother's education in the bottom panel of Table 4.[3] The mortality rates in this panel are shaky because of the small numbers of deaths in each cell, so only broad conclusions should be drawn from them. The overall child mortality rates (column 7) are more robust, however, and show that uneducated women have experienced 50 percent higher child mortality than women with some education. It is striking that despite the low cutoff point (any education versus no education), the differential is so strong. Yet despite this differential, the mortality of girls born to mothers who already have one or more surviving daughters is similar (or perhaps greater) among educated mothers as compared with uneducated mothers. Once again, although older women have 25 percent higher child mortality than younger, educated women, there has been no decline in the mortality of second and subsequent girls. This subset of girls experiences 32 percent higher mortality than their siblings if their mothers are uneducated, but this gap jumps to 136 percent if their mothers are educated. It seems that these girls are subjected to increasing concentrations of excess mortality relative to other children if their mothers are younger, and the more so if the mothers are educated.[4]

TABLE 4 Child mortality rates based on children born in the years 1965–84 (deaths at ages 0–59 months per 1,000 live births), by characteristics of mother, Khanna

	Number of surviving children of the same sex at the birth of the indexed child[a]						
	Male		Female				
Characteristic	0 (1)	1+ (2)	0 (3)	1+ (4)	(4) ÷ (1 + 2 + 3)[b] (5)	Total deaths (6)	Mortality rate (M + F) (7)
Age of woman							
15–29	82	81	(82)	140	1.71	220	92
30–59	97	101	105	146	1.45	741	115
15–59	91	98	96	145	1.53	961	109
Family's landholding status							
Landless	101	112	103	160	1.50	629	122
Landed	80	74	87	119	1.49	332	90
Mother's education[c]							
None	(95)	(100)	(119)	(137)	(1.32)	131	111
1+ years	(71)	(59)	(51)	(144)	(2.36)	89	74

NOTE: Figures in parentheses are based on fewer than 40 deaths.

[a] See text, p. 82 for explanation.

[b] This is the ratio of the child mortality rate of girls born with one or more previous surviving girls, to the child mortality rate of the other children combined.

[c] For women aged 15–29 years (see note 3 at end of article).

The explanation of this unexpected finding probably lies in the fact that fertility and child mortality levels have been declining in general, and especially rapidly in the case of educated women. Table 5 shows the steady decline in family size and rise in the use of contraception as one moves from uneducated women to those with some primary school education, to those with some secondary (or higher) education. Among women with one or more years of education, nearly three-fourths of women aged 30–34 report ever using contraception, and they have an average of only 2.78 living children. Since fertility levels are falling, younger cohorts of educated women are likely to have an average completed family size of fewer than three living children. Since these women continue to want one to two living sons (Table 1), they are under greater pressure not to have more than one surviving daughter than is the case for uneducated and older women, who have higher fertility.

At the same time, educated women experience substantially lower child mortality than others (Table 4), because they are better able to care for their children. By the same token, they can also keep the mortality of undesired children high by withholding the requisite care. Thus, through better control of both fertility and mortality, they are better placed than their uneducated counterparts to mesh their achieved with their desired family size and sex composition.[5]

On the question of the effect of economic status on child mortality, Table 4 presents data on differentials by the landowning status of the woman's household.[6] Women from landless households experience 35 percent higher child mortality than those from landowning households (column 7). Despite this relationship, landholding makes no difference to the excess mortality suffered by girls born to mothers who already have one or more surviving daughters, as compared with their siblings (column 5).[7]

Overall levels of child mortality are more influenced by the socioeconomic status of parents than by sex differentials, unless one disaggregates by birth order. Girls as a whole experience 31 percent higher mortality than boys, whereas the children of the landless have 36 percent higher mortality than those of the landed, and those of young uneducated mothers have 50 percent higher mortality than those of young educated mothers. However, girls born when there is already one surviving daughter experience 53 percent higher mortality than other children in the population as a whole, and, as mentioned above, this inequality is greatly heightened in specific subgroups of the population.[8]

Sex differentials in consumption

What accounts for these mortality differentials? It is generally believed that the answer lies in differential allocation of food and health care within the household (Chen et al., 1981; Hutton, 1933; Wyon and Gordon, 1971).

The results presented above show that it may be difficult to quantify neglect factors, because neglect resulting in death is applied highly selectively

TABLE 5 Average numbers of children ever born and living children per woman and percent ever using contraception, by age and education of woman, Khanna, 1984

Age of woman (years)	Number	No education			1–5 years education			6+ years education			All educational levels		
		Born	Living	Percent contra-cepting	Born	Living	Percent contra-cepting	Born	Living	Percent contra-cepting	Born	Living	Percent contra-cepting
15–19	114	0.36	0.34	4	(0.41)	(0.38)	(15)	(0.20)	(0.20)	(–)	0.33	0.32	6
20–24	591	1.43	1.35	22	1.19	1.12	28	0.78	0.74	29	1.16	1.09	26
25–29	673	2.88	2.48	46	2.42	2.18	59	1.85	1.75	61	2.47	2.20	54
30–34	557	4.01	3.42	61	3.32	2.98	72	2.66	2.42	76	3.59	3.13	66
35–39	463	4.47	3.93	69	3.80	3.40	73	(3.62)	(3.21)	(74)	4.25	3.75	70
40–44	429	4.83	4.16	55	(4.02)	(3.40)	(60)	(2.93)	(2.68)	(62)	4.62	3.97	56
45–49	323	5.36	4.49	49	(4.37)	(4.17)	(54)	(4.27)	(3.91)	(64)	5.21	4.43	50
50–54	306	5.56	4.44	29	(4.96)	(4.55)	(32)	[a]	[a]	[a]	5.47	4.42	29
55–59	174	5.60	4.47	17	(4.88)	(4.59)	(18)	[a]	[a]	[a]	5.53	4.49	17

NOTE: Figures in parentheses are based on data from fewer than 50 women.

[a] Data based on fewer than five women are not presented.

to a subgroup of girls. Furthermore, it may well be that even within this subgroup of girls, only a limited proportion is subject to such neglect. In principle, it would be possible to achieve an imbalanced sex ratio by denying one crucial input once only to a small proportion of the girls in the total population. If this were an input such as promptness in obtaining high-quality medical care, it would be very difficult to capture in the statistics. Clearly, this society falls somewhere on the spectrum between generalized neglect of females and the deliberate failure to provide crucial inputs for sustaining life to specific categories of females. The closer the society approaches the latter end of the spectrum, the harder it can become to measure neglect in terms of allocation of resources.

Despite measurement difficulties, this study did find evidence of differential care of boys and girls. The significance of the findings is increased by the fact that the maximum differentials in the allocation of food and medical care are found in the first two years of life, the period when most child deaths take place.

The data on expenditure on medical care (Table 6) show that more than twice as much was spent on boys as on girls in the age group 0–1 year. It is possible that this ratio is somewhat exaggerated by random differences in illness encountered, but the magnitude of the gap suggests a large difference between boys and girls in this sphere. This in itself could be enough to cause the mortality differentials reported above. Older children seem to be treated nearly equally.

Expenditure on clothing is greater for boys than for girls at all ages (Table 6). While this need not necessarily result in excess female mortality,

TABLE 6 Male/female ratios of expenditure on children's clothing and medicine, by age of child and by landownership status, Khanna, 1984–85

Item	Number of observations[a]	Clothing	Medicine
Age of child (years)			
0 (0–1)[b]	321	1.38	2.34
1–4	1,270	1.37	0.93
0–4	1,591	1.36	1.21
Landownership status[c]			
Landless	985	1.58	1.55
Landed	606	1.34	1.10

NOTE: The ratios were obtained by dividing the amount spent on boys by the amount spent on girls.

[a] Since each household was visited six times, the average number of children observed would be about one-sixth of the number of observations given here.

[b] The age group "0" includes some observations of children aged 12–23 months, because data were collected every 2 months over a 12-month period. Therefore children aged "0" (i.e., 0–11 months) at the beginning of this study were aged 12–23 months at the end of the study. Children born during the study were included as age "0."

[c] For children aged 0–4 years combined.

it is possible that some deaths are due to this, because winter temperatures fall to just above freezing. Certainly these data reflect differences in the care given to boys and girls, which may well manifest itself in more directly effective actions such as promptness in obtaining medical treatment.

The data on the allocation of food in Table 7 show that although infant boys and girls are roughly similar in caloric intake, girls are given more cereals, while boys are given more milk and fats with their cereal. It is not clear how much excess female mortality would be caused by this, but it is certainly the case that milk and fats are the highly valued (and high-cost) foods of this society. They also have high nutritional quality. Among older children, boys are given a little more of each foodstuff, with the difference greatest in the case of fats.[9]

On days when children aged 0–1 year ate partly at home and partly outside (for example, at neighboring kinsmen's homes), there was little difference in male/female consumption of cereals and sugars at home, but girls were given much less milk at home than boys and very little fat. It seems that efforts are made to ensure that boys get their usual amounts of milk and fats within the house even if they are away for some of the day, while girls are allowed to go without. Once again, this could have some nutritional effect on girls, but in any case suggests that girls aged 0–1 year receive less care than boys.

The data on consumption by landowning status are presented only for the entire age group 0–4 years. The numbers of children aged 0–1 year were

TABLE 7 Male/female ratios of food consumption per child, Khanna, 1984–85

Age of child (years)	Number of observations[a]	Cereals	Milk	Fats	Sugars	Total calories
Male/female ratios based on total children in the sample[b]						
0 (0–1)[c]	270	.76	1.09	1.22	.98	.95
1–4	1,115	1.06	1.05	1.09	1.03	1.05
0–4	1,385	1.01	1.05	1.07	1.01	1.02
Male/female ratios based on children who had all meals at home on the days of observation						
0 (0–1)[c]	261	.75	1.07	1.07	.97	.94
1–4	1,086	1.06	1.04	1.10	1.03	1.05
0–4	1,347	1.01	1.04	1.07	1.01	1.02
Male/female ratios of food consumed at home, by children who ate partly at home and partly outside the home on the days of observation						
0–1	9	.76	2.69	7.00	1.11	4.82
0–4	38	.95	1.77	1.24	1.11	1.22
Male/female ratios by landownership of household, based on children who had all meals at home on the days of observation						
Landless[d]	885	1.00	1.07	1.19	.99	1.02
Landed[d]	462	1.04	1.06	1.03	1.07	1.06

[a] See footnote a to Table 6.
[b] Including 38 children who ate partly outside the home on the days of observation.
[c] See footnote b to Table 6.
[d] For children aged 0–4 years combined.

too small to be broken down by such status. It seems that the landless discriminate more against girls in expenditure on medicine and clothing than the landed. They also give their daughters much less fat than the landed, presumably because fats are expensive and as such a rarer commodity for them. On the other hand, they seem to be more egalitarian in distributing cereals and sugars, so that in terms of total calories their sons and daughters are treated, if anything, more equally than children of the landed. In the absence of information on the treatment of the critical age group 0–1 year, the only conclusion that can be drawn from these data is that they are consistent with those on mortality differentials by landownership shown in Table 4.

Both the Narangwal data, for the same district of Punjab (De Sweemer et al., 1983), and the Matlab data (Chen et al., 1981) show more pronounced sex differentials in nutrition than were found in Khanna in 1985–86. Yet interestingly, sex differentials in mortality are far greater in Khanna than in Matlab (see Table 2).[10]

The Khanna 1985–86 data suggest that relative female deprivation in medical care may be more important than that in nutrition in accounting for sex differentials in mortality. This seems to be suggested by other studies as well. The original Khanna Study found that boys were given better medical care than girls in the course of the illness that led to their death (Singh et al., 1962). Differentials in medical care were felt to be more important in explaining sex differentials in child mortality than differences in nutrition (Wyon and Gordon, 1971). The Matlab data also show greater sex differentials in medical care than in nutrition (Chen et al., 1981: Tables 2 and 4).

Possible explanations for sex discrimination in Punjab

The region comprising the states of Punjab and Haryana evinces stronger son preference than any other region in India. These two states, which until 1966 formed a single administrative unit, have a history of the most imbalanced sex ratios in India[11] and correspondingly adverse male/female child mortality rates.[12] British administrators in the nineteenth and early twentieth centuries wrote of the widespread practice of female infanticide in this area and tried to abolish it (Panigrahi, 1972; Miller, 1981). Recently, Punjab figured prominently in a scandal involving the use of amniocentesis to detect female fetuses in order to abort them (*Times of India,* 1982).

To understand why sex differentials in mortality in this area are so high, we must first look at the caste and religious composition. The rural areas in this region are dominated by the caste of owner-cultivators, the Jats—in Punjab, the Jat Sikhs; in Haryana, the Jat Hindus. The Jats share strong cultural similarities despite their different religions. Within their villages, this caste usually owns almost all the land and is usually also numerically preponderant. For example, in the Khanna study villages in 1984, Jats constituted 47 percent of the total population and owned 96.6 percent of the land. Similar findings emerge from other village studies.[13] Other castes until recently were highly dependent

on the Jats for earning a living, and they continue to use the Jats as a reference group for emulation. The Jats dominate this region economically and culturally. Their role as a reference group for emulation has been strengthened by their leadership in obtaining employment, education, and access to other new opportunities. Thus Jat behavior and norms provide the role model for all groups in this rural society.

According to the 1931 Census of India, which was the last official census to collect data on caste, the Jats and the Rajputs of Rajasthan had the most imbalanced sex ratios of all castes in India (Hutton, 1933: 204). Moreover, the Sikhs had the most imbalanced sex ratio of all religious groups (p. 200). A substantial proportion of Sikhs are Jats. Data are not available for the other castes in this region because, unlike the Jats, these other castes are found throughout India and their sex ratios are swamped in the presentation of all-India data by caste.

The overall sex ratio of Punjab seems to have begun to improve a little, according to the 1981 census. This is probably due to the improvement of female survivorship above age 5 years relative to male survivorship. Dyson (1987) reports such a finding in his analysis of trends from the Sample Registration Scheme and other data sources.[14] However, he concludes, "Punjab–Haryana is a particularly instructive case since it shows that in Indian circumstances a pronounced sex differential in early age mortality can persist despite comparatively high overall levels of life expectation"(p. 29). Life expectation in this region has been rising because living standards and health care have been improving rapidly. Nonetheless, discrimination against female children is resistant to change, resulting in continued excess mortality among this group. This indicates the strength of son preference in the region. It also suggests that different factors are at work in generating discrimination against female children, as opposed to female adults. This is not inconsistent with Dyson's (1987) argument that there are several purely demographic reasons why there should be a trend away from excess female mortality in India, including the fact that fertility decline will reduce adult female mortality related to pregnancy and childbearing. As the persistence of sex differentials in child mortality in Punjab/Haryana indicates, however, discriminatory behavior can tilt the balance of mortality even in an environment conducive to improved survivorship.

A variety of explanations for this phenomenon can be set forth. First, female children may be neglected because their parents are poor, and, faced with difficult choices in allocating resources among their children, they give priority to children of the preferred sex. This does not tally, however, with the fact that the marked regional differences within India in sex ratio imbalances in no way correspond to regional differences in per capita income (see Table 8). It also does not accord with the fact that in the 1931 census, the castes with the most unequal sex ratios are all major landowning castes (Jats, Rajputs, Gujars), whereas the poor Untouchable castes have much more equal sex ratios (Hutton, 1933: 204). The 1984 Khanna data are interesting in this context, because Punjab is highly affluent by Indian standards, and landowning house-

holds in Punjab belong to the top deciles of rural Indian income and consumption levels. Yet the landowners are only a little behind the landless in excess female mortality and discrimination against girls in allocating resources (see Tables 4, 6, and 7).

Table 8 suggests that discrimination against female children in India is not motivated primarily by economic hardship, but rather by cultural factors. What can be said is that where a culture of son preference exists, scarcity of resources may heighten discrimination against females.

A second hypothesis, put forward by Bardhan (1974, 1982, 1984), is that neglect of female children is related to the low participation of female labor in agriculture and in income-generating activities in general. This idea is based on the observation that females are more disadvantaged in areas of dryland cultivation (which includes the wheat-growing areas of Northern India), where their rates of labor force participation are low, as compared with areas of wetland cultivation. Miller (1981) has hypothesized further that the exclusion of females from production is linked to their exclusion from holding immovable property, particularly land. This in turn is related to intense son preference and discrimination against daughters.

The Jats are a particularly interesting test case for Bardhan's hypothesis. The Jats are the main caste of peasant owner-cultivators throughout Punjab,

TABLE 8 Per capita income and sex ratios of Indian states

State	Per capita income, 1983–84	Ranking	Sex ratio, 1981 (females per 1,000 males)	Ranking
Punjab	3,691	1	879	16
Haryana	3,147	2	870	17
Maharashtra	3,032	3	937	11
Gujarat	2,795	4	942	9
West Bengal	2,231	5	911	13
Himachal Pradesh	2,230	6	973	5
Karnataka	1,957	7	963	7
Andhra Pradesh	1,955	8	975	4
Rajasthan	1,881	9	919	12
Tamil Nadu	1,827	10	977	3
Jammu and Kashmir	1,820	11	892	14
Kerala	1,761	12	1,032	1
Manipur	1,673	13	971	6
Madhya Pradesh	1,636	14	941	10
Uttar Pradesh	1,567	15	885	15
Orissa	1,339	16	981	2
Tripura	1,206	17	946	8
Bihar	1,174	18	946	8

NOTE: Excludes Assam, which was not covered in the 1981 census.
SOURCES: For per capita income, *Statistical Outline of India 1983–84* (Bombay: Tata Services Limited, June 1986), p. 22; for sex ratios, Census of India 1981b, p. xxiii.

Haryana, and Western Uttar Pradesh—that is, a large part of the prosperous wheat-growing area of Northern India. Traditionally, Jat women have participated actively in agriculture. There does not seem to be anything intrinsic to growing wheat that precludes female participation. Jat women participate in sowing, weeding, harvesting, threshing, maintenance of irrigation channels, and much other work in the fields, apart from tending cattle—another important source of income in rural areas (Das Gupta, 1976, 1981). This is well known to anyone familiar with the rural areas of this region and has been discussed in the colonial administrative literature since the nineteenth century. According to Malcolm Darling (1947: 35), "the Jatni [Jat woman] is an economic treasure. . . . 'She does not plough, dig or drive a cart, but there is no other form of agricultural labour which she does not practise and ordinarily adorn.' " The language is a little flowery, but the statement is based on generations of observation by colonial officers of the people they administered.

The advent of the Green Revolution has had a very variable impact on household labor participation in agriculture in different parts of this region. As Punjabi landowners grew wealthier, they substituted first female and then male household labor with hired labor. By contrast, in Haryana (especially in the Eastern districts), women do the bulk of manual labor in agriculture today. Their work has increased with the intensification of cropping. Since the essentially male tasks of ploughing and irrigation have been mechanized, a good deal of male labor is released for other income-earning activities. Economic marginalization of women by the Green Revolution has not taken place in Haryana and is very recent (over the past decade or so) in Punjab. The fact that both these states have shown adverse sex ratios for almost a century refutes Bardhan's hypothesis that low female labor force participation is the cause of neglect of female children.

National data-sets seem to seriously underestimate female labor force participation in this region. This is probably because of the male orientation of the society: respondents perceive income-generating activities as male work, regardless of actualities. Women's work in the fields is seen as an integral part of their household work. Women do not make managerial decisions in production, nor do they market the product and control the resulting cash. The wages earned by women laborers are the property of the men of the household, except in the rare cases of female-headed households. The fact remains, however, that until recently in Punjab and still today in Haryana, there has been a high level of female participation in production (Darling, 1947; Das Gupta, 1976, 1981). Women's labor force participation has coexisted with excess female child mortality, so there does not seem to be any clear relationship between the two. In short, Bardhan's hypothesis of a clear relationship between the two is not borne out.

A third hypothesis for the discrimination against daughters locates it in the culture of the Jats, a culture emulated by the other castes living in Jat-dominated areas, as noted above. Patrilineal descent is the key organizing principle of the Jat kinship system (which, in turn, forms the basis for much

of their economic organization), their political system, and their spatial distribution.[15] Jat villages are composed of patrilineages that are strictly exogamous; that is, they bring wives from outside the lineage and the village. The position of a daughter is that of one who will leave the patrilineage, and the position of a wife is that of an outsider to the patrilineage who lives within the household. In this social structure women are conceived as transitory components, the vessels whereby the men of the lineage reproduce themselves. This is made very clear by the fact that while men remember their genealogies up to several generations, women are not mentioned at all, except namelessly to clarify fine details of men's relationships to one another (for example, "Surjit Singh had two wives; by one wife he had two sons, A. Singh and B. Singh, and by the other wife he had one son, C. Singh"). Women's actual position in the social structure corresponds closely to their ideological position, as sketched above. For example, there is no question of a woman's owning land. If she should try to insist on her right to inherit land equally under the civil law, she would stand a good chance of being murdered.

Perhaps the most important determinant of Punjabi parents' attitudes toward girls is the fact that married women can do almost nothing for their natal kin. According to cultural norms, they cannot alter the basic societal patterns of allocation to divert resources to their natal kin, even if the latter are in need. This rule is rarely broken. The flow of resources is always supposed to be from the men of the woman's household of birth to her husband's household. The dowry given at the time of marriage is only one part of this resource flow. Throughout a woman's life her father or brothers provide her with clothes and gifts for her in-laws on specified occasions (at the time of marriage, childbirth, children's marriages, annual festivals, and when she visits her home). They are supposed to receive nothing in exchange. This lack of reciprocity is symbolized by the custom, widespread among many castes in North India, that a woman's father and brothers do not accept food or water in her husband's home. If they must accept hospitality, they pay generously for it before leaving, accounting for every glass of water.

There is a convergence of interests at several levels to put a premium on sons and discriminate against daughters. Son preference is in the interest of the lineage, whose continuity depends on sons alone. It is also in the interest of the household, for whom daughters are transitory members. For every individual, brothers and sons are more valuable than sisters and daughters. This does not mean that sisters and daughters may not be *loved* as much as brothers and sons. However, a girl values her brother more than her sister because the former will do much for her throughout life, while the latter will effectively disappear after marriage. Similarly, a woman values her sons more than her daughters because the former will be her major source of support. Indeed, a woman's position in her husband's home is not consolidated unless she produces at least one son.

Economic factors go a long way toward explaining son preference in Punjab, but not necessarily in the way put forward by Bardhan and Miller. These authors relate the care allocated to people to their value to the economy.

People's positions in society, however, are determined not only by the contributions they make to the economic process, but also by their rights of ownership and decisionmaking. In Jat culture the structure of rights over asset ownership and decisionmaking favors males very heavily and has an overwhelming influence on the relative position of the sexes. These social-structural factors generate son preference by making people depend heavily on sons or other male kin for necessary economic support.

The evidence suggests that Punjabis have a preference for removing unwanted daughters as early as possible by such means as infanticide, neglect at early ages, and, most recently, feticide. Once girls are past early childhood, the extent of discrimination is reduced. This is evident in the consumption data.[16] It is very difficult to explain this concentration of discrimination at early ages, but perhaps the explanation lies partly in the fact that very young children are especially vulnerable to the consequences of neglect, and also are not regarded as full members of society.

It should be added that, in some respects, women in Punjab are not treated very badly compared with the rest of India. Punjab has the highest female age at marriage next to Kerala. This means that parents are willing to risk the shame of premarital conception in order not to marry their daughters too young. Parents also make the sacrifices required to educate their daughters: levels of female literacy in Punjab are well above the Indian average and are increasing rapidly. Daughters are well educated largely for status purposes and to marry them to higher status men. Girls' education does not raise their brideprice, as dowry is the custom in this society. It also has little impact on their economic contributions to the household: only 0.33 percent of girls aged 10–14 years (compared with 3.95 percent of boys) and 2.63 percent of women aged 15–39 years (compared with 41.35 percent of men) work for salaries or wages, or are self-employed in professions or small business enterprises. Also indicative of their status relative to other Indian women, Jat women are not expected to be strictly monogamous within marriage as they are in much of India (Hershman, 1981: 173–188). Moreover, remarriage is the norm for widows for all but the small Brahmin caste. The preferred partner is the husband's brother. A widow normally remarries (usually legally, sometimes consensually) and has the opportunity to bear more children. This contrasts sharply with the bleak prospect facing higher caste widows elsewhere in India, who cannot remarry and become burdens on their male kin unless they have sons old enough to support them.

Although the Jats have worked out the logic of marginalizing women more starkly than other groups in North India, women of other North Indian groups are also subject to similar constraints in providing support to their natal kin. Bilateral kin play a more important role in South India, so there is a possibility of establishing some relationships of reciprocity with daughters and the affines acquired through them.

The explanation given in this article for discrimination against daughters is no different in essence from Dyson and Moore's (1983) argument that North Indian kinship rules result in lower autonomy of women and greater discrim-

ination against girls, as compared with South India. My hypothesis, however, focuses specifically on the structural marginalization of women. Dyson and Moore have developed a model that includes a much wider set of factors: North Indian exogamy versus South Indian endogamy; and greater distance between natal and marital homes, lower age at marriage, lower female labor force participation, lower female literacy, and greater practice of purdah[17] in North India as compared with South India. While this gamut of factors is powerful in explaining the differences in female autonomy between North and South India, Dyson and Moore themselves point out that Punjab does not fit their model well, because Punjabi women have comparatively high status by such measures as age at marriage and level of female literacy. These factors undoubtedly improve the status of women through a variety of means, not least of which is a reduced gap between men and women in knowledge of the outside world. However, they have as yet made little impact on the patterns of patrilocal residence and unidirectional resource flows from a woman's parental household to her in-laws. I would argue that higher education and later age at marriage have not increased the value of daughters to their parents because the patrilineal kinship system has remained largely untouched by them. Sex bias is likely to continue until this mechanism for structurally marginalizing women is altered. Such change could be effected by state policies or actions such as propaganda campaigns, enforcement of existing legislation for protecting women's rights (such as the law of equal inheritance by sons and daughters), and enacting new laws toward this end. (A good example is the recent Supreme Court of India ruling that women as well as men have a duty to support their parents.[18])

Summary and discussion

Sex differentials in child mortality in Punjab have persisted despite a number of changes that might have been expected to eradicate these differentials. These changes include a rapid decline in overall child mortality rates, great improvements in income levels, nutritional levels, and health care delivery, and a variety of modernizing forces such as rapid increases in female education. The mortality differentials have persisted despite recent improvements in female survivorship after age five years relative to male. This last point raises the question of whether different factors influence discrimination against female children as opposed to older females. For example, the value of a girl to her parents may be quite different from her value to her in-laws.

In Punjabi society discrimination against female children is closely related to individual parents' family-building strategies. It appears that Punjabi parents are careful to restrict the number of daughters they have. A sizable proportion of young women did not want to have even one daughter, and almost none wanted a second daughter. This attitude was reflected in the mortality rates; male mortality was higher only during the neonatal period, when biological factors predominate. During the subsequent periods of early

childhood (1–59 months), when mortality is more susceptible to societal manipulation, female mortality was almost twice that of males.

The most striking finding is that the burden of excess mortality falls selectively on a subset of female children—those born into families that already have a surviving daughter. This indicates that neglect is applied selectively among female children. The extent of conscious and voluntary behavior required to do this is far greater than would necessarily be involved in a generalized discrimination against females.[19]

The subset of daughters born to families that already have one or more surviving daughters seems to be subjected to increasing concentrations of excess mortality relative to other children, if their mothers are younger and, even more, if they are educated. Thus among young educated women, these girls experience 2.36 times higher child mortality than their siblings. This is probably because these mothers have experienced the maximum decline in both fertility and mortality. They are reducing their completed family size to fewer than three living children, and still want to have one to two sons, so they are under increased pressure to have fewer surviving daughters. Through a better ability to manipulate both their fertility and their children's mortality, educated women are better equipped than others to achieve the family size and sex composition that they desire.[20] This pattern contradicts the common assumption that increasing female education necessarily improves the quality of care given to children, regardless of their sex.

Of course, excess mortality may not be so highly focused on a subset of female children in other societies exhibiting sex differentials in mortality. This focus has been sharpened in Punjab by fertility decline. However, there is scattered evidence of similar patterns from other parts of South Asia. Nor does this finding preclude the possibility that lower birth order girls in Punjab are also discriminated against, though not to such an extent as to result in increased mortality. Overall levels of child mortality are influenced more by the socioeconomic status of parents (as measured by landholding or mother's education) than by sex differentials, until one disaggregates by birth order. Sex differentials by birth order are far stronger than by socioeconomic status.

Turning to the mechanisms of "neglect," this study found that in the first two years of life, the years of peak mortality, expenditure on medical care for sons is 2.34 times higher than that for daughters. In terms of nutrition, boys receive food that is superior nutritionally and more valued socially. Considerably more is spent on clothing boys than girls, which apart from its likely effect on morbidity reflects more general differences in caring for boys and girls. Differentials in the effective utilization of medical care are probably the major mechanism responsible for sex differentials in child mortality in this society. This study found much wider sex differentials among children in medical care than in food allocation, as has also been found in other studies in South Asia (Chen et al., 1981; Wyon and Gordon, 1971).

It has often been suggested that strong son preference hinders fertility decline. This study shows that strong son preference is not inconsistent with

fertility decline; in fact, sex bias may worsen with reduction in family size. A parallel situation seems to prevail in the People's Republic of China (Arnold and Liu, 1986).

The reasons for discriminating against females do not lie primarily in economic hardship. For India as a whole, the evidence suggests that son preference is primarily culturally determined, and scarcity of resources may at most accentuate the effects of sex bias within a given culture. Nor does sex preference seem to be associated with low levels of female participation in income-generating activities. Sex bias in Punjabi society seems to be determined more by the structure of rights of asset ownership and decisionmaking, which severely restricts women from providing economic and other support to their parents. Thus cultural factors are translated into economic considerations.

The reasons why sex differentials in child mortality in Punjab and Haryana are stronger and more persistent than elsewhere in India appear to lie in the extent to which women are structurally marginalized in the kinship system of Punjabi society. Indian society in general is patriarchal, such that parents benefit more from having sons than daughters. Punjabi society is exceptional, however, in being very strongly patrilineal in organization and patrilocal in residence. Relationships with matrilateral kin are negligible compared with other parts of India. Thus when a daughter marries and leaves the household, her ability to contribute to the subsequent welfare of her natal household is virtually nil. The flow of resources is unidirectional from the woman's father's household to her husband's household, and this flow continues throughout her life. Because women are so marginalized, brothers and sons are of greater value than sisters or daughters, for every individual. All these considerations result in strong and mutually reinforcing incentives for parents to successfully rear sons rather than daughters.

Notes

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1 Until 1947, "Punjab" included parts of present-day Pakistan and the present states of Punjab and Haryana in India. Punjab and Haryana split off in 1966.

2 People in this region have a clear idea of the quantity of flour used because it is weighed in the flour mill at the time of grinding for home consumption, so the amount within the kitchen containers is well known. Moreover, these people are accustomed to marketing agricultural and dairy products, and as a result are highly conscious of volume mea-

sures. Data quality was also enhanced by the fact that women interviewers collected the data from the women of the household, who are responsible for food preparation and distribution.

3 In the bottom panel of Table 4 data on educational differentials are presented for the age group 15–29 years, because this is the age group among which a substantial proportion of births occur to women with some education. The numbers of deaths are small because of the combined effects of reduced fertility and reduced mortality. Therefore all women with any education at all are combined into one group.

4 These figures are not distorted by differential quality of reporting of births and deaths by uneducated as opposed to educated mothers. Improved quality of reporting should be reflected in less distorted sex ratios of reported births. The differences in the ratios reported by educated and uneducated women are not such as to suggest better reporting by educated women.

5 For a discussion of the use of infant mortality to attain a desired family size and composition, see Scrimshaw, 1978. Evidence that female education may not always result in reduced sex bias is also available from West Bengal (Sen and Sengupta, 1983) and Pakistan (Sathar, 1987).

6 The data are not presented separately by size of landholding, because of the small numbers of deaths in each cell.

7 In West Bengal, Sen and Sengupta (1983) found contradictory evidence on the effects of resource shortages on sex inequalities. While the effects of nutritional discrimination were more evident among the daughters of the landless than the landed, the village with the better overall nutritional record showed greater sex discrimination.

8 There is some evidence that girls at higher birth orders are subject to greater discrimination elsewhere in South Asia. In rural Uttar Pradesh, Simmons et al. (1982) found that "females . . . are vulnerable, especially when the family perceives itself as having enough daughters." In South India, Beals (1976) found that daughters of high birth order were given very little medical treatment. Scrimshaw (1978) refers to a study in Bangladesh which found that "a girl is more likely to survive in a family with more boys than girls." In Pakistan, survey data show that "the postneonatal mortality of two girls born in succession was much higher than any other combination, followed next by a boy-girl, girl-boy, and last of all by two boys. This may well reflect the poorer care rendered to a female child when she follows another daughter" (Sathar, 1987).

9 Similar sex differences in the quality of weaning food were described by the health workers at the Matlab Project area in Bangladesh. For example, they said that while both sexes are given rice, even poor families will make an effort to get some milk for their sons (personal communication during a field visit to Matlab, January 1987).

10 Other studies in Punjab have found mixed evidence on sex differentials in nutrition. In Morinda, Levinson (1972) found anthropometric sex differences to be pronounced only among the poor Chamar caste. Seckler (1982) found no evidence of sex differences in weaning practices, cross-sectional health status, and anthropometric measurements in a large data set from Punjab; however, the data available to Seckler were in no way comparable in quality to the carefully conducted longitudinal study in Narangwal.

11 The sex ratio (females per hundred males) of Ludhiana District as a whole is low as compared with Punjab State in the 1981 census. This is largely due to the exceptionally low sex ratio in the urban areas of Ludhiana, which is a result of the greater concentration of industry (using migrant male laborers) within the district. Ludhiana's rural sex ratio is close to the Punjab average (Census of India 1981c, p. 21).

12 Sex differentials in child mortality are also very pronounced in Uttar Pradesh (Dyson, 1987). Uttar Pradesh has not been discussed here because its data are probably less reliable than those of Punjab and Haryana. However, very similar factors are likely to be at work in generating discrimination against female children in Uttar Pradesh, because it is dominated by Jats in the Western part and by Rajputs elsewhere. These are the caste groups with the most imbalanced sex ratios in the 1931 census.

13 See Das Gupta, 1981; Hershman, 1981; Kessinger, 1974; Leaf, 1972; Lewis, 1958; and Miller, 1975.

14 See also Chakravarty, 1986 for an analysis of trends in male and female mortality in India.

15 See references in note 13, Pradhan, 1966, and Pettigrew, 1975. The strength of the principle of patrilineal descent and of the ensuing corporate descent groups has led many to term Jats a "tribe" rather than a "caste."

16 It also emerges from the finding in the Narangwal study that female growth faltering is at its maximum in the first year of life, and the subsequent performance of the survivors compares more favorably with that of boys (De Sweemer, 1983).

17 Punjab and Haryana rank high among Indian states in the practice of purdah, because Jat and other women there customarily veil their faces in front of their husbands' elder male kin (and therefore, to be safe, in public). However, this does not prevent them from breastfeeding their babies anywhere, and it certainly is not concomitant with seclusion: Haryanvi women stride around the village streets and the fields, busy with their chores.

18 Since there is no law compelling anyone to support his or her parents, this ruling has been passed in the context of the law that destitutes are the responsibility of their kin.

19 In this context, it is interesting that the Narangwal study (in the same district of Punjab) found that "mothers of children . . . who were severely malnourished at death [the great majority of whom were female] had sought treatment later in the course of illness than they did for children who were . . . better nourished" (Kielmann et al., 1983: 201, 208). This overlapping deprivation almost suggests that these children were earmarked for dying.

20 Presumably, unwanted male children should also be subject to discrimination, but this is difficult to detect in the present study because levels of contraceptive use are such that too few women reach parities high enough to generate many unwanted boys.

References

Arnold, Fred, and Liu Zhaoxiang. 1986. "Sex preference, fertility, and family planning in China," *Population and Development Review* 12, no. 2 (June): 221–246.

Bardan, Pranab K. 1974. "On life and death questions," *Economic and Political Weekly* 9, nos. 32–34 (August): 1293–1304.

———. 1982. "Little girls and death in India," *Economic and Political Weekly* 17, no. 36 (September): 1448–1450.

———. 1984. *Land, Labor and Rural Poverty*. Delhi: Oxford University Press.

Beals, Alan R. 1976. "Strategies of resort to curers in South India," in *Asian Medical Systems: A Comparative Study*, ed. C. Leslie. Berkeley: University of California Press, pp. 184–200.

Bhatia, Shushum. 1983. "Traditional practices affecting female health and survival: Evidence from countries of South Asia," in *Sex Differentials in Mortality*, ed. A. D. Lopez and L. T. Ruzicka. Canberra: Australian National University, pp. 165–178.

Census of India. 1981. *Report and Tables Based on 5 per cent Sample Data*, Series 1—India, Part II Special.

———. 1981b. *Primary Census Abstract General Population*, Series 1—India, Part II B(i).

———. 1981c. *General Population Tables and Primary Census Abstracts*, Series-17 Punjab, Part II-A and Part II-B.

Chakravarty, Lalita. 1986. "Poverty studies in the context of agricultural growth and demographic pressure: Case of post-independence India," paper prepared for the International Workshop on Rural Transformation in Asia, New Delhi, October.

Chen, Lincoln C., Emdadul Huq, and Stan D'Souza. 1981. "Sex bias in the family allocation of food and health care in rural Bangladesh," *Population and Development Review* 7, no. 1 (March): 55–70.

Cochrane, Susan H., D. J. O'Hara, and J. Leslie. 1980. "The effects of education on health," *World Bank Working Paper* no. 405. Washington, D.C.

Darling, Malcolm. 1947. *The Punjab Peasant in Prosperity and Debt,* 4th edition. Bombay: Oxford University Press.

Das Gupta, Monica. 1976. "Ladies first," paper prepared for the International Congress of Rural Sociologists, Poland.

———. 1978. "Production relations and population: Rampur," *Journal of Development Studies* 14, no. 4 (July): 177–187.

———. 1981. "Population trends and changes in village organization: Rampur revisited," Ph.D. thesis, University of Sussex.

De Sweemer, Cecile, Arnfried A. Kielmann, and Robert L. Parker. 1983. "Indicators of nutritional risk," in *Child and Maternal Health Services in Rural India: The Narangwal Experiment,* Vol. I, ed. A. A. Kielmann et al. Baltimore: The Johns Hopkins University Press.

D'Souza, Stan, and Lincoln C. Chen. 1980. "Sex differentials in mortality in rural Bangladesh," *Population and Development Review* 6, no. 2 (June): 257–270.

Dyson, Tim. 1987. "Excess female mortality in India: Uncertain evidence on a narrowing differential," paper prepared for the Workshop on Differential Female Mortality and Health Care in South Asia, Dhaka, January.

———, and Mick Moore. 1983. "On kinship structure, female autonomy, and demographic behavior in India," *Population and Development Review* 9, no. 1 (March): 35–60.

Gordon, John E., Sohan Singh, and John B. Wyon. 1965. "Causes of death at different ages, by sex, and by season, in a rural population of the Punjab, 1957–1959: A field study," *Indian Journal of Medical Research* 53, no. 9 (September): 906–917.

Harriss, Barbara. 1986. "The intrafamily distribution of hunger in South Asia," paper prepared for the WIDER project on hunger and poverty, seminar on food strategies, Helsinki, May.

Hershman, Paul. 1981. *Punjabi Kinship and Marriage.* Delhi: Hindustan Press.

Hutton, J. H. 1933 (reprinted 1986). *Census of India 1931,* Vol. 1. Delhi: Gian Publishing House.

Kessinger, Tom G. 1981. *Vilyatpur 1848–1968.* Berkeley: University of California Press.

Kielmann, Arnfried A., Cecile De Sweemer, Robert L. Parker, and Carl E. Taylor. 1983. "Analysis of morbidity and mortality," in *Child and Maternal Health Services in Rural India: The Narangwal Experiment,* Vol. I, ed. A. A. Kielmann et al. Baltimore: The Johns Hopkins University Press.

Leaf, Murray J. 1972. *Information and Behaviour in a Sikh Village.* Delhi: Oxford University Press.

Levinson, F. J. 1972. *Morinda: An Economic Analysis of Malnutrition among Young Children in Rural India.* MIT/Cornell University Press.

Lewis, Oscar. 1958. *Village Life in Northern India.* New York: Random House.

Miller, Barbara D. 1981. *The Endangered Sex.* Ithaca: Cornell University Press.

Miller, Don. 1975. *From Hierarchy to Stratification.* Delhi: Oxford University Press.

Panigrahi, Lalita. 1972. *British Social Policy and Female Infanticide in India.* Delhi: Munshiram Manoharlal.

Pettigrew, Joyce. 1975. *Robber Noblemen: A Study of the Political System of the Sikh Jats.* London: Routledge and Kegan Paul.

Pradhan, M. C. 1966. *The Political System of the Jats of Northern India.* London: Oxford University Press.

Registrar-General of India. 1981. *Survey on Infant and Child Mortality, 1979.* New Delhi.

———. 1985. *Newsletter* 16, no. 1 (January).

Sample Registration Scheme. 1985. *Bulletin* 19, no. 2 (December).

Sathar, Zeba. 1987. "Female mortality and health in Pakistan," paper prepared for the Workshop on Differential Female Mortality and Health Care in South Asia, Dhaka, January.

Scrimshaw, Susan C. M. 1978. "Infant mortality and behavior in the regulation of family size," *Population and Development Review* 4, no. 3 (September): 383–403.

Seckler, David. 1982. "The mystery of the sex ratio in the Punjab." New Delhi: The Ford Foundation, mimeo.

Sen, Amartya, and Sunil Sengupta. 1983. "Malnutrition of rural children and the sex bias," *Economic and Political Weekly* 18, nos. 19–21 (May): 855–864.

Simmons, George B., C. Smucker, S. Bernstein, and E. Jensen. 1982. "Postneonatal mortality in rural India: Implications of an economic model," *Demography* 19, no. 3 (August): 371–389.

Singh, Sohan, John E. Gordon, and John B. Wyon. 1962. "Medical care in fatal illnesses of a rural Punjab population," *Indian Journal of Medical Research* 50, no. 6 (November): 865–880.

Times of India. 1982. "Government against total ban on foetus tests," 27 July.

Visaria, Pravin M. 1969. *The Sex Ratio of the Population of India*, Census of India 1961, Vol. 1, Monograph no. 10.

Wyon, John B., and John E. Gordon. 1971. *The Khanna Study*. Cambridge: Harvard University Press.