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Sex Preference in Bangladesh, India and Pakistan, and its Effect on Fertility

THE widespread occurrence of preference for sons over daughters in Bangaladesh, India and Pakistan, and its underlying reasons are well-known (Prabhu 1963; Kapadia 1966; May and Heer 1968; Williamson 1976; Miller 1981; Amin and Mariam 1987; Jeffery *et al.* 1989; Vlassoff 1990; ORG n.d.). Social, religious, economic, and psychological reasons for son preference exist in varying degrees among all population groups in the Asian subcontinent except a few marginal ones with a tradition of matriarchy. The behavioral and fertility consequences of preferring one sex over another, however, are not so clear. The objective of this paper is to review the quantitative findings regardng attitudinal and behavioral evidence of sex preference from surveys conducted in Bangladesh, India and Pakistan, and assess its impact on contraceptive use and fertility. An attempt will also be made to compare the strength of son preference in the three countries.

Attitudinal Evidence

Quantitative evidence regarding sex preference usually comes from survey questions on (1) desired number of sons and daughters, (2) order of preferences for various possible combinations of sons and daughters, (3) preference for the sex of the next child, and (4) desire for additional children.

A few studies in Bangladesh (e.g., Bairagi and Langsten 1986; Chowdhury and Bairagi 1990) and India (e.g., Bhatia 1978; Khan and Prasad 1985) have used the responses to questions on desired or ideal number of sons and daughters in order to assess the preference of one sex over another. All the studies indicate a general preference of sons over daughters as well as a desire for at least one daughter, although usually not before two sons are born. The data regarding desired or ideal number of children are not very appropriate for measuring sex preference because they represent first-choice responses and confound the issues of desired family size and sex composition of children.

A measure known as the Coombs sex preference scale has been devised to disentangle the two phenomena (Coombs, Coombs, and McClelland 1975). This measure, based on survey data using questions referred to in (2) above, places respondents on a sex preference continuum. Unfortunately, no survey in South Asia has collected data necessary for measur-

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ing the Coombs scale except in Matlab Upazila, Bangladesh (Ahmed 1981). A survey conducted among 1,050 sample households in Matlab in 1975-76 shows that while son preference, measured according to Coombs scale, was related to woman's age, age at first cohabitation, education, and attitude toward the use of contraceptives, it remained high for all variables. Compared on the basis of the Coombs scale measure, Matlab women had stronger son preference than Malaysian and Korean women.

Date regarding stated preference for the sex of the next child were collected in the Bangaladesh Fertility Survey (1975) and the Pakistan Fertility Survey (1975). In Bangladesh, among currently married fecund women of all parities, 60 per cent wanted their next child to be a boy while only 7 per cent wanted it to be a girl (Cleland, Verrall, and Vaessen 1983:11), thirty-three percent were undecided. In Pakistan 71 per cent preferred to have a boy, 5 per cent a girl, and 24 per cent were undecided. Among 27 countries for which World Fertility Survey date related to this indicator are available similar strong son preference was prevalent in Jordan, Korea, Nepal, and Syria.

The type of attitudinal date that are more commonly collected, especially for Bangladesh, India, and Pakistan, are responses of women to questions asking whether or not they desire any more children. Sets of such survey data from each of the three countries, classified according to parity and sex composition of children, are presented in Table 1. These surveys were conducted during a space of two decades, from 1969 to 1988. A few other surveys in these countries were designed to collect data on stated desire to have additional children, but they are not available in comparable categories and hence have not been used in Table 1 (e.g., Mannan 1988 for Bangladesh; Lahiri 1975 for India; Khan and Sirageldin 1977 and PWD 1986 for Pakistan).

All ten sets of data presented in Table 1 were collected in nationwide sample surveys except the one (col. 3) from Companiganj Upazila in Bangladesh. The combinations of parity and sex composition for which data are available are not the same for all surveys. All possible sex combinations for parities up to three are available for all sets. Data for mothers with four children are not available for the Pakistan survey conducted in 1979-80 and are also incomplete for Indian surveys conducted in 1980 and 1988. Hence figures in a few cells of Table 1 are missing. Comparable data for mothers with five or more children are rare. Most mothers in this category (often over 90 per cent) want no more children irrespecitve of the sex combination of their living children.

An examination of the figures in Table 1 brings out clearly the widely prevalent preference for sons in all three countries. Take, for example, the percentages of women with three living children (of varying sex composition) who wanted no more children in Bangladesh (1975), India (1980), and Pakistan (1975) presented in columns (2), (6), and (8), respectively. In each case, figures for mothers having two sons and one daughter are considerably higher than those for mothers having two daughters and one son (in Bangaladesh 80.4 and 67.2 per cent, in India 89 and 72, and in Pakistan 65 and 27). Evidence of son preference in each country can be observed by similar comparison of percentages for most of the sex compositions in each parity.

Although a preference for sons is evident in the figures presented in Table 1, these also reveal a common desire of parents for at least one daughter. For example, among the parity-3 mothers the percentages wanting no more children were less for those having three sons

TABLE 1 : PERCENTAGE OF MARRIED WOMEN WANTING NO MORE CHILDREN, BY NUMBER OF LIVING SONS AND DAUGHTERS: BANGLADESH, INDIA AND PAKISTAN

		Nationwide Bangladesh	*Nationwide Bangladesh*	*Companiqanj Bangladesh*	*Nationwide Bangladesh*	*Nationwide India*	*Nationwide India*	*Nationwide India*	*Nationwide Pakistan*	*Nationwide Rural Pakistan*	*Nationwide Urban Pakistan*
		1969	*1975*	*1976*	*1979*	*1970*	*1980*	*1988*	*1975*	*1979-80*	*1979-80*
		(D	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
1 Child	No son	16.6	48.3	4.0	8.3	13.5	10.0	13.0	_	1.5	2.2
	One son	17,3	52.3	6.0	13.0	25.8	17.0	22.0	_	4.1	6.8
2 Children	No son	31.4	49.9	9.0	23.5	21.4	25.0	33.0	6.0	6.2	6.8
	One son	41.4	66.0	19.0	46.0	45.8	56.0	63.0	32.0	19.4	26.8
	Two sons	33.5	69.2	22.0	42.5	44.0	52.0	69.0	39.0	8.1	26.7
3 Children	No son	48.5	55.7	10.0	34.6	37.8	32.0	33.0	6.0	72[2]	20.3[2]
	One son	46.9	67.2	26.0	61.9	60.5	72.0	72.0	27.0	42.6[2]	49.7[2]
	Two sons	68.4	80.4	54.0	79.2	75.2	89.0	89.0	65.0	58.9[2]	76.9[2]
	Three sons	51.4	70.1	42.0	64.1	48.1	77.0	87.0	61.0	76.2[2]	87.S[2]
4 Children	No son	40.9	61.0	0.0	43.0	20.7	4l'.0	39[1].0	21.0	_	_
	One son	63.0	80.8	72.0	79.0	73.3	80'.0	78[1].0	42.0	_	„
	Two sons	83.8	82.3	82.0	84.7	90.4	96^0	93\0	73.0	_	_
	Three sons	85.8	90.3	88.0	88.8	90.1	96[1].0	*90[l].O*	84.0	_	_
	Four sons	21.5	77.3	40.0	78.5	75.3	-	-	75.0	-	-
Attitudinal Index of Son Preference		12/18 = .67	15/19 = .79	16/20 = .80	15/20 = .75	13/18 = .72	13/15 = .87	14/16 = .88	17/19 = .89	8/9 = .89	9/9 = 1.0

SOURCES

Columns (1 and 4)	Amin and Mariam (1987)
Column (2)	Bangladesh, MHPC (1978)
Column (3)	Bairagi and Langsten (1986)
Column (5)	Sarma and Jain (1974)
Columns (6 and 7)	ORG (1990); Khan and Prasad (1985)
Column (8)	Cleland, Verrall, Vaessen (1983)
Columns (9 and 10)	Ali (1989)

Notes

1 . Figures presented in Cols. (6) and (7) for four-child families in India represent those families with four+ children. That is, figures in the four consecutive rows correspond to (1) no son and four+ daughters, (2) one son and three+ daughters, (3) two sons and two+ daughters, and (4) three sons and one+ daughters.

2. Figures presented in Cols. (9) and (10) for three-child families in Pakistan represent those for families with three+ children. That is, figures in the four consecutive rows correspond to (1) no son and threc+ daughters, (2) no son and two+ daughters, (3) two sons and one+ daughters, and (4) three sons and 0+ daughters.

and no daughter than for those having two sons and one daughter in each data set except those in Pakistan (cols. 9 and 10). This implies that mothers havng two sons and one daughter were more inclined to perceive their family as complete than those having three sons and no daughter. A similar inference can be made by comparing the figures for mothers having three sons and one daughter with those for mothers having four sons.

In order to compare the prevalence of son preference in the three countries or to examine the trend of son preference within a country, it is necessary to derive a single summary measure of son preference for each data set based on the figures available for all parities. Such a measure, designated as the attitudinal index of son preference in Table 1, has been derived following the methodology used by Freeman and Coombs (1974:26) in a cross-cultural comparison of sex preference. If, at a given parity, comparison between two rows in Table 1 shows that the percentage wanting no more children is higher for those having a specific number of sons compared to the percentage for women having fewer sons, this may be defined as evidence of son preference. The difference in percentage points should be two or more to be considered as consistent with son preference.

The attitudinal index of son preference, presented in Table 1, is computed as a ratio of the number of comparisons consistent with son preference to the total number of comparisons possible from the available data (excluding comparisons with a difference of less than two percentage points). The index ranges from .67 to .80 in Bangladesh, from .72 to .88 in India, and from .89 to 1.0 in Pakistan. The indexes for Bangladesh and India are somewhat similar. Consistently higher indexes for Pakistan suggest a wider prevalence of son preference there compared to Bangladesh and India. Higher national indexes for 1975 and 1979 compared to the national index for 1969 in Bangladesh indicate some increase in the prevalence of son preference during the period. The increments in India form 1970 to 1980 and from 1980 to 1988 indicate a similar trend.

One limitation of the data presented in Table 1 is that in all the surveys except those for India they represent responses of women only. Indian national surverys were designed to interview husband or wife, depending upon whether the household was assigned an even or odd sample number. Relevant data for husbands and wives separately, however, are not available. Men are likely to have a stronger son preference than women (Williamson 1976; Coombs and Fernandez 1978; Nag and Duza 1988).

Behavioral Evidence: Neglect of Daughters in Food Allocation and Health Care

Discrimination against daughters in favour of sons begins immediately after birth in Bangladesh, India, and Pakistan. Ethnographic literature describes how rituals celebrating birth and the critical phases of children's growth are more elaborate and joyous in the case of sons. Societal and parental discriminaton against girls in education is reflected in a significantly lower proportion of girls enrolled in school in all three countries (World Bank 1990: 234). Despite some legal provisions safeguarding the rights of daughters in inheriting property, very often women are not in a position to take full advantage of those rights. Discrimination against daughters in these aspects of life have a long-term deleterious effect on them. What is more immediately harmful to them—even leading to higher mortality than among sons during infancy and childhood—is the discrimination in health care and

household food allocation (Miller 1981; Miller 1984; Chatterjee 1989; Harriss 1989). Although female infanticide is reported to have been practiced in some areas of India and Pakistan (Pakrasi 1970; Miller 1981), it has never been the norm anywhere in the subcontinent and direct evidence for it is rare. The availability of amniocentesis in recent years in urban areas, especially of India, have made it possible for couples to take recourse to female feticide, but its incidence is probably negligible at national levels (Jeffery, Jeffery, and Lyon 1984). However, by now there is sufficient survey evidence, although not easily obtainable, of discrimination against girls in health care and nurtition. The relevant findings from a few in-depth community-level surveys, along with available data regarding the sex differential in infant and child morality, are presented below.

Bangladesh

Matlab Villages. Most of the evidence of son preference in intrafamily food distribution and utilisation of health services in Bangladesh comes from studies conducted in Matlab Upazila. In a longitudinal study of 130 Muslim families in six Matlab villages in 1978-79, Chen, Huq and D'Souza (1981) find that calorie and protein consumption was less among females than males for all age groups. Among children aged 0-4 average daily calorie intake between June and August 1978 was 694 gms for girls compared to 809 gms for boys; the average daily protein intake was 20.2 gms for girls and 23.0 gms for boys. Allocation of food within households was done by women. When asked directly regarding distributional bias in favour of sons, they tended to deny unequal treatment. However, if the inquiry presented a hypothetical situation of marked overall food shortage, son preference was expressed by a majority of women. Distributional preference was reflected not only with respect to the quantity of food but also to the socially preceived quality of food, not necessarily coinciding with nutritional quality. Other studies in Matlab have shown no bias against female children in breastfeeding (Huffman *etal.l* 980; Koenig and Wojtyniak 1987).

The nutritional advantage of Matlab boys over girls is confirmed by their superior anthropometric index (Chen, Huq, and D'Souza 1981). Among 882 children under 5 years measured by a weight-for-age standard, 14.4 per cent of girls were serverely malnourished compared to 5.1 per cent of boys. The proportion of moderately malnourished girls (59.6 per cent) also exceeded that of boys (54.8 per cent). Food consumption is fundamental to nutritional well-being, but infections too are critically important in influencing nutritional status. As regards the incidence of infectious diseases there was no significant difference between Matlab boys and girls under 5 years but the recovery rate from these diseases was higher for boys. Data regarding utilisation of a free treatment facility for diarrheal diseases shows that boys were brought to the facility by their guardians far more frequently than girls. The treatment rate averaged 135.6 visits per 1,000 boys compared to 81.9 among girls.

Parental son preference in seeking medical care is also evident in another Matlab study of medicines purchased for children less than 5 years of age from 68 privately owned pharmacies in the study area (Hossain and Glass 1988). Defining the average rate of medicine purchase as the number of purchases per 1,000 person-weeks, the ratio of male to female purchases was 1.7 for overall drug pruchases and 2.9 for medicines prescribed by physicians (whose fees were considerably higher than those of pharmacists and other health

practitioners). The average number of items per purchase, the distribution of the costs of the purchases for each prescribed category, and the distances traveled by the purchasers were not markedly different for male and female children. The results demonstrate Matlab parents' greater concern for the health of their sons than of their daughters.

Preferential treatment of Matlab boys in health care and food allocation is reflected in their lower mortality as compared with girls. The mortality rates estimated from Matlab birth and death registration data for 1974-78 show that in the postneonatal (1-11 months) and the 1 - 4 age groups, mortality rates for girls were significantly higher than for boys. The higher mortality among boys during the neonatal period (0 - 1 month) is consistent with evidence from many societies that the biological risks of death for newborns is higher among boys than among girls (Madigan 1957; Shettles 1958). Similar findings are reported by Koenig and D'Souza (1986) in a longitudinal study of a cohort of 11,454 births in Matlab during the same period. In the age group 1 - 4 years, female mortality exceeded male mortality by 59 per cent.

There is evidence from Matlab that during famine when food supply is acutely short the tendency of parents to discriminate against daughters increases. In a study of 1400 children aged 1 - 4 in 12 Matlab villages, Bairagi (1986) confirms the earlier finding of Chowdhury and Chen (1977) that the effects of the 1975-76 famine on nutritional status were more acute among girls than among boys. Also, male-female differences were consistently higher among children of high socioeconomic status. There is also evidence from Matlab that seasonal differences in availability of food have an effect on sex differentials in child mortality. For example, Koenig and Wojtyniak (1987) have found that during November, prior to the availability of rice from the main harvest, excess female mortality among children aged 1 - 4 years in Matlab comprised 35 per cent of all child mortality, while during March when food is somewhat plentiful, excess female mortality accounted for only 12 per cent of child mortality.

That the sex differential in child mortality is less in a more advantageous situation has been demonstrated in a comparison between child mortality data from Matlab and data from Teknaf, another area of Bangladesh where food supply is not a major problem due to the availability of less expensive rice from nearby Myanmar (Burma) and the abundance offish as a source of protein (Koening the Wojtyniak 1987). Although the average infant mortality rate in Teknaf during 1978-84 was higher (137 per 1000 live births) compared to Matlab (113), the mortality rate of children 1 - 4 years was substantially less in Teknaf and the excess female mortality among these children was considerably less as well. Relatively less sex bias in food allocation among chidlren in Teknaf was also indicated by smaller differences in nutritional status (in terms of an anthropometric index of weight-for-age) between boys and girls in Teknaf than in Matlab.

The differential effect of mother's education on the survival of boys and girls has been demonstrated in a study based on a 2 year follow-up of 7,913 live births that occurred in the Matlab study area during the whole of 1982 (Bhuiya and Streatfield 1991). Hazard analysis shows convincingly that the positive effect of mother's education is greater for the survival of boys than of girls.

India

Punjab Villages. The best empirical evidence regarding discriminatory behavior against girls in India comes from a few village studies in Punjab. One of them is a 1984-87 restudy

of 11 villages in Ludhiana district, Punjab (Das Gupta 1987, 1990) that were originally surveyed in the 1950s in the Khanna Study (Wyon and Gordon 1971). Data on intrafamilial distribution of various consumption items were collected from 400 households from six of the 11 Khanna Study villages. Infant and child mortality rates (deaths per 1,000 live births in the age group below 60 months) are based on live births in 11 villages from 1965 to 1984. As expected, male mortality was higher than female mortality during the neonatal period. For all ages from one to 59 months, female mortality rates were far higher than male mortality rates. Between one and 23 months, when a large proportion of childhood deaths occurs, the female rates were nearly twice those of males. The data on sex differentials in child mortality by birth order show that the burden of excess mortality falls most heavily on girls at higher birth orders. There was a steep rise in the mortality of girls at birth order four and higher. Four and higher order births appeared to be geared toward achieving the desired quota of boys. A surprising finding from Das Gupta's study is that girls born to mothers who already had one or more surviving daughters were subjected to an increasing concentration of excess mortality relative to other children if their mothers were younger, and more so if their mothers were educated. An analysis of 1981 national level census data on child mortality, however, strongly suggests that mother's education has a greater effect on the survival of daughters than of sons (Bourne and Walker 1991).

Das Gupta (1990) finds evidence of discrimination in favour of male children in the allocation of medical care and food. The maximum differential was found in the first two years of life. The expenditure on medicine for boys was twice that for girls in the age group 0-1 year. For the 1 - 4 age group the difference in expenditure on this item was small. The expenditure on clothing was less for girls than for boys at all ages—perhaps contributing to higher mortality among girls in winter when the temperature falls to just above freezing. The data on allocation of food show that although caloric intake was roughly the same for boys and girls, girls were given more cereals, while boys were given more milk and fats with their cereals. Among older children, boys consumed a little more of each foodstuff, with the difference larger in the case of fats. Since the sex differential in medical care was greater than in nutriton, Das Gupta thinks that the relative deprivation of girls in medical care perhaps contributed more toward their higher mortality than did nutritional deprivation.

In an earlier (1955-59) study of three villages near the town of Khanna in Punjab, Wyon the Gordon (1971:186-194) found evidence of discrimination against girls in medical care and allocation of food among children below 3 years of age. Life table analysis shows that except for the age group 1 - 5 months, mortality rates were consistently higher for female children than for male children. For example, deaths per 1000 person-years lived among children aged 6-11 months were 151 for girls and 106 for boys. The causes of death for boys and girls were similar and mothers started feeding boys and girls with solid foods at the same time, but parents gave boys higher quality medical care (Singh, Gordon, and Wyon 1962) and possibly more supplementary food.

More evidence of discrimination against girls in Punjab comes from a 1971-73 survey carried out at the Narangwal Rural Health Research Centre, also located in Ludhiana district (DeSweemer, Kielmann, and Parker 1983). The food intake data for 169 children between 6 months and 3 years of age from six villages show that female children received less food than males. In comparison with male children, females received 86 percentas many calories,

84 percent as much protein, 69 per cent as much calcium, 88 percent as much iron, and 78 percent as much vitamin A. The sex differencial in food intake is reflected in lesser weight gain among girls than boys and in higher mortality among girls except during the first seven days of life. Female deaths were 53 percent of total neonatal deaths, 59 percent of total postneonatal deaths, and 63 percent of total mortality among children 1-3 years old. For the total period of 0 - 3 years of age, female deaths formed 59 per cent of total mortality (Kielmann *et al.* 1983).

A Slum in Delhi. In a 1985-86 survey conducted among two ethnically different groups of poor households living in a resettlement slum in Delhi, Basu (1989) collected data regarding sex differentials in mortality, nutrition, and health care among children between 6 months and 12 years of age. One group of households originated in two contiguous districts in the northern Indian state of Uttar Pradesh and another in four contiguous districts in the southern state of Tamil Nadu. Their socioeconomic levels were similar and their physical environment identical; yet the retrospective data on child mortality collected from these groups show differences similar to those found in secondary data from the two states of origin. In the Tamil Nadu group the proportion of children dead among those born to ever-married women was lower and differences in their proportions between the sexes were also lower compared to the Uttar Pradesh group. An analysis covering all children born during the previous 12 years with at least one younger living sibling shows that in Uttar Pradesh mortality among children aged 6 months to 12 years is considerably higher among females than among males, whereas in Tamil Nadu the corresponding female/male difference was quite small.

Although child mortality among females was considerably higher than among males in the Uttar Pradesh sample, the proportion of severe malnutrition cases, as assessed from weight-for-age measurement, was higher among males than females. Food consumption data also show that in Uttar Pradesh boys received slighly poorer diets than girls as regards some choice food items such as fruits, eggs, and multi-vitamins (although the boys did slightly better on milk). Basu thinks that the slightly better diet of the girls in the Uttar Pradesh sample is not an indication of favouritism toward daughters, but probably reflects other circumstances, such as longer presence of daughters at home which increases their access to food, especially to snacks. In the Tamil Nadu sample, the food intake of boys and girls appeared to be similar. Apparently the female/male differential in mortality in the Uttar Pradesh sample cannot be explained by sex differentials in food consumption. Basu, however, finds an explanation in the treatment of illness. There was no large sex differential in the average number of reported illnesses during the six-month study, and no large differential in the percentage of living children who were immunized against a few childhood diseases. However, with respct to respiratory and gastro-intestinal illnesses, girls in the Uttar Pradesh sample were more likely to receive no treatment or non-professional treatment (home remedies etc.) than boys, and boys were more likely to get modern clinical treatment. In the Tamil Nadu sample, the picture was less clear. The efficacy of modern clinical treatment by government or private physicians appeared to be well known among both ethnic groups. Hence the difference in the referral rates between boys and girls in the Uttar Pradesh sample is clear evidence of a greater desire to have a son cared for

An Uttar Pradesh Village. In a 1982-83 in-depth study of a village in Uttar Pradesh, Khan *et al.* (1989) found that although their 20 female informants gave them the impression that they did not discriminate between male and female children either in breastfeeding or in distribution of food, in practice there was discrimination againstgirls. In the case of four mothers whose first-born child was a daughter, they wanted to become pregnant as early as possible in the hope of getting a son, and they stopped breastfeeding as soon as they conceived. In the case of three women whose first child was a son, they tried to avoid the early birth of the next child through abstinence so that they would be able to pay more attention to their son. No differentiation between sons and daughters was noticed in consumption of regular food like *chappati* (bread), rice, and vegetables, but sons were favoured in the distribution of more-nutritious foods like milk, butter, and eggs.

All female informants in the Uttar Pradesh village denied that in treatment for illness there was any discrimination in favour of sons. But observations as well as records in the primary health center showed that boys were given medical attention at an earlier stage of illness than girls and that the treatmentreceived by boys was of a better quality. For example, out of a total of 58 children who visited the primary health center in January 1983,43 (74.1 percent) were male and only 15 (25.9 percent) were female. There is no reason to believe that morbidity was less frequent among female children than among male children. For example, out of 163 persons reported sick in the previous month in a household survey of the village, 84 were male and 79 female. Analysis of the reproductive history of 31 women from 20 informant families shows that mortality among female children (below 10 years of age) of Hindu high-caste families was considerably higher than among male children of Hindu low-caste and Muslim families. Apparently, sex discrimination against girls in food consumption and health care was stronger among Hindu high castes than others.

Two West Bengal Villages. In a study of two villages (Kuchli and Sahajapur) of West Bengal, Sen and Sengupta (1983) found a systematic bias against girls reflected in both (i) the greater prevalence of undernourishment among girls than among boys and (ii) the lower growth dynamics of girls *vis-a-vis* boys. The malnutrition level of children in general was much higher in Sahajapur than in Kuchli but sex bias was more prevalent in Kuchli. The undernourishment index for Shahjapur and Kuchli girls was about the same. The superior nutritional status of the Kuchli boys *vis-a-vis* Sahajapur boys was responsible for the greater male/female difference in Kuchli as well as for the entire advantage of Kuchli over Sahajapur in average nutrition of children. The West Bengal government's policy of land reform was implemented better in Kuchli, but the economic advantage accruing to the poor families of Kuchli as a consequence of the policy seems to have benefitted boys more than girls. In Sahajapur both sons and daughters of literate mothers did consistently better in terms of children's nourishment than those of illiterate mothers, but in Kuchli the difference was clear-cut only in the case of boys. A direct nutritional programme for tribal children in Sahajapur contributed to a higher nurtitional level for these children than their counterparts in Kuchli.

Sex **Differentials in Infant and Child Mortality at the National Level**

Discrimination against daughters in favour of sons in health care and food allocation is reflected in sex differentials in infant and child mortality at the national level.

Banqladesh. The available national-level mortality data by age and sex indicate that the female infant mortality rate in Bangladesh was consistently less than the male rate for each year between 1983 and 1988 (Bangladesh, BBS 1990). The difference was greater in urban areas compared to rural areas, implying less interference with the higher biological survival capacity of female than male children in urban areas. Mortality among children of 1 - 4 years at the national level was higher for girls than for boys in all six years except 1983. The difference was greater in rural areas, implying greater discirmination against girls in those areas.

India. At the all-India level, there is very little sex differentials in the infant mortality rate (IMR). For example, in 1981 the IMR for males was 110 per 1000 births and for females 111; in 1987 the corresponding rates were 95 and 96 respectively (India, ORG 1985; India, ORG 1989). The estimates derived from surveys in local areas in India suggest that the absence of sex differentials in infant mortality estimates often obscures higher male mortality during the neonatal period and higher female mortality during the postneonatal period. The early childhood (0-4 years) mortality rate per 1000 population at the all-India level is higher for females than for males. For example, in 1981 the rates were 43.3 for females and 39.2 for males; in 1986 the corresponding rates were 36.8 and 33.6. The sex differential in the early childhood mortality rate was higher in rural areas than in urban areas.

An analysis of Indian sample registration data (1970 to 1980) as well as fertility survey data collected in the 1981 census of India shows that both at the all-India level and at state levels, sex differentials in early childhood mortality are narrowing (Dyson 1988; Dyson 1989). It also shows that female early childhood mortality is greatest in northern and western states (Bihar, Gujarat, Haryana, Madhya Pradesh, Punjab, Rajasthan and Uttar Pradesh) and least in southern states of Kerala and Tamil Nadu. The southern states of India, in contrast to states in the north, are characterized by lower marital fertility, later age at marriage, lower infant and child mortality, lower ratios of female to male infant and child mortality, and a comparatively high female to male sex ratio in the 0 - 9 age group of children (Dyson and Moore 1983; Miller 1989). The division between the two demographic regimes broadly coincides with the division between areas of northern kinship/low female autonomy and southern kinship/high female autonomy.

Pakistan. The Pakistan Fertility Survey (1975) data show very little difference between male and female infant mortality rates—141 and 137 per 1000 births respectively. This finding is similar to the male/female estimates of 137 and 135 derived from the Population Growth Experiment Survey (1962-65) (Alam and Cleland 1984). Again, the virtual identity of male and female infant mortality rates obscures the fact of higher male mortality during the neonatal stage and higher female mortality during the post-neonatal stage. Excess female mortality at the post-neonatal stage was maintaind into childhood (Alam and Cleland 1984; Rukanuddin 1967). A similar pattern of sex differentials in infant and childhood mortality in Pakistan can be observed in the estimates derived from the 1979 Population, Labour Force and Migration Survey (Sathar 1985).

The male and female infant mortality estimates derived from the PFS provide no evidence of a rise in female infant mortality with a rise in the number of older surviving daughters. But an analysis of the Population, Labour Force and Migration Survey by Sathar

(1985,1987) shows that the higher post-neonatal mortality for girls was further exacerbated if the previous sibling was also a girl. The findings of these studies suggest that there was discrimination in food allocation and health care against female children after they survived the neonatal stage and that perhpas it was stronger when two daughters were born in succession. According to Sathar (1987), it is still customary in many Pakistani households for adult females and female children to eat after adult males and male children have finished their meals; hence they are likely to eat less, if food is insufficient. Again, since a daughter's health is basically a concern of her mother, the custom of female seclusion and segregation makes it more difficult for sick female children to get proper medical care than for sick male children, who are often taken by their fathers to health centers or practitioners. No survey data, however, are available for Pakistan to demonstrate discrimination against daughters in food allocation and health care.

Sex **Preference and the Use of Contraception**

Since acceptance of sterilisation as a contraceptive method represents a decisive action to stop childbearing, data regarding sterilisation acceptors according to parity and sex composition can be used to assess the strength of sex preference. These data can also be used to assess the effect of sex preference on contraceptive use— a proximate determinant of fertility. Unfortunately survey data regarding sterilisation acceptors according to parity and sex composition of living children are rarely available. More commonly available are survey data regarding use of all contraceptive methods according to parity and sex composition of living children. Since in South Asian countries sterilisation is the most frequently used constraceptive method, contraceptive use data by parity and sex composition of living children are expected to reflect fairly the strength of sex preference.

Data regarding the percentage of women using contraception according to number and sex composition of their living children are available from four surveys in Bangladesh, three in India, and one in Pakistan. These are presented in Table 2. As in the case of data regarding desire for no more children, relevant comparable data regarding contraceptive use are available for mothers with up to four children.

It can be observed from Table 2 that for all the data sets except the 1970 nationwide survey in India, the percent of women of each parity using contraception tends to increase with the number of living sons, indicating a widely prevalent preference for sons. For 1970, Indian survey data show a number of deviations for women of parity 3 and 4. As in the case of stated desire for no more children, contraceptive use data also indicate a common desire for at least one daughter. For example, among the parity-3 women the percentages using contraception were less for those having three sons and one daughter than for those having two sons and one daughter in most of the surveys presented in Table 2.

Following a procedure similar to that employed in the case of data regarding desire for no more children (Table 1), a contraception index of son preference has been computed from each data set presented in Table 2. If, at a given parity, comparison between two rows in Table 2 shows that the percentage of women practicing contraception is higher for those having a specific number of sons compared to the percentage for women having fewer sons, this may be defined as evidence of son preference. The index varies from .69 to .94 and,

TABLE 2: PERCENTAGE OF WOMEN CURRENTLY USING CONTRACEPTION, BY NUMBER OF LIVING SONS AND DAUGHTERS: BANGLADESH, INDIA, AND PAKISTAN

		Nationwide	*Nationwide*	*Companiganj*	*Nationwide*	*Nationwide*	*Rural South*	*Baroda City*	*Nationwide*
		Bangladesh	*Bangladesh*	*Bangladesh*	*Bangladesh*	*India*	*Gujarat, India*	*India*	*Pakistan*
		1969	*1975*	*1976*	*1979*	*1970*	*1979-80*	*1979-80*	*1975*
		(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
1 Child	No son	0.5	7.6	0	10.7	6.4	9.1	23.8	0
	One son	0.6	5.5	3	12.1	6.4	12.5	27.6	0
2 Children	No son	0.3	4.6	2	12.4	7.9	12.3	46.9	4
	One son	2.8	6.9	7	17.8	9.6	46.2	64.4	5
	Two sons	2.0	8.6	18	18.1	16.8	51.7	70.6	4
3 Children	No son	2.8	8.6	0	12.3	17.6	19.0	54.0	2
	One son	2.2	9.8	7	18.6	10.3	58.0	71.3	9
	Two sons	7.2	13.8	4	21.3	15.9	82.9	84.2	6
	Three sons	6.2	8.4	5	21.4	11.8	80.7	83.9	7
4 Children	No son	6.2	5.7	0	16.7	19.3	38.9	45.8	4
	One son	4.0	9.3	11	19.0	15.3	71.6	75.3	10
	Two sons	6.2	11.0	13	24.3	14.2	85.9	88.0	9
	Three sons	1.3	16.4	12	25.3	13.7	91.5	80.6	8
	Four sons	16.7	12.3	0	17.5	6.9	78.1	88.5	12
Contraception Index of Son Preference		10/14 = .71	11/14 = .79	11/16 = .69	12/14 = .86	3/13 = .23	17/20 = .85	17/18 = .94	10/13 = .78

SOURCES

Columns (1 and 4)	Amin and Mariam (1987)
Column (2)	Bangladesh, MHPC (1978)
Column (3)	Bairagi and Langsten (1986)
Column (5)	Sarma and Jain (1974)
Columns (6 and 7)	Das (1987)
Column (8)	Cleland, Verrall, Vaessen (1983)

with the singular exception of .23 for the nationwide Indian survey (1970), indicates a strong son preference in the three countries. The highest indexes (.94 and .85) are reflected in urban and rural data sets respectively of Gujarat (Das 1987). Contraceptive prevalence levels were also highest in those two areas: 71 percent and 62 percent respectively. The results suggest that the effect of son preference on contraceptive use increases as contraceptive prevalence increases.

To assess the effect of sex preference on contraceptive use, Arnold (1985) has devised a method that compares actual contraceptive prevalence among women of each parity and sex composition of living children with the corresponding hypothetical estimate of prevalence derived on the assumption of no effect of sex preference on contraceptive use. If the sex of children is assumed to be of no importance, all couples with varying composition of living children at any parity are expected to use contraception at the same rate as those couples at the same parity who are currently most satisfied with the sex composition of their children, that is, at the maximum actual rate within thatparity. By using the 1975 Bangladesh Fertility Survey data on contraceptive use, Arnold (1987) finds that, on the assumption of total absence of sex preference, the percentage of women using contraception would be 11.2 compared to the actual estimate of 9.6. Similarly, by using 1970 national survey data collected in India, he finds that in the absence of sex preference, contraceptive prevalence would be 15.9 percent compared to the actual estimate of 12.2 percent. Citing findings from 25 other countries, he concludes that even if sex preference was pervasive in a society, it did not have as strong an influence on contraceptive use as would be suggested by the attitudinal and contraceptive use data by parity and sex composition of living children. He also comments that efforts to reduce son preference by improving the status of women, although highly desirable in themselves, are not likely to have a major inpact on contraceptive prevalence rates or fertility rates. Bairagi (1987), however, points out that Arnold's method is likely to underestimate the true effect of son preference because of the possible partiy-specific heterogeneity of preferences.

Arnold (1985) did not test the statistical significance of the discrepancies between acutal contraceptive prevalence for varying sex composition of children within each parity and the estimates of prevalence were derived on the assumption of "no composition effect". Cleland *et al.* (1983) have applied such a test to the data collected in the Bangladesh Fertility Survey and the Pakistan Fertility Survey. The results show no significant association between sex composition of living children and use of contraception in Bangladesh and Pakistan in 1975. Contraceptive prevalence in both countries was quite low at that date.

Rahman, Akbar, and Phillips (1990) have used more refined measures and statistical methods to analyse prospective fertility data (1982-87) collected from 3,145 married women in the Matlab Treatment Area who had singleton births in 1982. A longitudinal record of births, deaths, and contraceptive use for each mother was kept for five years. The results of bivariate and regression analysis show that both acceptance and continuation of contraception increased substantially with the number of surviving sons at each parity level. An indication of a 'daugher preference' also is suggested in the finding that for parents with three and four surviving children, contraceptive acceptance and continuation was higher among those who had a combination of sons and daughters than among those with sons only. The effect of son preference on contraceptive use was more evident among sterilisation acceptors than among users of other methods. Nearly every couple who accepted sterilisation

had at least one son, and the proportion of sons predominated among children of those couples.

Applying Arnold's method to the Matlab Treatment Area data, Rahman *et al.* (1990) find that the effect of sex preference increased the contraceptive acceptance rate by 10 points and the continuation rate by 15 points. Such increases would imply that in the absence of sex preference, contraceptive acceptance would increase by 8 points above the 50 percent rate achieved in the Matlab Treatment Area by 1990. This, in turn, would avert nealy half a birth per woman in the absence of change in other proximate determinants of fertility. The findings of this study suggest that sex preference— the predominant desire for two or more sons and at least one daughter—may have an increasingly dampening effect on the rates of contraceptive acceptance and continuation in Bangladesh, as the national contraceptive prevalence rate (31 percent in 1989) approaches the rate achieved already in the Matlab Treatment Area.

The Effect of Sex Preference on Fertility

A strong preference for children of one sex can be a constraint on fertility decline if couples who have already reached their desired family size continue childbearing until they achieve the desired sex composition of children. Sheps (1963) has shown mathematically that if the probability of having a boy is the same for all individuals, the expected family size increases with increasing preference for one sex over the other. For example, in a hypothetical situation of perfect fertility control, if all fertile couples desire a minimum of two sons and would not stop childbearing until having two, they would average 3.88 children, whereas if all couples desire at least one son and one daughter, they would average 3.00 children. For any desired family size, the actual number of children born would be smallest if there were no sex preference and largest if the desire were to have all children of one sex only. The effect of sex preference on fertility is expected to vary in population groups according to the strength of preference, probability of child survival, and contraceptive prevalence. Relevant empirical studies of a few groups in Bangladesh, India and Pakistan are reviewed below. Studies done so far by analysing data from other developing countries have generally concluded that the link between sex preference and fertility is often rather weak (Ben-Porath 1972; Kent and Larson 1982; Arnold and Liu 1986; Park 1986; Arnold 1987; Arnold 1991).

Bangladesh

By using the reproductive history data (1961-62) relating to 2,500 rural and urban couples in Bangladesh, Repetto (1972) finds, in contradiction to the usual expectation, a positive association between total live births of a couple and the percentage of males among all living children. The association computed by regression analysis is quantitatively small but consistent across the age groups 25-29,30-34, and 35-39 of women. The resutls imply that couples who managed to ensure the survival of several sons went on to have a relatively large number of additional children and thus do not support the idea that fertility limitation in Bangladesh is constrained by a desire to ensure the survival of one or more sons. Repetto thinks that a likely explanation of the positive association would be that since in Bangladesh sons contribute more to family income than daughters, or impose less of a financial burden, families with a high proportion of sons should feel themselves under less demographic pressure, other things being equal, than those with a high proportion of daughters, There are,

however, two possible flaws in the data used: (1) under-reporting of female births (common in South Asian countries) and (2) regression analysis used data on only two variables which explain a small percentage of the total variance in fertility. Moreover, awareness about and use of contraception, as well as the motivation to limit fertility, were very limited in Bangladesh in 1961-62.

Bairagi and Langsten (1986) have estimated the effect of sex preference on fertility by analysing the data obtained from a cross-sectional KAP survey (1976) and a three-year longitudinal study (1976-79) of vital events for 860 married women of childbearing age in Companiganj, Bangladesh. An examination of the percentages of women having live births in the three years following the KAP survey shows that, in general, women with a relatively high proportion of sons at each parity were less likely to have a birth in the follow-up period and tended to have longer birth intervals than women with a high proportion of daughters. The differences in percentages among women with varying sex composition of living children at each parity were small and not statistically significant. But consistent differences, despite a low level of contraceptive use (7 percent in 1976), suggest that non-achievement of desired number of sons was an important reason to have additional children. The results do not support Repetto's (1972) findings stated above.

Cleland, Verrall, and Vaessen (1983) have used the Bangladesh Fertility Survey to test the association between sex composition of children and marital fertilit/by cross-classifying the fertility rates by family size and sex composition at the start of the survey period. The association is not statistically significant, suggesting that sex composition of living children did not significantly affect the reproductive behaviour of couples in Bangladesh at the national level. The absence of significant association may be due to the fact that, at the time, contraceptive prevalence in Bangladesh was quite low (9.6 percent) and fertility quite high (total fertility rate 6.3).

In order to assess the effect of sex preference on fertility, Chowdhury and Bairagi (1990) applied the same methodology as used by Bairagi and Langsten (1986) to data collected in a longitudinal survey over 3 1/2 years (1982-86) in two areas of Matlab known as the Treatment Area (TA) and Comparison Area (CA). Contraceptive prevalence was higher and fertility was lower in the TA because of considerably higher family planning service intputs. An examiniation of the childbearing pattern of 11,662 married women of reproductive age (15-44 years) in the TA and 11,157 women in the CA shows that in both areas, at each parity level, the percentage giving birth in the follow-up period was lower when the number of living sons was higher, except for women at parities three and four with no daughters. For example, at parity two in the TA the proportion of women giving birth was 79 percent among those with two sons. Sex preference had a clear effect on fertility in both areas, but it was more evident in the TA than in the CA.

To estimate the reduction in fertility in the absence of sex preference, Chowdhury and Bairagi (1990) have devised the SPEF (sex preference effect on fertility) index—*a* modified version of Arnold's (1985) index. Comparisons of these indexes at each parity level show that the estimated percentage reduction in fertility in the absence of sex preference was larger in the TA than in the CA. The estimated fertility reduction for women at all parities would be 8 percent in the TA as against 4 percent in the CA. The results suggest that in the context of strong son preference, as it exists in Bangladesh, the effect of such preference on

fertility becomes greater as contraceptive prevalence increases. Contraceptive prevalence rose from 35 percent in 1982 to 46 percent in 1985 in the TA and varied between 17 and 23 percent during 1983-85 in the CA. Chowdhury and Bairagi think that in settings like Matlab a programme to promote an egalitarian attitude toward sons and daughters might lead to lower fertility.

India

Repetto (1972) has tested the following hypothesis relating son preference and fertility using three sets of reproductive history data collected in Lucknow city (1968), six villages in Delhi (1958-61), and three villages in UttarPradesh (1961-63): if the desire for minimum number of sons directly affects fertility behaviour, then women whose first two or three live births are male should have lower total fertility than women whose first two or three children are female. Analysing the data collected from 851 women in Lucknow city, he found no significant differences in mean total pregnancies or in mean total births according to the four possible sex compositions of the first three live births. Women were grouped according to the sex of the first three live births, regardless of whether those children were alive at the time of survey. Since Indian families tend partially to 'make up' for their deceased children through increased fertility, the above analysis is inherently weak because it grouped women according to the sex of the first three live births instead of the first three surviving children.

This weakness was remedied in Repetto's analysis of the combined data collected from six villages in Delhi and three villages of Uttar Pradesh, by computing the mean total live births and mean total pregnancies according to four possible sex compositions of the first three live births as well as the first three surviving children. All differences among the means, whether compared by first three live births or by first three surviving children, were very small compared to sample variance. Repetto suggests that the success or failure in achieving the desired sex composition of children had little, if any, influence on subsequent fertility in these populations. The fertility level of women in the combined sample was high (mean total live births ranged from 5.8 to 7.0).

Sarma and Jain (1974) have computed parity progression ratios from the reproductive history data collected in the 1970 national family planning survey of India. The parity progression ratio denotes the conditional probability of moving to parity $x + 1$ from x and is derived from the proportion of women who progress to parity $x + 1$ from parity x. Women who had experienced infant or child deaths are excluded. The parity progression ratios for Indian women by parity and sex composition of their living children show that the sex composition at parity x influences the conditional probability of moving on to parity $x + 1$, but only slightly. With one exception, women who had all sons or all daughters were equally likely to have another child, indicating that both groups wanted to have a child of the other sex. Those who had children of both sexes were slightly less likely to have another child than those who had children of one sex only. The results indicate that the number of sons already born did not have a significant effect on family growth. The authors surmise that a majority of couples were not consciously deciding about having or not having another child. Indeed, contraceptive prevalence among the women in the sample was only 12.2 percent.

Das (1987) has analysed reproductive history data for 2,922 rural and 3,220 urban currently married women (15-49 years) in South Gujarat, collected during 1979-80. An

examination of parity progression ratios from parity two through parity four shows that among both rural and urban couples an effect of the sex of their previous children on subsequent fertility was present at each parity. Rural women displayed the effect more distinctly than urban women. The resutls of multiple classification analysis suggest that sex preference explains more variance in subsequent fertility than any of the other variables commonly known to affect fertility. At each parity a higher proportion of couples with no sons went on to have another child than of those who already had one or more sons, except when all living children were sons. In the last category, there is a slight increase in the parity progression ratio, indicating the desire for a daughter when all living children were sons.

Das (1987) has also estimated the effect of sex preference on completed fertility of the South Gujarat rural and urban women, on the assumption that in the absence of sex preference all women at a given attained parity could have the same number of additional children as women at that parity who were currently most satisfied with the sex composition of their living children. The sample for his analysis consists of 172 rural and 219 urban women who had completed their childbearing. The mean numbers of children born to women of each parity and sex composition after they had borne their second, third, and fourth children were computed. The subsequent fertility behaviour of women after attaining parity two and three indicates that in the absence of sex preference, completed family size would drop by 12 to 13 percent in the rural sample, and 9 to 10 percent in the urban sample. The impact of sex preference on the completed fertility of women, based on their fertility behaviour after attaining parity four, however, was not consistent and was relatively less in both rural and urban samples. Combining rural and urban samples, the reduction in overall fertility in the absence of sex preference would not exceed 13 percent. If the mortality effect is removed by excluding women who had experienced infant or child deaths, the corresponding figure would be 9 percent.

The South Gujarat data have been further analysed by marriage cohorts. The results show that son preference has had a more pronounced effect on fertility of more recent cohorts, among whom contraceptive prevalence was higher. The level of contraceptive prevalence was 62 percent in the rural sample and 71 percent in the urban sample—considerably higher than in rural and urban India as a whole.

Pakistan

Using parity progression ratios and length of birth interval as measures of fertility, De Tray (1984) undertook a regression analysis of the National Impact Survey data collected in Pakistan in 1968-69. He found no overall relationship between sex composition of children and subsequent fertility bevhaviour. De Tray suggests two explanations for the lack of consistency between the strong influence of sex composition of previous children on couples' intentions to have additional births and its absence in the case of actual fertility behaviour: (1) couples' inability to control births, and (2) dominance of preference for a specific number of children over the preference for a specific sex composition.

Cleland, Verrall, and Vaessen (1983), have used the Pakistan Fertility Survey to assess quantitatively the effect of sex preference on fertility. As with Bangladesh Fertility Survey data, the association between sex composition of living children and marital fertility rates

in the five-year period preceding the survey has been tested. In this case, the association is found to be statistically significant This finding is somewhat puzzling because contraceptive prevalance was very low in Pakistan (8 percent) and the association between sex composition of living children and contraceptive use is not statistically significant. As a possible explanation Cleland *et al.* suggest under-reporting of contraceptive use in Pakistan, particularly of the use of spacing in the early years of reproductive life. The sex composition effect on fertility in Pakistan is more marked at smaller family sizes than at larger sizes—an unexpected finding for a high-fertility country where couples are unlikely to begin efforts to control family size until they have at least three or four children.

Discussion

A review of attitudinal survey data on sex preference in Bangladesh, India, and Pakistan shows widespread prevalence of preference for sons over daughters. It also reveals a common desire in all three countries for at least one daughter, especially among parents having two or more living sons and no daughter. The responses to survey questions on desire for additional children given by parents with varied number and sex composition of living children have been used in this paper to derive an attitudinal index of son preference. According to this index, computed from ten data sets presented in Table 1, there was no noticeable difference in the prevalence of son preference at the national level between Bangladesh and India during the 1970s and 1980s, whereas Pakistan had a higher son preference than the other two countries. The indexes computed for Bangladesh and India indicate an increasing son preference in these countries. Descriptive accounts of son preference in all three countries abound in ethnographic and other types of literature, but it is not possible to compare its prevalence on the basis of these accounts. However, they suggest a regional difference within India—a stronger son preference in northern states compared to the southern, reflecting a difference in kinship structure, female autonomy, and other social characteristics.

Ethnographic literature for each country provides fairly good behavioral evidence regarding son preference in the form of negligence toward daughters in food allocation, medical care, and other aspects of life. This literature is mostly descriptive and does not lend itself to comparative analysis. On the other hand, data collected both in in-depth surveys of small communities in Bangladesh (mostly in Matlab Upazila) and India demonstrate, in general, the advantage of male children over female children in food consumption and use of health facilities during sickness. This advantage is reflected in higher anthropometric indexes for male children. There are indications that the discrimination against female children occurs more in health care than in food allocation. In periods of food scarcity (e.g., famine, drought, flood, and pre-harvest season) discrimination against female children is sharper than in normal times.

Discrimination against daughters in health care and food allocation is reflected in mortality data collected both in in-depth surveys of small communities and at the national level. The evidence of higher female mortality in early childhood (1-4 years) at the national level is clear in all three countries. There is also evidence from community studies conducted in Bangladesh (Matlab) and India (Punjab) that female mortality was higher in the post-

neonatal age group (1 month -1 year) while male mortality was higher in the neonatal age group (0 -1 month). Sex differentials in infant mortality (0-1 year) are generally small and inconsistent. For example, the male and female infant mortality rates were respectively 108 and 107 for rural Bangladesh in 1988, 95 and 96 for India in 1987, and 141 and 137 for Pakistan in 1975. The female infant mortality rates in Bangladesh and Pakistan were lower than the male rates, but if there were no discrimination against female infants the differences would be larger because of the biological advantage in favour of females.

A common desire to have at least one daughter is confirmed by the finding in a few studies that girls with at least one surviving older sister have higher risks of mortality, compared both to girls with no surviving older sisters and to boys. A recent analysis of data collected in the Narangwal (Punjab) Study, however, shows that boys with surviving older brothers also have higher mortality rates compared to boys with no surviving older brothers, at least between ages 1 and 3 years (Pebley and Amin 1991).

The survey data on the use of contraception (including sterilisation) by parents with a varied number and sex composition of living children have been used in this paper to derive a contraception index of son preference. All the indexes computed from the data sets presented in Table 2, except the 1970 Indian national survey, indicate a pattern of contraceptive behaviour consistent with widely prevalent son preference as well as with a comon desire to have at least one daughter. The high index values for Indian samples of rural and urban women in Gujarat states (1979-80) suggest that the manifestation of son preference through contraceptive behaviour becomes clearer with increasing use of contraception. Contraceptive prevalence among parents in the Gujarat rural and urban samples was significantly higher than among parents in other samples presented in Table 2.

Simulation exercises demonstrate that under the assumption of perfect fertility control, fertility is likely to rise with increasing preference for one sex over the other. On the other hand, a few empirical studies analysing survey data collected in the 1960s and 1970s in Bangladesh, India, and Pakistan conclude that the success or failure in achieving the desired sex composition of children had little, if any, influence on couples' subsequent fertility. There were, however, some weaknesses in the data and methods used in these studies. Moreover, since most couples in the populations studied were having large families that were likely to include some children of each sex and since only a very small proportion of them deliberately controlled fertility, sex preference was not likely to have any significant effect on fertility. Indeed, a few subsequent studies, applying innovative methodology to more appropriate data collected from populations with relatively high contraceptive prevalence, show a noticeable effect of sex preference on fertility. For instance, in a sample of the Bangladesh rural population the estimated fertility reduction in the absence of sex preference would be 8 percent; in a sample of the Indian rural and urban population the reduction would be as high as 13 percent. If the mortality effect is removed by excluding couples who had experienced infant or child deaths, the corresponding percentages would be lower. The fertility effect of sex preference in Bangladesh, India, and Pakistan is likely to increase as their contraceptive prevalence rises and their fertility level declines.

The overall fertility effect of sex preference in Bangladesh, India, and Pakistan cannot be expected to be large, since at each parity only a small—although not insignificant—proportion of couples would be affected as aresult of undesired sex composition. A majority

of parents achieve their goal for a minimum desired number of sons and daughters in their early childbearing period by sheer biological chance. However, in the context of South Asian countries, the fertility effect of sex preference is higher than in China, where son preference is still very strong while fertility is quite low. In a study analysing the data collected in 1982 from 169,812 currently married couples, Arnold and Liu (1986) find that in the complete absence of sex preference, contraceptive prevalence in China would increase by only 1.8 percent, from the actual level of 70.9 percent. The fertility effect of sex preference in China is relatively low—perhaps because, in contrast to Bangladesh, India, and Pakistan, there is no evidence of a parental desire to have at least one daughter or to have two or more sons as 'insurance' against loss of sons through death (a function of China's relatively low level of infant and child mortality).

By analysing Demographic and Health Survey data collected in 27 countries (which do not include Bangladesh, India, or Pakistan) during the 1980s, Arnold (1991) finds that preference for a balanced number of sons and daughters is quite common in these countries and is more likely to affect fertility than would a preference for sons. In Bangladesh, India, and Pakistan, the desire for at least one daughter in addition to a strong preference for son adds to the constraints on rapid fertility decline.

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