Demography India
Vol. 25, No. 2 (1996), pp. 177-187

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Imbalance of Sex Ratio of Children in

Introduction

AN increase in the sex ratio of children particularly under age five was observed in India and in some states in 1991 census and in the 1992-93 NFHS. This new trend in the sex ratio of young children is an important point in the history of demography of the country. In developed countries male mortality is higher than female mortality in every age group (United Nations, 1990). Usually females are thought to be genetically more resistant to disease than males and have likely to survive infancy. Female babies' this power of resistance seems to disappear in India recently. This new trend in the sex ratio of young children is certainly without any unexpected happening. The higher child mortality for girls than that of boys clearly indicates the existence of female disadvantage in the society.

A number of scholars have pointed out the signs of excess female mortality in north India (Miller, 1981; Dyson and Moore, 1993). Recently in India, a reduction in mortality rate was observed, particularly in female mortality. But this favourable trend was nullified by the increasing sex ratio at birth (Anilkumar and Rema, 1994). In India the sex ratio at birth changed from 1.05 in 1981 to 1.12 in 1991. On careful analysis of the sex ratio at birth in India, it is clear that the changes were not always positive during the period 1981-91. These variations in the sex ratio at birth are due to the demographic characteristics of the children and parents.

Objectives

This paper presents the changing sex ratio of children in India and states and explores the possible reasons for the variations in the sex ratio. It also intends to measure the

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** Revised version of the paper presented at the 19th Annual Conference of 1ASP at Baroda, Feb. 16-28, 1996.

extent of female mortality disadvantage and describes the possible demographic, social, health and other consequences of changing sex ratios of children. Finally, a thought is being given as to what can be done for the well being of female children.

Data and Methodology

The reports of 1971, 1981 and 1991 censuses, 1991 SRS and of the 1992-93 NFHS were used as the data sources for this study. Here the question is whether the data from different sources are comparable. In this study it is not a serious drawback, because we are mainly depending on age distribution of different surveys. For example, Swamy's (1995) analysis showed that the pattern of age distribution in the NFHS and SRS is similar for India and major states except Assam.

Sex ratio is measured in the usual manner (number of males per 100 females). An index developed by Hill and Upchurch (1995) is used to measure female mortality disadvantage. For a population i age range $x, x + n$, the index $I_{i(x, x+n)}$ of female disadvantage is given by

$$I_{i(x, x+n)} = ({}_nq_x^f / {}_nq_x^m) - [({}_nq_x^f / {}_nq_x^m)^s : {}_5q_0^m]$$

where $[({}_nq_x^f / {}_nq_x^m)^s : {}_5q_0^m]$ is the standard ratio from Table 2, given the level of under five male mortality. A positive value of I indicates a female disadvantage (higher female to male mortality than expected gives the overall level of under five male mortality) whereas negative value indicates a female advantage (relative to that expected). Here the difference of ratios are used because once the epidemiologic sex difference is controlled any remaining difference is an absolute indicator of discrimination (Hill and Upchurch, 1995).

Analysis

Sex Ratio of Children

The sex ratio of children in the age group (0-4) was 108.73 for the country in 1991 (Table 1). The corresponding rates in 1971 and 1981 were 102.14 and 102.64. The age-wise sex ratio of children for India and major states are given in Table 1, among the major states Bihar, Gujarat, Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan and Uttar Pradesh the sex ratio of children in the age group (0-4) were more than 106, while for the states Karnataka, Kerala and Tamil Nadu were between 105 and 106. The corresponding ratios were below 105 for the remaining states. The NFHS reports also supports this higher sex ratio among the major states except Bihar, Gujarat, Karnataka, Kerala and Tamil Nadu. From the table it is evident that there is an increase in the sex ratio of children in recent years.

Here, the urgent need is to find out the reasons for higher level of recent sex ratio of children. Several explanations were provided by many scholars for the decline in overall sex ratios (f/m) in India (Kundu and Sahu, 1991; Rajan *et al.*, 1991, 1992; Rajan, 1996,

Raju and Premi, 1992; Srinivasan, 1994; D'Souza, 1993). According to Kundu and Sahu (1991) the possible causes are: (i) undercount of women, (ii) increasing discrimination against women, (iii) sex selective migration, (iv) progressive reduction in reproductive wastage which affects sex ratio at birth and (v) increasing incidence of female foeticide. Raju and Premi (1992) supports the above arguments. But Rajan *etal.* (1991, 1992) rejects above causes and proposed an alternative explanation of double counting of males. Srinivasan (1994) explained that the decline in sex ratio *(f /m)* in the country in the recent decade is due to an increasing trend in female life expectancy and the possibilities of large scale underenumeration of females in the 1991 census, in some states.

The reasons like sex selective migration, inclusion of institutional population and higher female life expectancy will not affect the group of young children. Even in the case of overall sex ratio also, the migration factor will not affect considerably when we are dealing with the country as a whole. Another reason for the discrepancy between the two sexes is reported as the relative undercount of females. It's chances would be very low because of the improvements in female counting in different surveys (Rajan *et ai,* 1991, 1992). Hence the possible reasons may be sex selective abortions and neglect and increased discrimination against girl children (including infanticide).

The sex selective tests are very costly and it is not easily accessible to people of all walks of live. In addition both the state and national Government sought to discourage these tests and even some state Government have banned them. But illegal tests are available and there are chances of abortions of female foetuses. The recent increase in the sex ratio at birth in India and some states amply support the above statement. These type of tests have found favourable responses only in the large metropolitan cities of Bombay, Calcutta, Madras and Delhi where the facilities for such techniques were available (Rajan *et al.,* 1991, 1992). Thus female foeticide linked with amniocentesis or other sex selective tests cannot be advanced as a major contributory factor for increasing the sex ratio at birth (D'Souza, 1993; Rajan *et al.*, 1991, 1992).

According to D'Souza (1993) the three major factors which contribute to the increase in sex ratio at birth and infancy, which is adverse to females are: (i) the declining, infant mortality rate with relatively greater chances for the survival of infant boys, (ii) the increasing ability of the couples to achieve the desired family size, (iii) the increase in the proportion of the first order births as a result of the shrinking family size. Another reason for the increase in sex ratio at birth is in the context of the practices of decision-making in family planning, which are related to son preference (Oldenburg, 1992). However, Srinivasan (1994) suggests that "even if the sex ratio at birth between 1981 and 1991 had increased by four points that is, from 106 to 110 male births to 100 female births, even then the population sex ratio in the 1991 census could not have been lower than the 1981 level, given the increase in life expectancy of females after birth compared to males."

Finally it was emerged that, the neglect and discrimination against girl children are the main reasons for higher sex ratio among children. Higher practices of female infanticide and increasing female child mortality are the results of the discrimination against female

children. Some girl children are killed or abandoned soon after birth. There is no clear evidence how common or widespread this practice is, but some scholars have doubted its existence. As mentioned earlier, in India there was excess female mortality in some age groups, especially in childhood, adolescence and in child bearing years. The age specific death rate based on 1991 SRS and 1992-93 NFHS data (not shown here) support, the above argument. An analysis of the age specific death rate reveals that upto age 10, the female death rates were higher than males. According to the SRS data, except the state, Andhra Pradesh, Assam, Himachal Pradesh, Kerala and Tamil Nadu, all other major states have high girl (0-4) child mortality. Similarly from the NFHS reports under five female mortality is higher than that of males for major states excluding Andhra Pradesh, Assam, Kerala, Maharashtra, Orissa and Tamil Nadu.

TABLE 1: AGE-WISE SEX RATIO OF CHILDREN AND TOTAL (Male/Female) FOR INDIA AND STATES

Country/ States	Year	Age					Total (All ages)
		</	1-4	0-4	5-9	10-14	
1	2	3	4	5	6	7	8
	1971	103.60	104.60	102.14	106.05	113.09	107.55
	1981	103.40	102.00	102.64	106.38	111.73	106.80
India	1991 (SRS)	—	—	108.73	109.76	110.76	107.87
	1992-93 (NFHS)	100.61	106.63	105.32	108.43	107.98	104.47
	1971	106.80	101.50	99.84	101.00	102.50	102.40
Andhra	1981	100.90	99.70	100.66	101.34	106.00	102.42
	1991 (SRS)	—	—	101.98	104.69	103.79	102.88
	1992-93 (NFHS)	100.78	96.28	97.29	100.96	102.75	100.94
	1971	98.50	99.70	99.11	101.80	104.70	111.49
Assam	1981	—	—	—	—	—	—
	1991 (SRS)	—	—	102.93	105.56	106.12	108.07
	1992-93 (NFHS)	86.00	98.56	96.00	109.84	102.69	104.28
	1971	100.10	104.10	101.55	107.84	107.90	104.87
Bihar	1981	103.80	98.80	98.90	106.03	119.90	105.62
	1991 (SRS)	—	—	1 1 1	108.72	114.06	109.60
	1992-93 (NFHS)	104.95	103.36	1$\bar{0}\bar{3}$.69	104.09	108.83	101.46
	1971	105.90	104.40	104.26	108.59	110.30	107.04
Gujarat	1981	103.00	104.20	103.50	107.88	112.30	106.12
	1991 (SRS)	—	—	107.82	109.70	111.70	106.89
	1992-93 (NFHS)	89.96	103.73	100.35	104.03	112.58	104.94
	1971	107.20	112.50	108.58	116.60	116.86	115.40
Haryana	1981	107.60	108.70	107.39	112.83	115.60	114.01
	1991 (SRS)	—	—	115.17	114.36	119.51	114.36
	1992-93 (NFHS)	135.71	114.27	118.55	113.42	116.20	114.29

	1971	106.60	101.50	104.05	103.30	103.50	104.34
Himachal	1981	102.80	102.50	102.65	103.80	104.50	101.19
	1991 (SRS)	—	—	113.48	108.79	109.72	100.42
	1 992-93 (NFHS)	94.17	113.54	109.08	103.85	104.85	95.03
	1971	110.40	103.00	101.57	100.91	101.30	104.50
Karnataka	1981	102.50	101.80	102.75	100.18	101.50	103.83
	1991 (SRS)	—	—	105.01	105.01	105.92	104.12
	1992-93 (NFHS)	94.81	106.24	111.16	111.16	102.06	102.89
	1971	103.00	103.00	101.99	102.77	101.99	98.40
Kerala	1981	102.30	102.60	102.57	102.79	101.76	96.92
	1991 (SRS)	—	—	105.53	103.67	106.64	96.49
	1992-93 (NFHS)	97.99	100.72	100.19	113.65	94.47	92.80
	1971	101.00	107.00	100.81	104.62	107.70	106.22
Madhy a Pradesh	1981	101.40	101.10	101.53	103.83	112.70	106.27
	1991 (SRS)	—	—	107.30	109.10	110.07	107.30
	1992-93 (NFHS)	114.07	107.03	108.60	116.77	108.51	110.30
	1971	102.30	102.10	102.53	102.14	107.80	107.49
Maharashtra	1981	105.20	103.80	104.83	103.77	107.20	106.59
	1991 (SRS)	—	—	107.65	110.64	110.93	106.83
	1992-93 (NFHS)	103.10	106.26	105.63	103.05	107.59	103.05
	1971	100.00	101.40	97.02	98.00	103.80	101.26
Orissa	1981	101.80	99.20	98.18	98.60	102.30	101.81
	1991 (SRS)	—	—	106.17	106.84	103.79	102.88
	1992-93 (NFHS)	108.16	111.55	110.86	99.81	107.65	102.94
	1971	108.00	112.20	109.31	115.63	115.20	115.63
Punjab	1981	105.70	108.70	108.15	112.18	114.60	112.91
	1991 (SRS)	—	—	112.63	113.57	108.42	112.63
	1992-93 (NFHS)	109.64	119.28	117.09	118.54	114.99	109.45
	1971	103.10	107.00	104.75	111.70	111.00	109.79
Rajas than	1981v	103.80	101.80	101.29	107.90	112.80	108.33
	1991 (SRS)	—	—	112.73	107.81	112.79	109.51
	1992-93 (NFHS)	108.22	116.25	114.48	114.15	124.12	112.61
	1971	106.10	104.30	101.70	101.86	101.40	102.24
Tamil Nadu	1981	101.20	103.00	102.83	103.39	103.80	102.27
	1991 (SRS)	—	—	105.01	105.91	104.89	102.91
	1992-93 (NFHS)	101.51	94.47	95.85	104.18	100.57	96.89
	1971	104.81	110.30	105.22	116.72	117.90	113.77
Uttar Pradesh	1981	104.70	103.40	104.75	116.01	124.50	112.86
	1991 (SRS)	—	—	113.43	113.43	118.20	113.43
	1992-93 (NFHS)	94.02	111.74	107.57	114.72	114.92	106.14
	1971	98.90	98.05	98.10	100.38	109.40	112.26
WestBengal	1981	102.50	100.50	99.81	102.59	106.00	109.72
	1991 (SRS)	—	—	104.12	106.10	107.06	109.04
	1992-93 (NFHS)	105.68	107.16	106.84	98.77	97.34	105.94

The discrimination of girl children is seen mainly in providing the minimum nutrition, access to health and other amenities. In some places boys get more benefits and better food than girls. Girls are sick as often as boys, but boys sometimes receive better treatment. The differential treatment of children might be due to their understanding of the differential survival capabilities of the two sexes (Srinivasan, 1994). Srinivasan (1994) also explained that ". . . Over the centuries the additional care required for the male child became institutionalised as his having intrinsic social and religious value not possessed by the female child, and preferential nutrition practices might have become strong gender biases that became institutionalised."

Measurement of Excess Female Mortality

As reported earlier the majority of population data sources show that female mortality rates are lower than those for males at all ages. It is mainly due to some genetic reasons. Hence the higher girl child mortality rates than that of boys is certainly without any unexpected happening. It is sure that there is some gender-discrimination in any population. But excess girl child mortality than that of boys clearly indicates the existence of female disadvantage in the society. In order to measure the female disadvantage we need a standard population of female advantage. Observed advantages in female mortality can then be measured against this standard to identify 'excess' female mortality (see, Hill and Upchruch, 1995). As mortality falls, the female advantage in each age range increases; the lower the level of mortality, the greater the rate of increase in the female advantage.

Differences between the observed ratio of female to male child mortality using data from the NFHS and the standard level obtained from Table 2 provide an Index of female disadvantage in child mortality. The indices of female mortality disadvantage are given in Table 3. The standard level is selected based on the mortality level during the last 10 years. The index of female mortality disadvantage were estimated for India and for 16 major states only. It is interesting to note that the index of female disadvantage is higher for young childhood than the other two childhood measures. The index is negative for only two states (Maharashtra and Tamil Nadu) in infancy, only one state (Tamil Nadu) in young childhood and under five mortality. The girl child mortality disadvantage is largest for the young child (1-4 years) age group in India and in all states. In this age group care of the child is more important than genetic reasons in determining mortality risks (Hill and Upchurch, 1995). This clearly indicates the existence of gender discrimination in child care. Tamil Nadu is the only state which has the female advantage in childhood mortality. Among the states, Bihar, Gujarat, Haryana, Himachal Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal shows higher female disadvantage.

A slight female advantage observed in Maharashtra and Tamil Nadu, is important point to be noticed. Maharashtra is one of the developed states in India with high proportion of urban people. Since the inception of the family welfare programme Maharashtra has been ahead of most other states in India in implementing it (NFHS Report, Maharashtra). But this advantage is not seen in young childhood and under five mortality for the state. In Tamil Nadu social welfare programmes have been an important priority area of the

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TABLE 2: EXPECTED SEX RATIO OF INFANT, YOUNG CHILD AND UNDER-F1VE MORTALITY FOR SPECIFIED LEVELS OF MALE UNDER-FIVE MORTALITY: HISTORICAL EXPERIENCE OF NORTH-WESTERN EUROPE 1820-1964

Male Under Five Mortality $_5q_0$	*Expected Female-Male Ratio for*		
	Infant Mortality $_1q_0$	*Young Child Mortality* $_4q_1$	*Under-five Mortality* $_5q_0$
0.025	0.767	0.814	0.774
0.050	0.778	0.852	0.795
0.075	0.786	0.876	0.810
0.100	0.793	0.896	0.823
0.125	0.801	0.910	0.835
0.150	0.810	0.921	0.847
0.175	0.817	0.930	0.857
0.200	0.823	0.941	0.867
0.225	0.830	0.950	0.877
0.250	0.837	0.958	0.887
0.275	0.843	0.964	0.894
0.300	0.846	0.966	0.899

Reproduced from: *Population and Development Review* (1995), 21(1).

TABLE 3: INDEXES OF FEMALE MORTALITY DISADVANTAGE FOR INDIA AND STATES

Country/States	*Index of Female Mortality Disadvantage*		
	Infant (< 1)	*Young (1-4)*	*Under five (< 5)*
India	0.146	0.5186	0.2257
Andhra Pradesh	0.0949	0.3877	0.1462
Assam	0.0245	0.2057	0.0883
Bihar	0.1102	0.6407	0.2300
Gujarat	0.2416	0.5284	0.3115
Haryana	0.3508	1.4518	0.5007
Himachal Pradesh	0.1430	0.5415	0.2129
Karnataka	0.1037	0.3947	0.1640
Kerala	0.0370	0.0640	0.0406
Madhya Pradesh	0.1139	0.2863	0.1613
Maharashtra	-0.0147	0.3396	0.0656
Orissa	0.0694	0.5324	0.0927
Punjab	0.0971	0.9350	0.2403
Rajasthan	0.2793	0.6825	0.3709
Tamil Nadu	-0.0252	-0.1100	-0.0489
Uttar Pradesh	0.2557	0.7829	0.3628
West Bengal	0.1128	0.7213	0.2176

Government in recent periods (NFHS Report, Tamil Nadu; Srinivasan, 1995). Two programmes recently introduced in the state aim to improve the status of female children. In one scheme a grant of 5000 rupees is given at the time of marriage to girls who have completed at least eight years of schooling. Another programme, the 'Girl Child Protection Scheme' has been introduced recently to eliminate the practice of female infanticide. Under this scheme, the second girl child is given bonds worth 2000 rupees at the time of birth, Rs. 2507- at first birth day and another Rs. 2507- when she enters school (NFHS; Tamil Nadu). It is surprising to note that female mortality disadvantage is observed in Kerala, a state which is socially and demographically developed one, which needs further investigation.

Consequences

The consequences of sex ratio imbalances in a population are discussed in this section. In a fertility declining population (for example, China and Korea) there is a chances of high sex ratio at birth. Raju and Premi (1992) have mentioned that the countries which have completed their demographic transition have experienced an increase in the proportion of the male children born. The control in the infant mortality, especially neonatal mortality, increases the chances of survival of the male babies (D'Souza, 1993). Improvements in maternal as well as infant care, is beneficial for the live birth and survival of children, but male children gain more than the girls, thereby contributing to an increase in sex ratios at birth as well as during infancy.

We have estimated the number of female children missing (including birth averted) based on the three levels of normal sex ratio at birth to the 1991 census and 1992-93 NFHS data. Age wise data were not available for 1991 census, but the number of children in the (0-6) age group were available, hence, number of female children missing in the (0-6) age group were estimated for 1991 census. While based on NFHS data, the number of female children missing in the (0-4) age group were estimated. Generally, the sex ratio at birth should be slightly higher than the ratio recorded at ages (0-4) and this disparity should reduce with age. It is assumed that by attaining age five the sex ratio will be balanced. However, the recorded sex ratio of children under age five may be considered as reflecting the general level of a population's sex ratio at birth (Park and Cho, 1995). Hence the number of female children missing were estimated based on the three levels of normal sex ratio at birth, which are presented in Table 4. According to the medium level estimation (sex ratio of 103) the number of female children (0-6) missing in India based on 1991 census were 1971018. These missing girls represents about 2.63 percent of the total (including the missing children) female children in the (0-6) age group. Similarly the missing girls in (0-4) age groups based on NFHS data were about 2.22 percent. Really it is a sad comment on our national development programmes.

According to 1991 census, at medium level estimation, the states Punjab (9.89) and Haryana (9.48) have the highest percentage of female children missing of the total female children. The states Gujarat, Rajasthan and Uttar Pradesh have more than four percent

missing female children and the states Andhra Pradesh and Assam have a little proportion of higher female children. The estimate based on NFHS data shows that the states Haryana (13.14), Punjab (12.08) and Rajasthan (10.04) have more than 10 percent missing girls and the states Himachal Pradesh (5.56), Madhya Pradesh (5.18), Orissa (7.13) and Uttar Pradesh (4.27) have more than four percent missing girls. While the states Andhra Pradesh (-5.22), Assam (-6.35), Gujarat (-2.49), Kerala (-2.65) and Tamil Nadu (-6.46) have negative values. According to the index of female mortality disadvantage the states Maharashtra (in, infancy) and Tamil Nadu (for all childhood ages) have female advantages (Table 3). But here at medium level of estimation Maharashtra have been 2.54 percent girls (0-6, age group) are missing based on 1991 census and 2.51 percent (0-4, age group) are missing based on NFHS data. In Tamil Nadu, at medium level of estimation, 2.33 percent girls (0-6) are missing based on 1991 census, while by NFHS data, the value is -6.46 percent for (0-4) age group. This clearly supports the progress of the recent development programmes of the 3tate Government, which aim to improve the status of female children.

TABLE 4: ESTIMATED PERCENTAGE OF FEMALE CHILDREN MISSING ASSUMING THREE LEVELS OF NORMAL SEX RATIO AT BIRTH

Country/State	*1991 Census (0-6)*			*NFHS (1992-93) (0-4)*		
	Normal Sex Ratio			*Normal Sex Ratio*		
	100	*103*	*105*	*100*	*103*	*105*
India	5.46	2.63	0.73	5.05	2.22	0.31
Andhra Pradesh	2.51	-0.41	-2.36	-2.71	-5.22	-6.84
Assam	2.49	-0.44	-2,33	-4.00	-6.35	-7.89
Bihar	4.05	1.18	-0.74	3.56	0.68	-1.22
Gujarat	7.24	4.45	2.60	0.35	-2.49	-4.21
Haryana	12.12	9.48	7.72	15.65	13.14	11.46
Himachal Pradesh	4.86	2.00	0.10	8.33	5.56	3.77
Kamataka	4.04	1.16	-0.76	3.59	0.71	-1.20
Kerala	4.19	1.32	-0.59	0.19	-2.65	-4.37
Madhya Pradesh	4.78	1.92	0.02	7.92	5.18	3.32
Maharashtra	5.38	2.54	0.65	5.33	2.51	0.62
Orissa	3.34	0.44	-1.47	9.79	7.13	5.26
Punjab	12.51	9.89	8.14	14.60	12.08	10.35
Rajasthan	8.35	5.60	3.77	12.65	10.04	8.30
Tamil Nadu	5.18	2.33	0.44	-4.15	-6.46	-7.99
Uttar Pradesh	7.22	4.44	2.58	7.04	4.27	2.40
West Bengal	3.34	0.44	-1.47	6.41	3.65	1.74

Next we turn to the another implication of imbalanced sex ratio, that is of possible marriage squeeze in the society. Mate selection becomes crucial in a population, which is experiencing increasing sex ratio of children. According to NFHS reports there was on an average five years age difference between husband and wives in India. This higher sex ratio of children will continue to the coming generation also then the surplus males find it very difficult get mates from the younger generation. Thus meti will be forced to marry very younger women (th is may increase the age difference between spouses) or older women. The latter is a positive aspect in societies where women have longer life expectancy than men which will reduce the loneliness of women at older ages. Another positive consequence of higher sex ratio is the improvement in the position of women in the society and thus it will result in the avoidance of dowry system, but on the other side this will result more atrocities, rapes, forced marriages, prostitution, sale of brides, and polyandry. Thus the sex ratio imbalance will affect the entire social equilibrium of a population.

What Can be Done?

Any society planning to make progress must integrate women into its productive, educational, cultural and political activities. Participation of women in decision making at all levels has to increase. Increasing economic opportunities for women and raising the value of female labour increases the likelihood that parents will see girl children as economic assets and not as liabilities. Pension plans and other forms of old age security would influence parents' strong desire of having sons. Recent women's conference at Beijing (1995) provides guidance on improving the status of women. The measures include increased opportunities for education and literacy, greater opportunities for meaningful employment, greater political, economic and civil rights, including the right of married women to enter into contracts and to inherit property and equality within the family. From the experience of many societies, which had implemented different measures for the betterment of women it can be seen that only concrete and far-reaching measures for improving the cultural, social, legal and economic position of women will improve the well-being of female children.

Acknowledgements

The author gratefully acknowledges the comments and suggestions of Dr. K. Krishnakumari, Head, Department of Demography, University of Kerala, on the earlier version of this paper.

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