International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

MAGNITUDE OF "MISSING GIRLS" IN INDIA: AN EMPIRICAL ANALYSIS

[1*]Darshy Saran, [2]Indrani Roy Chowdhury, [3]Lekha Chakraborty

[1]Doctoral scholar, Economics, Jamia Millia Islamia, New Delhi

[2]Associate Professor, Jawaharlal Nehru University, New Delhi

[3]Associate Professor, National Institute of Public Finance & Policy, New Delhi.

*Corresponding Author

ABSTRACT

Amartya Sen raised the issue of "missing women" concept when he estimated that the number of "missing women" in the world has exceeded 100 million. He referred to the number of females who had died as a result of unequal access to resources in parts of the developing world. Sen's crude estimate highlighted the importance of the issue and paved way for many demographers to provide serious quantitative estimates of "missing women". This paper provides the estimates of "missing girls" across fifteen major states of India using recent 2011 Census data for three age categories-- birth, infancy and under-five age group. Our estimates suggest that in India a total of 1.80 million girls went missing by the age of five, out of which 0.59 million girls could never get a chance to be born. These estimates reveal the existence of severe gender bias at birth and young ages in India. Our results also show that 0.23 million girls in infancy stage died as a result of post natal gender discrimination. Statewise disaggregation shows that the bigger States such as UP, MP and Bihar together with three northwestern States -- Haryana, Rajasthan and Punjab have enormously contributed to the number of missing girls in all the three age groups in 2011.

Keywords: missing girls, child sex ratio, mortality, female deficit, gender discrimination

INTRODUCTION

Declining Child Sex Ratio in India is an alarming trend. The lowest-ever child sex ratio of 919 in Census 2011 since independence is a matter of grave concern for the country. While the overall sex ratio has gone up by ten points to touch 943, against 933 in Census 2001, the child sex ratio plummeted to 919 from 927. With the exception of Punjab, Haryana, Gujarat, Karnataka, Kerala and Tamil Nadu, all the remaining States have seen a decline in the child sex ratio in Census 2011. Though these north-western states have improved further, they have by no means come to

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

the expected level and lie far below the normal mark. The state wise figures demonstrate a widening of the circle well beyond the prosperity belt of north-west India, to the poorer states.

The position of India is highly disappointing in the global comparison. As per the data released by the United Nations Department of Economic and Social Affairs (UN-DESA, 2011) for 150 countries over 40 years, India and China are the only two countries in the world where female infant mortality exceeds male infant mortality. These are the regions where rampant demographic masculinization has taken place today. The issue is significant as it refers to female survival disadvantage arising from unequal access to household resources, nutrition and health care. The increasing availability of scientific and technical advancements in sex determination techniques has been linked to the sharp decrease in the sex ratio at birth in most parts of India in recent decades. Female infanticide continues to be practiced in the poorest areas, although its extent is unknown. This prenatal and postnatal excess mortality of girls are believed to be the primary cause of the gender imbalance in the country. The biological advantage for girls in early childhood is so strong that the high mortality among girls should be seen as "a powerful warning" that differential treatment or access to resources is putting girls at a disadvantage.

The term 'missing girls' refers to the number of females, relative to the number of males, which should have been alive in the population but are not. In other words, missing females refers to the deviation of the actual sex ratio from the expected sex ratio. Amartya Sen (1990) raised the issue of "missing women" concept when he estimated that number of "missing women" in the world has exceeded 100 million. His estimation of missing females attracted attention of various researchers and demographers who then applied various methodologies to estimate the number of missing women across the world. Against the backdrop of declining child sex ratio, this paper estimates the number of missing girls in India for three age categories – at birth, infancy and under five (U5) age cohort for major States of India using 2011 Census data.

REVIEW OF LITERATURE

Global Estimates

While Sen's crude estimation of 100 million missing women was based on a demographic peculiarity of African nation, Coale (1991) relied on another counterfactual benchmark and evaluated that there were only about 60 million missing women in the world. Klasen (1994) refined Coale's methodology and provided alternatives to this estimate. He observed that while Sen's estimates overstated the number of missing women, Coale's procedure underestimated it. Part of the reason for the higher number of females in sub-Saharan Africa is purely because there are comparatively more girls born than boys. On the other hand, Coale's approach of using "Model Life Tables West" led to an underestimation of missing women, as the countries that

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

formed the basis for these Life Tables had themselves encountered incidents of excess female mortality, particularly in the 19th century. He then refined these estimates by amending some of Coale's assumptions and suggested that there were around 90 million missing women in the world.

All of the above calculations were dependent on demographic data from the 1980s and early 1990s and were based on preliminary census figures. Klasen and Wink (2003) realized that Coale and Klasen had missed out on a few countries with possible excess female mortality. They provided the revised estimate of missing women by using the latest census then available and also adding the additional countries that were not considered by Coale and Klasen. They evaluated that in absolute terms the number of missing women has increased to 101 million from 93 million.

Bongaarts J and Guilmoto (2015) estimated the number of missing women across the world from 1970 to 2010 and highlighted those regions and countries that contributed the most to the global total. Their approach was based on a systematic comparison of observed values of countries having presumed gender bias with the expected values drawn from countries with no known discrimination. Their findings suggested that the number of missing women grew from 61 million in 1970 to 126 million in 2010. India and China recorded the highest number of missing women in 2010 (43 million and 62 million respectively) together accounting for 84 percent of the world total. This is the combined result of their large population sizes and comparatively high percentages of missing females (7.4 percent in India and 9.5 percent in China).[1]

Regional Estimates-- Developing Countries

The computations of missing women, so far, have been dealt at the aggregate level. However, it is a fact that number of female deaths may vary at various age groups. Anderson and Ray (2010) carried out an elementary accounting exercise to break-down the number of missing women by age across three different developing countries- Sub-Saharan Africa, China and India. Unlike the earlier estimates which gave the stock of missing women at a given point of time, Anderson's estimates were given in terms of annual 'flows' of missing women. The methodology is posited with a "reference" death rate for females, one that would be attained if the death rates of men in that country were to be rescaled by the relative death rates of men and women (in the same category) in developed regions[1]

[1] The study also made projections for the total number of missing women across the globe (using the medium-variant population projections of the United Nations 2013 a) and concluded that the worldwide number is expected to grow from 126 million in 2010 to a maximum of 150 million in 2035.

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

The most striking findings were that there were missing women in sub-Saharan Africa also; that the number of missing women as a proportion of total female population was highest in sub-Saharan Africa; and the absolute numbers were comparable to those for India and China. While the estimates for China and India accounted for 1.73 and 1.71 million missing women respectively, the figure for Sub-Saharan Africa was 1.53 million.

Intra-Regional Estimate--India

In the context of India, Anderson and Ray (2012) made an attempt to provide the break-down of missing women by age across different States of India. The study yielded some important results. Firstly, Indian females face the risk of excess mortality at every stage of their lives. Secondly, there was large variation across the states in the distribution of missing females.

Current research has looked at sex selective abortions as a major factor causing imbalance in sex ratio of India especially at young ages and thus attempted for a calculation of the number of missing girls and sex selective abortions. Kulkarni (2007) estimated number of missing girls at birth and childhood age in India using Model Life Tables. The expected sex ratios (ESRi) has been estimated separately for age groups 0, 1-4, 5-9 and 10-14 for the year 2001. Under western mortality differential, a deficit of 0.38 million for age 0, the deficit of 1.46 million for the age group 1-4, 3.24 million for age group 5-9 and 4.77 million for age group 10-14 was noticed. The total deficit for 0-14 ages was computed to be nearly 10 million. The study also estimated the number of sex selective abortions since the 1980's. The annual number of sex selective abortions, under certain assumptions, rose from over two lakhs to over six lakhs during 2001-2005. It was estimated that during the 25 year period -1981 to 2005 - roughly corresponding to the period during which access to sex detection technology became easy, over 10 million sex selective abortions were performed.

In yet another attempt in quantifying the number of missing females, Mari Bhat (2002) computed the number of females who have gone additionally missing in different age groups after 1901. This was done by calculating the difference between the expected number and the reported number in a census in each age group. The expected number of females in each age group was taken to be the age-specific sex ratio of 1901. The study estimated that an additional five million women went missing by 1951, and 21 million by 1991.

In India, severe gender bias is more prominent at a very young age, especially between 1 to 59 months. In the subsequent section, we have attempted to obtain the estimates of missing girls in the pre-natal, infant (0-1) years and under-five age group for the year 2011.

[2] In fact, one cannot be confident about lack of discrimination in any country. All what can be argued is that the developed regions today set a norm that other countries can be measured against.

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

RESEARCH METHODOLOGY

Using the methodology developed by Anderson and Ray, we estimate the missing girls across major states of India. We preferred this methodology for two reasons. One, instead of the cumulative impact of gender bias in mortality, we want to estimate the annual estimates of missing women. In other words, we want to estimate the annual 'flows' of missing women, not the stock of missing women at a given point of time. Two, this methodology also makes it possible to estimate the missing girls distributed by different regions of India across all age groups. We have estimated the missing girls disaggregated by age group under three categories - at birth, infant (0-1) years and under-five age-group. The methodology is as follows:

Let 'a' denote an age group, where a=1,2……..n. The extra value a = 0 indicates birth. For any age a ≥ 1, deaths within that group 'a' refers to all deaths between the ages of a - 1 and a. Let $d^m(a)$ and $d^w(a)$ represent the rate of death of men and women respectively at age 'a' in the country. The label ^ denotes these variables in the benchmark or reference region.

The unbiased death rate for women of age 'a' in the country is defined by:

$$u^w(a) = \frac{dma}{\widehat{dma}/\widehat{dwa}}$$

The methodology assumes that for each age group after birth, the relative death rates of females to males are "free of bias" in developed countries which are taken here as the reference region[2]. Excess female mortality or "missing women" in the region at age a is then equal to the difference between the actual and unbiased death rates for women, weighted by the number of women in that age group:

$$mw(a) = [d^w(a) - u^w(a)]\ \pi^w(a),$$

where $\pi^w(a)$ is the starting population of women of age a.

To carry out the computation for missing girl at birth, the sex ratio at birth (SRB) in a given State is compared with a 'unbiased' SRB, drawn from a reference region. The formula is:

$$mw(0) = \left(1 - \frac{\sigma(0)}{\sigma\hat{}(0)}\right) * \pi w(0)$$

2 While Anderson's reference regions included Western Europe, Canada, United States, Australia, New Zealand and Japan, the designated "Developed regions" taken in this study comprise all regions of Europe plus Northern America, Australia, New Zealand and Japan.

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

where σ(0) is the SRB of the State, σ^(0) is the reference SRB and πw(0) is the total number of female births in the state. The total number of missing girls in a given year and State, mw is aggregated across the age-groups:

$$mw = \sum_{a=0}^{n} mw(a)$$

The aggregation denotes the missing girls at birth and under-five age- group.

The data is organized from Sample Registration System (SRS, 2011) which provides figures for under-five mortality rate and infant mortality rate by gender for the major States of India. The sex ratio at birth is obtained from SRS, Statistical Report (SRS,2012) which gives SRB for the period 2010-12 as three years moving average.[3] Correspondingly, the female population in absolute numbers is obtained from Census of India, Office of the Registrar General, India, for the country and for the major states. For reference group, male and female death rates in the age group (0-1) years and under-five age-group have been taken from the dataset of UN-Department of Economic and Social Affairs (UN-DESA, 2011).

RESULTS AND DISCUSSION

Estimates of Missing Girls in U5 Category

In U5 (under five) category, the aggregate estimates suggest that there were 1.21 million missing girls in India in 2011 (Table 1). When expressed as a proportion of state-level female population, the highest percent of missing girls was found in Uttar Pradesh followed by Rajasthan, Madhya Pradesh and Bihar. The last column indicates state-level missing girls as a percentage of the total over all 15 States. It is striking to note that more than 60 percent of the country's missing girls come from these four States alone.

Table 1: State-wise Estimates of Missing Girls in U5 Category, 2011

States	Missing Girls (in million)	As percent of Female Population	Proportion of missing girls
India	**1.21**	**0.21**	
UP	0.33	0.35	32.34
Rajasthan	0.11	0.34	10.85
MP	0.11	0.31	10.37

[3] SRB given by SRS is subject to sampling and non-sampling errors. Since sampling errors for annual estimates could be large, the SRS gives three-year moving averages of the sex ratio at birth rather than annual estimates.

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Bihar	0.13	0.27	12.78
Haryana	0.03	0.24	2.80
Orissa	0.04	0.19	3.80
Gujarat	0.05	0.16	4.50
Punjab	0.02	0.15	1.93
Andhra Pradesh	0.06	0.14	5.60
J&K	0.01	0.12	0.69
Karnataka	0.03	0.12	3.36
WB	0.05	0.10	4.45
Tamil Nadu	0.03	0.07	2.58
Maharashtra	0.03	0.06	3.33
Kerala	0.01	0.04	0.62

Source: (Basic data), Census of India, 2011.

Southern States *viz*, Karnataka, Kerala and Tamil Nadu reported a low percent of excess female mortality along with Jammu & Kashmir, Maharashtra and West Bengal. Kerala exhibited the lowest of all. Table 3 presents excess female mortality disaggregated by rural and urban regions of all 15 major States in the U5 category.

Table 2: Geographically Disaggregated Estimates of Missing Girls in U5, 2011

	RURAL			**URBAN**			
State	**Missing Girls (in million)**	**Percent of female pop**	**Proportion of missing girls**	**State**	**Missing Girls (in million)**	**Percent of female pop**	**Proportion of missing girls**
India	**1.04**	**0.26**		**India**	**0.20**	**0.11**	
UP	0.30	0.40	34.76	Haryana	0.01	0.23	5.66
Rajasthan	0.10	0.39	11.28	Rajasthan	0.02	0.20	9.77
MP	0.09	0.36	10.90	Gujarat	0.02	0.20	14.25
Bihar	0.13	0.29	15.07	UP	0.03	0.14	18.13
Haryana	0.02	0.25	2.26	Andhra Pradesh	0.02	0.12	10.32
Orissa	0.03	0.19	3.92	Karnataka	0.01	0.11	7.95
Punjab	0.02	0.19	1.82	J&K	0.00	0.11	1.06
Andhra Pradesh	0.04	0.15	4.80	Orissa	0.00	0.11	2.22
Gujarat	0.02	0.14	2.79	MP	0.01	0.10	5.76
WB	0.04	0.13	4.54	Punjab	0.00	0.09	2.71
J&K	0.01	0.12	0.63	Bihar	0.01	0.09	3.08

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Karnataka	0.02	0.11	2.31	Tamil Nadu	0.01	0.06	6.00
Tamil Nadu	0.01	0.08	1.75	WB	0.01	0.05	4.52
Maharashtra	0.02	0.08	2.76	Maharashtra	0.01	0.05	6.57
Kerala	0.00	0.04	0.41	Kerala	0.00	0.04	2.00

Source: (Basic data), Census of India, 2011.

The rural regions of India indicate more than one million missing girls (1.04 million), while for urban territory, it is 0.20 million (Table 2). The urban figure is low because of its low population size. Roughly 30 percent of India's population is urbanized and nearly 70 percent of the country's population is still living in rural areas. The State-wise disaggregation showed that UP, Rajasthan, MP and Bihar contributed the most to missing girls in rural regions, while Gujarat and Andhra Pradesh explained the highest female mortality in urban areas in addition to UP and Rajasthan. Expressed as a proportion of their respective State level female populations, the States of Uttar Pradesh, Rajasthan Madhya Pradesh and Bihar ranked top in reporting maximum number of missing girls in rural areas whereas, in urban regions, it was Haryana, Rajasthan, Gujarat and Uttar Pradesh that accounted for highest number of missing girls in under-five age category.

Estimates of Missing Girls in Infancy, 2011

Infanticide is defined as the killing of an infant in the 0–1 age group, which is a criminal offence; which often gets under-reported in most parts of the country. In India, 0.23 million girls (2.30 lakhs) went missing in the infant stage in 2011 suggesting female infanticide playing its role in the country. Table 3 provides estimates for the missing girls in infant stages in the 15 major States of the country. The regions where the highest percent of missing infants were noticed were Madhya Pradesh, Haryana, Uttar Pradesh and Rajasthan. The estimates revealed that all Southern States except Andhra Pradesh have reported minimum percent of missing female infants. The alarmingly high number of missing girls in Andhra Pradesh in 2011 should no longer be seen as a surprise as it is due to high infant female mortality noticed in the year 2011 as per SRS, 2012.

Table 3: State-wise Estimates of Missing Girls in Infancy, 2011.

State	Missing Girls (in million)	Percent of total female pop	Proportion of missing girls
India	**0.23**	**0.04**	
MP	0.02	0.06	11.29
Haryana	0.01	0.05	3.25
UP	0.05	0.05	25.52

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Rajasthan	0.02	0.05	8.31
Orissa	0.01	0.05	4.90
Bihar	0.02	0.04	10.21
Andhra Pradesh	0.02	0.04	8.46
J&K	0.00	0.04	1.11
Gujarat	0.01	0.04	5.31
Punjab	0.00	0.03	2.08
WB	0.01	0.03	6.59
Karnataka	0.01	0.02	3.72
Maharashtra	0.01	0.02	5.06
Tamil Nadu	0.01	0.02	3.15
Kerala	0.00	0.01	1.03

Source: (Basic data), Census of India, 2011.

The regional variations showed that 0.18 million female infants reportedly went missing in rural areas while in urban, it was 0.05 million. The State-wise analysis for rural regions showed that the highest number of missing female infant was indicated by Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan (Table 4) while for urban areas, it was Uttar Pradesh followed by Andhra Pradesh and Gujarat.

Table 4*:* Geographically Disaggregated Estimates of Missing Girls in Infancy, 2011

	Rural			**Urban**			
State	**Missing Girls (in million)**	**Percent of female pop**	**Proportion of missing girls**	**STATE**	**Missing Girls (in million)**	**Percent of female pop**	**Proportion of missing girls**
India	**0.18**	**0.04**		**India**	**0.05**	**0.03**	
MP	0.02	0.07	11.60	Haryana	0.00	0.05	4.51
Haryana	0.00	0.06	2.98	Rajasthan	0.00	0.04	7.42
UP	0.04	0.06	27.65	Andhra Pradesh	0.01	0.04	11.92
Rajasthan	0.01	0.05	8.50	Gujarat	0.00	0.04	10.10
Orissa	0.01	0.05	5.49	MP	0.00	0.03	7.87
J&K	0.00	0.05	1.29	UP	0.01	0.03	17.17
Bihar	0.02	0.04	11.86	Punjab	0.00	0.03	3.47
Gujarat	0.01	0.04	4.44	Orissa	0.00	0.03	2.13
Andhra Pradesh	0.01	0.04	7.17	Bihar	0.00	0.03	3.39
WB	0.01	0.04	6.96	Karnataka	0.00	0.02	6.75
Punjab	0.00	0.03	1.62	J&K	0.00	0.02	0.81

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Karnataka	0.00	0.03	3.21	Tamil Nadu	0.00	0.02	7.36
Maharashtra	0.01	0.02	4.32	Maharashtra	0.00	0.02	9.09
Tamil Nadu	0.00	0.02	2.20	Kerala	0.00	0.02	3.05
Kerala	0.00	0.01	0.72	WB	0.00	0.01	4.96

Source: (Basic data), Census of India, 2011.

As a percent of female population, missing female infants was largely found in Madhya Pradesh, Haryana, Uttar Pradesh and Rajasthan in the rural areas. Haryana, Rajasthan, Andhra Pradesh and Gujarat ranked top in exhibiting the maximum percentage of missing girls in (0-1) age group in urban regions (Table 4). This is due to the fact that the female infant mortality rate in Andhra Pradesh is as high as other high mortality States such as Gujarat, Haryana, MP and Rajasthan. Apart from that, other Southern States in both rural and urban regions have indicated a low number of missing female infants.

Estimates of Missing Girls at Birth, 2011

Defining an unbiased reference sex ratio at birth is difficult and the choice of any benchmark can be challenged as it is hard to get the SRB generated by "the same group in the same circumstances", cleansed of any differential treatment for boys and girls . The reference sex ratio at birth chosen here is 105 males for every 100 girls born (that is, 952 girls per 1000 boys born). The actual sex ratio at birth are taken from statistical reports of sample registration system (2012).Table 5 provides the estimates for missing girls at birth.

Table 5*:* Estimates of Missing Girls at Birth, 2011.

State	Missing female births (in million)	Percent of female pop	Proportion of missing girls
India	0.59	0.10	
Uttar Pradesh	0.22	0.23	39.79
Haryana	0.03	0.22	4.73
Rajasthan	0.05	0.16	9.82
Punjab	0.02	0.15	3.64
Bihar	0.06	0.13	11.42
Jammu & Kashmir	0.01	0.11	1.15
Maharashtra	0.05	0.10	9.74
Gujarat	0.03	0.10	5.10
Madhya Pradesh	0.03	0.09	5.62
Andhra Pradesh	0.03	0.07	5.39
Tamil Nadu	0.01	0.04	2.65

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

West Bengal	0.01	0.01	1.12
Odisha	0.00	0.01	0.32
Karnataka	0.00	0.00	0.22
Kerala	0.00	-0.02	-0.71

Source: (Basic data), Census of India, 2011.

Table 5 reveals that there were 0.59 female births (5.9 lakhs) in the country that did not take place in 2011. Uttar Pradesh accounted for highest percent of missing female births followed by Haryana, Rajasthan and Punjab. These four States together constituted more than 50% of the girls missing at birth in India.

Regional analysis indicated 0.43 million girls in rural and 0.16 million girls in urban India that are missing at birth (Table 6). Uttar Pradesh, Haryana, Punjab and Rajasthan that ranked top in having the highest percent of missing births accounted for roughly 60 percent of the total missing girls in rural India. On the other hand, the top 4 scorers in urban India-Haryana, Rajasthan, Uttar Pradesh and Bihar accounted for little more than 50 percent of the total missing female births. Kerala in all the three regions did not show any missing girl at birth.

Table 6: Geographically Disaggregated Estimates of Missing Girls at Birth, 2011

	Rural			**Urban**			
State	**Missing female Births (in million)**	**Percent of female pop**	**Proportion of missing girls**	**State**	**Missing female Births (in million)**	**Percent of female pop**	**Proportion of missing girls**
India	**0.43**	**0.11**		**India**	**0.16**	**0.09**	
Uttar Pradesh	0.18	0.24	43.59	Haryana	0.01	0.20	6.62
Haryana	0.02	0.22	4.19	Rajasthan	0.02	0.20	12.67
Punjab	0.01	0.17	3.39	Uttar Pradesh	0.04	0.17	28.29
Rajasthan	0.04	0.15	9.02	Bihar	0.01	0.14	6.05
Maharashtra	0.04	0.13	9.25	Gujarat	0.02	0.13	12.64
Bihar	0.05	0.12	13.12	Punjab	0.01	0.12	4.68
Jammu & Kashmir	0.00	0.11	1.20	Jammu & Kashmir	0.00	0.08	0.98
Madhya Pradesh	0.02	0.10	5.96	Maharashtra	0.01	0.06	10.98
Andhra	0.02	0.08	5.22	Madhya	0.01	0.05	3.98

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Pradesh				Pradesh			
Gujarat	0.01	0.07	2.95	Tamil Nadu	0.01	0.05	7.22
Tamil Nadu	0.01	0.03	1.36	Andhra Pradesh	0.01	0.05	5.56
West Bengal	0.01	0.02	1.68	Odisha	0.00	0.05	1.27
Odisha	0.00	0.00	0.00	Karnataka	0.00	0.03	2.79
Karnataka	0.00	-0.01	-0.56	West Bengal	0.00	-0.01	-1.07
Kerala	0.00	-0.02	-0.39	Kerala	0.00	-0.04	-2.66

Source: (Basic data), Census of India, 2011.

It is to be noted that the excessive female pre-natal deaths has been observed in the regions where son preference remains strong—These are Haryana, Rajasthan, Punjab and Uttar Pradesh. The higher incidence of female foeticide is largely reported in the urban areas because of the easily available sex screening technologies. However, the study has found that even in rural regions, these 4 States have indicated the highest percentage of missing female births. These are attributable to the good transportation network and the ability to pay for the services of the mobile doctors

Aggregating the estimates of missing girls

Table 7 reports all missing girls of early childhood starting from their birth. The first and third column indicates the number of missing girls at birth and at under-five age group respectively while column 5 shows their sum total. The findings indicate a total loss of 1.80 million (18 lakhs) girls by the age of 5 years which constitute 0.31 percent of the total female population of India. In the State disaggregation, UP shares the highest number of missing girls followed by Bihar, Rajasthan and MP. The last column shows the overall percentage of missing girls with respect to their state level female population. UP followed by Rajasthan and Haryana are the three States that have demonstrated the highest percentage of total missing girls resulting from both pre natal sex selection and postnatal excess mortality in India in 2011.

Table 7: Aggregating Missing Girls by Age-Group, 2011

State	At Birth (million)	Percent	Missing Girls (0-5) (million)	Percent	Total	Percent of Female Population
	(1)	(2)	(3)	(4)	(5)	(6)
India	**0.59**	**33**	**1.21**	**67**	**1.8**	**0.31**
Andhra Pradesh	0.03	34	0.06	66	0.09	0.21

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Bihar	0.06	32	0.13	68	0.19	0.39
Gujarat	0.03	37	0.05	63	0.07	0.26
Haryana	0.03	47	0.03	53	0.05	0.46
J&K	0.01	47	0.01	53	0.01	0.23
Karnataka	0	3	0.03	97	0.04	0.12
Kerala			0.01		0.01	0.04
MP	0.03	22	0.11	78	0.14	0.39
Maharashtra	0.05	61	0.03	39	0.09	0.16
Orissa	0	4	0.04	96	0.04	0.2
Punjab	0.02	50	0.02	50	0.04	0.3
Rajasthan	0.05	32	0.11	68	0.17	0.5
Tamil Nadu	0.01	35	0.03	65	0.04	0.11
UP	0.22	39	0.33	61	0.55	0.58
WB	0.01	12	0.05	88	0.05	0.12

Source: (Basic data), Census of India, 2011.

The second and fourth column under each age category in Table 7 represents the proportion of total missing girls in a state in that particular age group. The percent distribution shows that in India, 33% of girls are found to be missing at birth due to prenatal sex selection while 67% are reportedly missing after birth as a result of post natal gender discrimination. State-wise decomposition show that in Maharashtra close to 60% of the excess female mortality is at birth and for Haryana and Jammu & Kashmir, these numbers are well over 40%. Punjab has shown an equal distribution of 50% each in both these categories.

CONCLUSION

Against the backdrop of declining child sex ratio, this paper estimated the extent of missing girls in the pre-natal, infant and under-five age group for 2011 across major States of India. The results suggested that in India, a total of 1.80 million girls went missing by the age of five out of which 0.59 million girls could never get a chance to be born, showing the existence of severe gender bias at birth and young ages. About 1.21 million girls in under-five age group (including 0.23 million in infancy stage) died as a result of post natal gender discrimination. In all the three age groups, Uttar Pradesh remained predominant in having the largest share of missing girls, which is not just as the result of its large population size but because of high proportion of girls missing in this region. Apart from UP, other densely populated States of Bihar and Madhya Pradesh too indicated the highest number of missing girls at younger ages. UP, Madhya Pradesh and Bihar constitute roughly about 30 per cent of India's total female population and are also over-contributing to the missing girls' at all three childhood stages relative to their populations. As a percent of female populations, Haryana, Rajasthan and Punjab, in addition to UP, MP and

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

Bihar, featured in different age groups depicting the highest percentage of missing females in the juvenile stage. Southern States viz. Kerala, Karnataka and Tamil Nadu have shown a relatively low number of missing girls except for Andhra Pradesh which figures out prominently in showing the significant deficit of female infants in 2011.

REFERENCES

1. Anderson, S and Ray, D. (2010): "Missing Women: Age and Disease", Review of Economic Studies, Vol. 77, pp.1262-1300.

2. Anderson, S and Ray, D. (2012): "The Age Distribution of Missing Women in India", Economic and Political Weekly, Vol. XLVIII, No. 47 & 48.

3. Bhat, P.N.M. (2002): "On the trail of missing Indian females I: Search for Clues", Economic and Political Weekly, Volume 37, pp. 5105-5118.

4. Bongaarts, J and Guilmoto, C. (2015): "How Many More Missing Women? Excess Female Mortality and Prenatal Sex Selection, 1970–2050", Population and Development Review, Vol 41, Issue 2, June 2015, pp 241-269

5. Coale, A. (1991): "Excess Female Mortality and the Balance of the Sexes", Population and Development Review, Vol.17, No.3, pp. 517-523.

6. Klasen, S. (1994): "Missing Women; Reconsidered", World Development, Vol.22, No. 7, pp. 1061-1071

7. Klasen, S. and Wink C. (2003): "Missing Women; Revisiting the Debate", Feminist Economics, Vol.9, No. 2-3, pp. 263-299

8. Kulkarni, P.M. (2007): "Estimation of Missing Girls At Birth And Juvenile Ages In India", Commissioned by United Nations Population Fund (UNFPA), India

9. Office of the Registrar General, India, "Statistical Report 2011", Sample Registration System, Ministry of Home Affairs, New Delhi.

10. Office of the Registrar General, India, "Statistical Report 2012", Sample Registration System, Ministry of Home Affairs, New Delhi.

ISSN: 2455-8834

Volume:02, Issue:09 "September 2017"

11. Office of the Registrar General, India, (2011), "Primary Census Abstract", Census of India, Office of the Registrar General & Census Commissioner, India

12. Sen, A. (1990): "More than 100 Million women are missing" The New York review of books, Vol. 37 no. 20

13. United Nations, Department of Economic and Social Affairs Population Division (2011): "Sex Differentials in Childhood Mortality", United Nations, New York, 2011.

