

# A Statistical Study of Child Sex Ratio (0-6 Age Group) in India

Dr. Mohanbhai Namdev Mane

(M.Com. M.Phil., Ph.D. NET)

Sir. K.P. College of Commerce, Surat, Gujarat

## ABSTRACT

Like the sex composition of the total population, the sex composition by age groups is vital for studying the demographic trends of young population, its future patterns and particularly, the status of the girl child. At the Census 2011, sex ratio of the population in the age group 0-6 years has been registered as 919, in India, decreasing from 927 in 2001. Overall the decreasing sex ratio in this age group has a cascading effect on population over a period of time leading to diminishing sex ratio in the country. To study the scenario and estimates the future trend of CSR of India by using previous years data. This time series data analysis study was conducted during February 2017. Study included the data of Indian census 1961 to 2011. Study had focused mainly on data of India. Study had systemically searched the data and relevant information from internet, internet and index journals. Bi-variate analysis regarding to know the association between dependent and independent variable, Correlation and Simple linear regression model have applied accordingly. India recorded a 8 point decrease in CSR from girls to 1000 boys in 2001 to 2011, still significantly lower than desirable levels. After analyses and estimates the data the projected child sex ratio up to 2021 it is 908 girls per 1000 boys which also in decline trend to compare with the previous years of CSR of India. Correlation coefficient and R-squared value was -0.983 and 0.966 respectively. Study results show that if there is no change in current situation or more actions are not taken, CSR of India will continuously decrease. Parents in a society should change their attitude towards certain norms that lead them to give better care to their sons than their daughters, and excess female mortality may be an unintended consequence.

**Keywords:** Child Sex Ratio(CSR), Census, Gender Discrimination, Regression

### ➤ INTRODUCTION

Sex ratio is one of the important demographic parameter, which indicates the balance between females and males in the society. Gender composition reflects mortality and migration character of a given population. Distribution pattern of male and female in a population affects relative roles and economic relationships. There are different tools to measure gender equity in a population. Sex ratio is one such widely used tool for cross sectional analysis to measure gender balance. Sex ratio is defined in the Census of India as the number of females per 1,000 males in the population; whereas in many western countries sex ratio is defined as number of males per thousand females. Mainly in India, due to male dominated society, more preference is given to the male child. As a result, it is possible that historically the sex ratio is less than 1000 in India in Indian states since the year 1901 onwards till now. It is also well known that socio-cultural factors and practices, such as the status of women, patriarchal structure of the society, preference for a son, fear of dowry and the belief that it is the son who can look after the old parents and so on are the main reasons for adverse sex ratio.

Foeticide is an act that causes the death of a foetus. This term is highlighted much in present days because of the decrease in sex-ratio. It is learnt throughout the world that sharp decline in sex ratio is a result of deliberate action of killing female fetus in mother womb itself. There can be several reasons behind this but foremost reason is the dowry and liabilities for nurturing the girl child. This becomes a global issue because of criminal human act that alter the ingredient of social composition adversely affecting the human society.

Research shows that the sex ratio declines primarily through lack of attention toward female health, killing girl babies after they are born, and terminating pregnancies if the baby is a girl. Low literacy levels, especially among women, could indicate the status of women in that region, besides contributing to a lack of awareness of how important girl children are for demographic balance.

In this situation it becomes very essential to know whether the future trend of CSR of India increase or decrease. With reference to above mentioned situation and background, investigator decided to estimates the regression equation of CSR and studied. Moreover, it also becomes necessary to know that value of CSR of India in census 2021.

### ➤ OBJECTIVES OF THE STUDY

Following were the main objectives of the present study:

- (1) To know the trend of child sex ratio in India level.
- (2) To apply the method of data validation to fulfil the assumptions of good simple regression model.
- (3) To obtain Correlation co-efficient and coefficient of determination  $R^2$  between variables and interpret it.
- (4) To estimates linear trend equation of CSR using simple linear regression analysis to determine future trend of CSR of India.
- (5) To offer suggestions for the trend of CSR of India.

### ➤ TRENDS IN CHILD SEX RATIO OF INDIA: 1961-2011:

Trend of child sex ratio is very important to knowing the changing pattern of the value during the various time periods. The trend of child sex ratio of India were as under table 1.1.

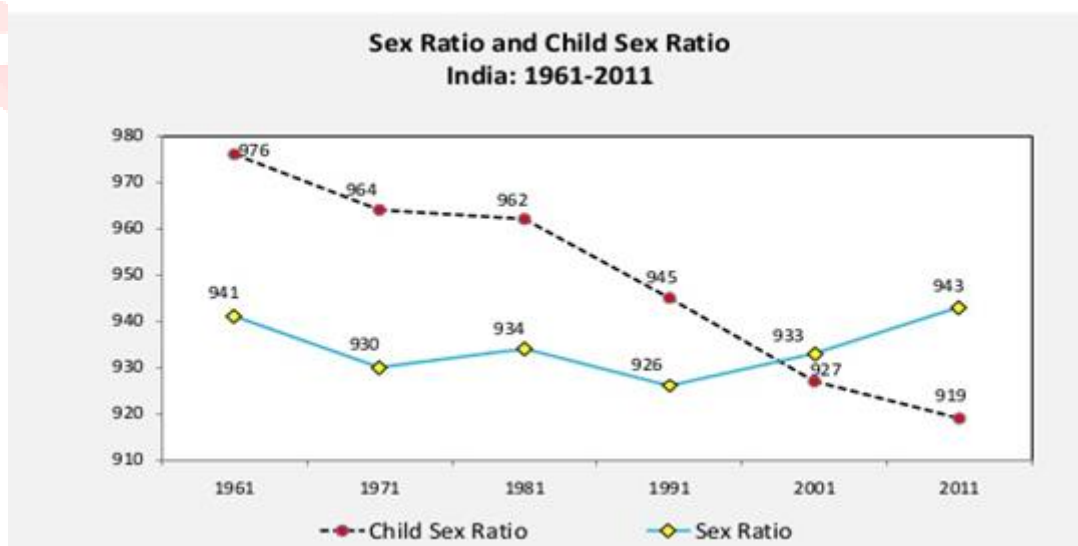
India recorded a 8 point decrease in CSR from 927 girls to 1000 boys in 2001 to 919 in 2011, still significantly lower than desirable levels which seen in below table-1.1.

**Table -1.1**  
**Child Sex Ratio in India from 1961-2011**

Year	Overall Sex Ratio India	Child Sex Ratio India	Decadal difference
1961	941	976	-
1971	930	964	-12
1981	934	962	-2
1991	926	945	-17
2001	933	927	-18
2011	943	919	-8

The overall sex ratio has increased a 10 point to 943 in 2011 as compared to 933 in 2001, the child (0-6 years) sex ratio, i.e. the number of girl children per 1,000 male children has shown an unabated decline 1961 to 2011. While 8 points declined from 927 in 2001 to 919 in 2011. The latest figures are the lowest since 1947. This is of grave concern as the country is already grappling with gender discrimination and female foeticide /infanticide. Trend of child and overall sex ratio in India (1961-2011) is shown below in Graph 1.1.

**Graph 1.1**



Adverse sex ratio also may encourage domestic violence and crime against women. There are several reasons which explain the consistently low level of sex ratio and their father decline in the country. Possible reasons for declining Sex ratio in India as listed below:

- (I) An increased discrimination of females (including infanticide) in providing the minimum nutrition, access to health and other amenities
- (II) Increase in the proportion of male selective migrants from other countries and states.
- (III) Reduction in fetal wastage resulting in a decline in female male ratio at birth.

(IV) Female selective termination of pregnancy

(V) Neglect of the girl child resulting in their higher mortality at younger ages

(VI) High maternal mortality

➤ **RESEARCH METHODOLOGY**

This secondary data analysis study was conducted during November December 2017 and included the data of Indian census 1901 to 2001 and provisional data of census 2011. Study had focused mainly on data of India.

• **Data Sources**

Study had systemically searched the data and relevant information from internet and index journals. Study analyzed the data of Sample Registration System (SRS), Indian Census data of 1901 to 2011, as primary data.

Investigator obtained relevant data for overall child sex ratio, from various issues of census published by government of India.

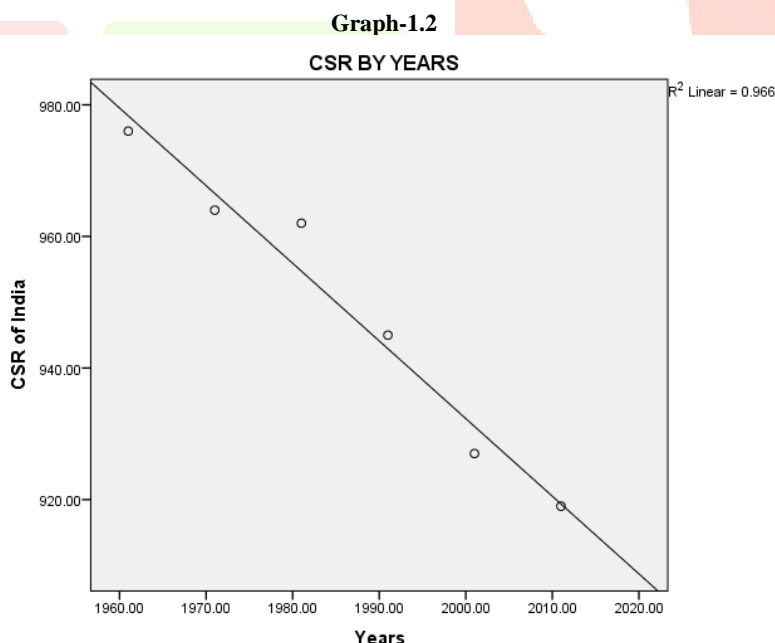
• **Statistical Method**

After collection of data, investigator will apply method of validation and fulfil the assumptions of good simple regression model and estimates the regression equations using SPSS 20 Software. Bi-Variate analysis regarding to know the association between dependent and independent variable, correlation and linear regression model have applied accordingly.

➤ **METHOD VALIDATION**

• **Linearity test**

There needs to be a linear relationship between the two variables. Whilst there are a number of ways to check whether a linear relationship exists between two variables, investigator creating a scatter plot using SPSS Statistics where plot the dependent variable as CSR against independent variable as years and then visually inspect the scatter plot to check for linearity. Scatter plot Graph-1.2 of CSR in India was respectively as under.



Graph-1.2 indicates when years increasing then CSR decreasing. It can be concluded that strong negative linear relationship a between variables of Years with CSR in India.

• **Normality test**

The following numerical and visual output investigated:

(I) Skewness & Kurtosis z- values (should be somewhere in the span of -1.96 to +1.96)

(II) The Shapiro-Wilk test p-value (should be above 0.05)

(III) Histograms, Normal Q-Q plots and Box plots (should visually indicate that our data are approximately normally distributed)

(I) **Skewness & Kurtosis z- values**

**Table-1.2**  
**Result of Skewness & Kurtosis z- values**

Descriptives		Statistic	Std. Error
CSR of India	Skewness	-0.296	0.845
	Kurtosis	-1.721	1.741

The above table-1.2 shows that the Skewness z- value for CSR of India was  $-0.3502(-0.296/0.845)$  and Kurtosis calculated z- value  $-0.9885 (-1.721/1.741)$  respectively. This two values were neither below -1.96 nor above +1.96. All four Z- values were within  $\pm 1.96$ . It means that data were a little skewed and kurtotic for CSR of India, but it does not differ significantly from normality. So it can assume that the data were approximately normally distributed, in terms of skewness and and kurtosis.

**(II) The Shapiro-Wilk test p-value**

Result of Shapiro-Wilk test of CSR of India were shown below in table – 1.3.

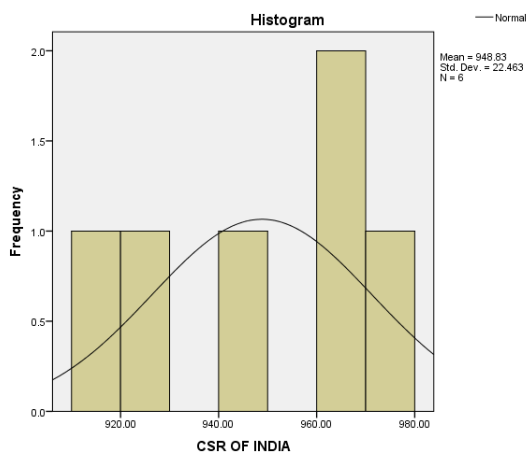
**Table – 1.3**  
**Result of Shapiro -Wilk test**

	Shapiro-Wilk		
	Statistic	Df	Sig.
CSR of India	0.934	6	0.610

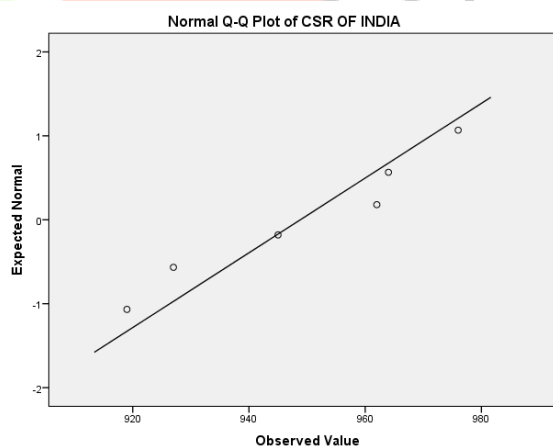
**(II) Histograms, Normal Q-Q plots and Box plots**

Histogram Graph-1.3, Graph-1.4 of Normal Q-Q plot and Graph-1.5 of Box plot of CSR of India were shown below.

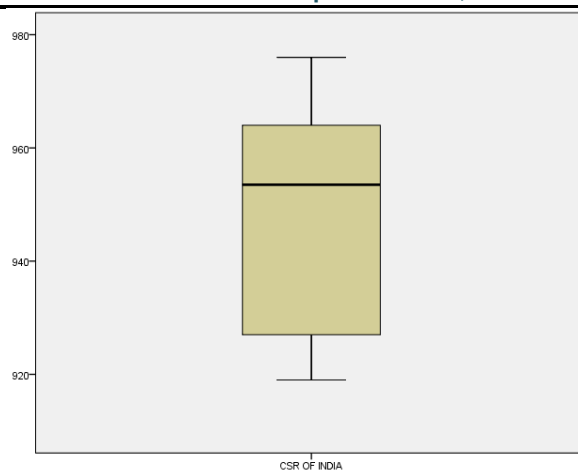
**Graph-1.3**



**Graph-1.4**



**Graph-1.5**  
**Box plot**



The above Shapiro - Wilk test result, the p-value for CSR of India was 0.610 respectively which was above 0.05 and a visual inspection of their Histogram, Normal Q-Q plots and Box plot showed that the data of CSR of India was approximately normally distributed.

#### ➤ ESTIMATES OF LINEAR TREND EQUATION OF CSR OF INDIA USING SIMPLE LINEAR REGRESSION ANALYSIS

To estimates linear trend equations of CSR of India using simple linear regression analysis, investigator used the data of CSR (Table-1.1) in SPSS software.

The SPSS results of estimates of CSR of India were mentioned below in Table-1.4.

Country	Regression Equation	Correlation coefficient	Sig.	R <sup>2</sup>	Estimated Trend Value of CSR of India in 2021 year
India	$Y = 3292.313 + (-1.180)X$	-0.983	0.000*	0.966	908
Y = Sex Ratio, X = Year, * = p value < 0.05					

#### • Correlation coefficient

It can be seen from above table that correlation coefficient between India and Years is -0.983. Estimated Correlation coefficients was statistically significant at 0.05 percent level. This indicates that child sex ratio of India has very strong negative correlation coefficient during 1961 to 2011. This suggest that when years increasing then CSR is decreasing. So it can be also concluded that the estimated trend values of CSR of India about 908 will be in decreasing trend.

#### • R- Square

The coefficient of determination R-square was 0.966 for India; therefore, about 96.6% of the variation in the CSR data is explained by years. The regression equation appears to be very useful for making predictions since the value of R<sup>2</sup> is close to 1.

#### • Regression Equation

From the SPSS result the coefficient of variable X was -1.180 and the constant value was 3292.313. By these values the estimates regression equation of CSR of India obtained  $Y = 3292.313 + (-1.180)X$ . This Regression equation of CSR of India gave the estimates trend of CSR of India in the year 2021. Which was about 908.

#### ➤ CONCLUSION AND SUGGESTIONS

Study results shows that if there is no change in current situation or more actions are not taken, sex ratio will continuously decrease. Parents in a society should change their attitude towards certain norms that lead them to give better care to their sons than their daughters, and excess female mortality may be an unintended consequence.

- I. If the reduction of child sex ratio can be continues the projected child sex ratio up to 2021 it will be about 908 girls per 1000 boys.
- II. A declining sex ratio in the population is also strongly suggestive of the neglect of girl children and sex selective abortions where available medical services are used to realize that.
- III. The sex ratio in India 919 (2011) for child in the age group of 0-6 years is below that of 927 (2001). The reason for this may be attributed to the strong son preference approach in India.
- IV. In the develop sugar belt and industrial area aware about use medical facility so the sex ratio is less.

In all, investigator would like to conclude that the present investigation contributes to the field of Commerce, Economics, Demography and Statistics.

➤ **EPILOGUE**

Every research helps to increase the level of knowledge in its specific field. This research would also contribute in the field of econometric statistics. It will help to the field of Investigator would like to conclude with the only feelings that this investigation will help to different parties by different ways.

➤ **REFERENCES**

1. Dave, A., Dave, S, Preetha, G.S. Pant, B (2009). Why Me? A Missing Girl. Indian Journal of Public health 2009; 53(4): 259-263.
2. D' Souza, S., Lincoln, C (1980). "Sex differentials in mortality in rural Bangladesh, "Population and Development Review 6, no. 2 (June): 257-270.
3. Government of India, Census (2011). Available from <http://www.censusindia.gov.in> - prov-results/child sexratio-india.htm.
4. Gupta D, Bhat,M (1997). PN. Fertility decline and increased manifestation of sex bias in India. Population Studies ; 51(3): 307- 315.
5. Gupta,M.D (1987). Selective Discrimination against Female Children in Rural Punjab, India. Population and Development Review 1987:13(1);77- 100.
6. Jha P., Kumar, R., Vasa. P (2006). Low female (corrected)-to-male (corrected) sex ratio of children born in India: national survey of 1.1 million households. Lancet ;367:211–18.
7. Miller, B.D (1981).The Endangered Sex: Neglect of Female Children in Rural North India, Cornell University Press, Ithaca, New York;
8. Oldenberg, P (1992). Sex ratio, son preference and violence in India: A research note. Economic and Political Weekly; 27 (49-50): 2657-2662.
9. Sen A (1992). Missing women. BMJ; 304: 587–8.
10. Subramanian, S.V., Selvaraj, S (2009). Social analysis of sex imbalance in India: before and after implementation of PNDT Act. J Epidemiol Community Health;63;245-252.



