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On Estimation of Indicators of Development with Gender Perspective

Statistics

Sheela Misra Department of Statistics, University of Lucknow, Lucknow, U.P., India

Anjali Singh Department of Statistics, University of Lucknow, Lucknow, U.P., India

ABSTRACT

The two main indicators of growth and development of a society are educational attainment and literacy level. Universal primary education for every child till 2015 was set as a Millennium Development Goal by United Nations which is still a dream. The Planning Commission of India had also included reduction of gender gap and increment of literacy rate in the eleventh five year plan. Educational attainment and literacy rate may also be considered as the main factors affecting the vital indicators like Infant Mortality rate, fertility and migration. It also increases the quality of life in different ways such as life expectancy, infant mortality and nutritional status of a mother and child, social and economical mainstreaming and Labour force participation. It has been observed that higher level of educational attainment and literacy provides great attention for helping people in developing and honing new skills. In this paper we are analyzing the impact of gender on literacy and discuss the reasons for incorporating gender impact in estimation and other aspects while estimating indicators of social and economic development.

KEYWORDS:

Sex Ratio, Literacy Rate, Gender Gap, Correlation

Introduction

Sex Ratio is an important indicator of growth and gender equality. It reflects current status of infanticides, foeticides and gender discrimination with respect to girl child in the society. Current sex composition of child population defines future events like age structure, birth and death, migration, labour force participation and marriage rate, which greatly affects gender disparity and gender gaps. Sex ratio is basic vital indicator for any sensible vital analysis. Variability in sex ratio of any population greatly affects the cultural and socio-economical patterns of a society in many ways. It is a basic indicator which measures the degree of present gender equity between females and males at a particular time which affects growth rate and marriage rate of the population. It is also an important tool for assessment of socio-economic of a particular area and its analysis. It affects the nature and volume of social importance, consumption pattern and employment. Sex ratio is expressed as the numbers of females per thousand males. Sex ratio varies with time and space.

According to Population Commission of United Nations the ability of reading and writing both with understanding in any language is considered as literacy. If a person posses any of the one quality means he/she can read but not write or write but cannot read then he/she will not be included as literate. There is no formal and minimum eligibility criterion for a person to be literate other than this. In Indian census 1981, all the children of age 4 or below age 4 were treated as illiterate even if some of them were going to schools and might have learnt reading and writing of few words. According to Primary Census Abstract of years 1991 and 2001, a person aged 7 and above and can read, write with the understanding of language were considered as literate. Female literacy is very important for the growth and development of a society it also helps in upliftment of sex ratio. In this paper we are analyzing the relation between female literacy and sex ratio and how it affects the calculation of indicators for total population. The data used in our analysis is secondary data taken from census 2011.

Literacy rate is an important indicator of growth and development of a society; especially in rural areas it defines basic criteria of human development. It represents the socio-cultural status of any geographical unit and change in literacy rate shows the socio-economic transformation of a society. It is initial tool for the removal of poverty and mental isolation for developing peaceful and friendly international relations and also for the growth of vital indicators (Chandana, 1980 and Krishan, 1978). It has been observed that the social discrimination between female and male literacy can be interpreted by gender gap, which can be used as a sensitive indicator of gender equity measuring the inequalities between females and males in terms of school going status. If there are systematic differences in education level of females and males then gender gap in Education will occur. It has been observed that the role of any gender in a society is influenced by many factors and poverty and growth are dependent on it. Gender equality indicators mostly include education, economic status, political participation and life expectancy. Developing countries like India, has always been greatly affected by these gender inequalities, deep rooted in India by centuries by its evaluation of cast and residence. Gender inequality in literacy level of female and male are because of our old social discrimination thought and their frequent adaptations (M.B. Singh, 2011).

Sex ratio is calculated for different age groups but it is most important for 0-6 years. An adverse sex ratio shows that more boys are being born compared to girls and thus it indicates discrimination against female foetus. This discrimination could occur at the time of gestation or delivery or at the time of conception. This discrimination also indicates that survival chances of female are determined by socio-cultural factors of a place.When the survival chance of female and male at a place is equal then numbers of male and female are equal in a society. In some places of India female population is much lower than male population because of higher mortality rates for females during their reproductive span.

Our country India represents a great demographic diversity. A diverse economic development in context of regional differences by age group, social group and levels of prosperity is also occurs due to sex discrimination (Agnihotri, 1995: Dyson and Moore, 1983). In some researches it has been shown that there is a considerable difference in sex ratio between Northern and Southern states of India. The northern states have higher level of agricultural development and lower level of literacy rate while Southern states have better health services and higher level of literacy rates. India lies in the list of those countries of the World for which males outnumber females. According to the reports of census of India, year 1961, 1971 and 1991 shows decline in sex ratio and year 1951, 1981, 2001 and 2011 shows increase in sex ratio. The sex ratio of year 2011(940) were 7 point greater than that of year 2001(933).Thus sex ratio is the indicator of social status and health of a women in a society, and have direct impact on child mortality.

Review of Literature

A study "Sex ratios of population of India" by Visaria in 1971 shows that low female –male ratio (FMR) is mainly due to sex differences in

Mortality rates of females and males. He showed that the contribution of sex ratio, under enumeration of females and migration at birth have marginal influences. A study " The Endangered Sex" by Miller in 1981 shows that socio-cultural differences against female children are the main reason for female mortality. Miller called, Life sustaining inputs like food, health care and nutrition not for girl child as "extended infanticide". There are many studies which show that less food and health care services are provided to girl child mostly in north Indian states. Dreze and Sen (1995) observed in his study that girls are breast fed for shorter time periods of their birth also few medical consultations and often very late or not at all hospitals facilities are provided to girl child.

Objectives of Study

Main objectives of this paper are:

1. To understand the concept of gender gap and its impact on development.

2. To study the pattern of sex ratio and literacy rate is all states of India

3. To analyze the correlation between male and female literacy rate and sex ratio in all states of India.

4. To propose a weighted estimator of indicators for total populations include both males and females.

5. To study the efficiency of proposed estimator.

Database and Methodology

For this paper we used secondary data from Census of India 2011.We have taken literacy rates of all states of India for both the sexes and sex ratio of all states of India. Pattern of Literacy for both the sexes is shown by graphs and pattern of sex ratio is also shown by graph. We suggested an estimator based on the proportion of females and males. On the basis of this estimator we have calculated weighted literacy rate for both the sexes in context to sex ratio. Correlation is calculated by using statistical software SPSS 21.

Concepts

According to the experts, the ability to read and write with understanding is not ordinarily achieved by a person until the age of 7, hence the age of literacy was increased to 7 years. Thus in Census of year 1991 the child group of age 0-6 was treated as illiterate. The census of year 2001 and 2011 has retained same criteria of literate. So other than this no minimum eligibility criteria is required for a person to be literate or illiterate.

Literacy Rate.The literacy rate of any place or state or country is defined as the ratio of number of literate person aged 7 and above to the total population aged 7 and above. It is calculated in percentage so we multiply the ratio by 100.If we take total population in denominator then it is known as "Crude Literacy Rate" otherwise it is known as the "Effective Literacy Rate".Formulae of Crude Literacy rate and effective literacy rate are given below.

$$\text{Crude Literacy rate} = \frac{\text{Number of literate person aged 7 and above}}{\text{Total Population}} \text{x100}$$

$$\text{Effective Literacy rate} = \frac{\text{Number of literate person aged 7 and above}}{\text{Population aged 7 and above}} \text{x100}$$

Sex Ratio. Sex ratio is defined as the number of females per thousand males. Thus in India sex ratio is a great measure to find equality of females and males in a society at a particular period of time. Sex ratio of India was better before independence, after independence it is decreasing continuously upto2001.In 2011 it was increased by 7 points. Formula of Sex ratio is given below

$$\text{Sex Ratio} = \frac{\text{Total number of females}}{\text{Total number of males}} x1000$$

Notation and Terminology

$\bar{y}_t$ = Total literate

$\bar{y}_m$= Male literate

$\bar{y}_f$ = female literate

m = male proportion = $\frac{1000}{\text{sex ratio}+1000}$

f= female proportion = $\frac{\text{sex ratio}}{\text{sex ratio}+1000}$

We know that $\bar{y}_t = m\bar{y}_m + f\bar{y}_f$ (1)

Where, $m + f = 1$ (2)

By using equation (2) we can write equation (1) as weighted literacy rate

$$\bar{y}_t = \bar{y}_m - f \cdot g_l \quad (3)$$

Where g_l is Gender gap for literacy

From equation (3) we see that total literacy depends on male literacy and the product of female proportion and gender gap.

An ideal condition for gender equality is

Female proportion = Male proportion

i.e, $f = m = ½$

In this case from equation (1) total literacy become

$$\bar{y}_t = \frac{1}{2}(\bar{y}_m + \bar{y}_f) \quad (4)$$

Now we compare equation (3) for different values of f and gl by different graphs.

Correlation Between gender gap and ideal weighted literacy rate is

$$\rho(\bar{y}_t, g_l) = -0.73586 \quad (5)$$

This shows that by increasing literacy rate we can decrease gender gap.

Table 1: Gender gap in literacy in different percentage

State	$\bar{Y}_t$	$\bar{Y}_m$	Female Proportion	Gender Gap	$\bar{Y}_{t1}$	$\bar{Y}_{t2}$	$\bar{Y}_{t3}$	$\bar{Y}_{t4}$
Jammu & Kashmir	68.74	78.26	0.47	20.25	75.89	73.51	71.14	68.76
Himachal Pradesh	83.78	90.83	0.49	14.23	89.07	87.32	85.56	83.81
Punjab	76.68	81.48	0.47	10.14	80.28	79.09	77.89	76.70
Chandigarh #	86.43	90.54	0.45	9.16	89.51	88.48	87.45	86.42
Uttarakhand	79.63	88.33	0.49	17.63	86.17	84.01	81.84	79.68
Haryana	76.64	85.38	0.47	18.61	83.21	81.03	78.86	76.68
NCT of Delhi #	86.34	91.03	0.46	10.10	89.86	88.69	87.51	86.34
Rajasthan	67.06	80.51	0.48	27.85	77.16	73.82	70.47	67.12
Uttar Pradesh	69.72	79.24	0.48	19.98	76.86	74.49	72.11	69.73
Bihar	63.82	73.39	0.48	20.06	70.99	68.59	66.20	63.80
Sikkim	82.2	87.29	0.47	10.86	86.01	84.73	83.46	82.18
Arunachal Pradesh	66.95	73.69	0.48	14.12	72.00	70.31	68.62	66.92
Nagaland	80.11	83.29	0.48	6.60	82.49	81.70	80.90	80.11
Manipur	79.85	86.49	0.50	13.32	84.84	83.18	81.53	79.87
Mizoram	91.58	93.72	0.49	4.32	93.19	92.65	92.12	91.59
Tripura	87.75	92.18	0.49	9.03	91.07	89.97	88.86	87.75

Meghalaya	75.48	77.17	0.50	3.39	76.75	76.33	75.91	75.49
Assam	73.18	78.81	0.49	11.54	77.40	75.99	74.58	73.18
West Bengal	77.08	82.67	0.49	11.51	81.27	79.87	78.47	77.07
Jharkhand	67.63	78.45	0.49	22.24	75.75	73.04	70.34	67.63
Orissa	73.45	82.4	0.49	18.04	80.17	77.94	75.71	73.48
Chhattisgarh	71.04	81.45	0.50	20.86	78.85	76.26	73.66	71.07
Madhya Pradesh	70.63	80.53	0.48	20.51	78.06	75.59	73.12	70.65
Gujarat	79.31	87.23	0.48	16.50	85.26	83.28	81.31	79.33
Daman & Diu #	87.07	91.48	0.38	11.89	90.34	89.21	88.07	86.94
Dadra & Nagar Haveli #	77.65	86.46	0.44	20.53	84.22	81.98	79.74	77.50
Maharashtra	82.91	89.82	0.48	14.34	88.10	86.37	84.65	82.93
Andhra Pradesh	67.66	75.56	0.50	15.82	73.59	71.62	69.65	67.68
Karnataka	75.6	82.85	0.49	14.72	81.04	79.23	77.42	75.61
Goa	87.4	92.81	0.49	10.97	91.46	90.11	88.76	87.41
Lakshadweep #	92.28	96.11	0.49	7.86	95.15	94.20	93.24	92.29
Kerala	93.91	96.02	0.52	4.04	95.49	94.97	94.44	93.92
Tamil Nadu	80.33	86.81	0.50	12.95	85.20	83.58	81.97	80.35
Puducherry #	86.55	92.12	0.51	10.90	90.73	89.34	87.96	86.57
Andaman & Nicobar Islands #	86.27	90.11	0.47	8.27	89.14	88.18	87.21	86.24

represents Union Territories

$\bar{Y}_{t1}$ is weighted literacy rate when there is no gender gap.

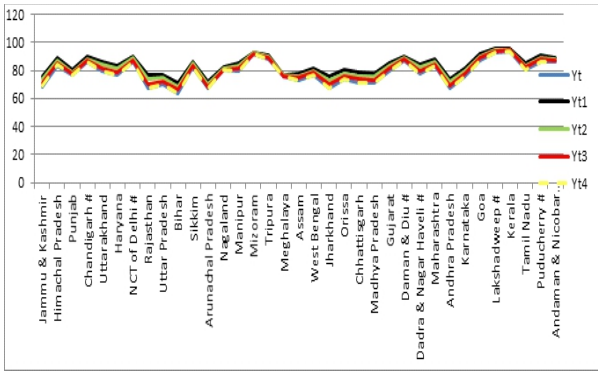
$\bar{Y}_{t2}$ is weighted literacy rate when gender gap is 75 percent of existing gender gap in present.

$\bar{Y}_{t3}$ is weighted literacy rate when gender gap is 50 percent of existing gender gap in present.

$\bar{Y}_{t4}$ is weighted literacy rate when gender gap is 50 percent of existing gender gap in present.

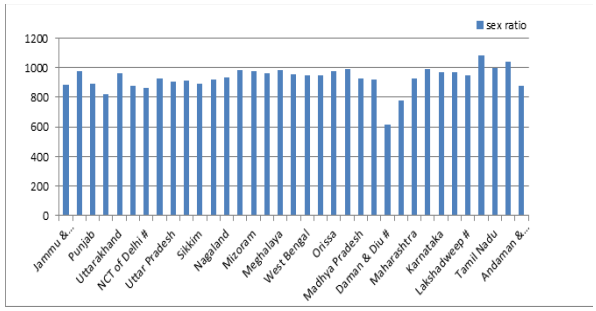
Graphical Representation and Interpretation

Figure 1: Gender Gaps in Literacy



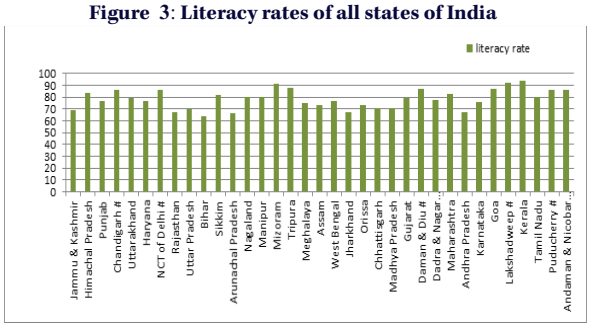
Interpretation of Figure 1. From above figure we see that as the gender gap is decreasing, the weighted total literacy is increasing continuously. When gender gap is 25% it is at top of all lines shown in above figure below the total literacy line and when gender gap is 50%, 75% and 100% then it is showing a declining pattern.

Figure 2 : Sex ratio of all states of India



Interpretation of Figure 2. The above Figure is a bar diagram of sex ratio of all states of India. In this figure we can see that the sex ratio of Kerala and Pondicherry is Maximum i.e. number of female per thousand male are greater. Haryana has minimum sex ratio.

Figure 3: Literacy rates of all states of India



Interpretation of Figure 3. The above figure is a bar diagram of literacy rate of all states of India. Mizoram, Laksadweep and Kerala has more than 90% literacy rate and Jammu & Kashmir, Bihar, Arunanchal Pradesh, Jharkhand, Andhra Pradesh and Uttar Pradesh has less than 70 % literacy rate. If we compare sex ratio and literacy rates it has been seen that the states having large sex ratio have highest literacy rates.

Conclusion

Gender Gap in literacy is a main issue for upliftment of female literacy in India. It varies with social structures. All states of India have different social structure so their gender gap in literacy is also different. Literacy rate is highest in Kerala so the gender gap is least here. As female literacy is increasing in all Indian states is does not means that females are getting good education. Females are getting enrolled to increase literacy rate but they are not getting good facilities so that they can take part in the development of society.

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