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## RESEARCH ARTICLE

### WOMEN EDUCATION AND INFANT MORTALITY: STATE WISE DISPARITY

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#### ABSTRACT

Women education is powerful instrument for development of socio-economic status of country because it holds the half resource of country. If we want to development of a nation through healthy population it cannot be possible without making women population healthy and wealthy. For the utilization of women population with its potential level women education is most important factor. It is well known fact that educated women are the weapons who yield positive impact on the child health as well as on society through giving healthy human recourses. Educated woman has capability to handle her children and professional life. The women education in ancient India was quite good but in the middle age it was deteriorated because of many restrictions against women. However, again it is getting better and better day by day as modern people in India understand that without the growth and development of women, the development of country is not possible. In the above context this paper aims to determine the extent to which women's education contributes to the good health of their children of EAG state of India. The purpose of this paper is to explore the relationship between women literacy rate and infant mortality rate, as well as highlight this relationship at the rural and urban levels also. Another objective of this paper is to know correlation between child sex ratio and women's literacy rate in EAG states. Through the data of many years, this paper will attempt to know the trend of infant mortality rate in India. This paper is based on mainly secondary data as census report 2011, NHP 2018 and SRS Statistical Report etc. Simple Statistics is used for analysis of secondary data. After analysis it is very clear that infant mortality rate is not directly associated with women education. The conclusion of study is that women should be given equal opportunity in education like men. Women should not be isolated from any development activities. The pace of social and economic development will be faster in India through the women education because it further improves the human recourse of country.

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#### INTRODUCTION

Women education is powerful instrument for development of socio-economic status of any nation because it holds the half resource of the nation. If we want to development of a nation through healthy population IT cannot be possible without making women population healthy and wealthy. For the utilization of women population with its potential level women education is most important factor. It is well known fact that educated women are the weapons who yield positive impact on the child health as well as on society through giving healthy human recourses. Educated woman has capability to handle her children and professional life. The women education in ancient India was quite good but in the middle age it was deteriorated because of many restrictions against women.

However, again it is getting better and better day by day as modern people in India understand that without the growth and development of women, the development of country is not possible. In this paper correlation between literacy rate of women and Infant mortality rate has been analyzed in three ways as rural infant mortality rate (RIMR), urban infant mortality rate (UIMR) and total infant mortality rate (TIMR). The infant mortality, the deaths under one year of age are called infant deaths. The infant mortality rate is defined as the number of infant deaths occurring in a community within a specified calendar year per 1000 live births in the same community during the same calendar year.

*Infant mortality rate =*

$$\frac{\text{Number of deaths in the age group 0-1 year after birth in a year}}{\text{Total number of live births in that year}} \times 1000$$

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With above context this study has some objectives to represent the women's literacy participation in infant health in EAG (Empowered Action Group) states.

## Objectives of the Study

- To determine the extent to which women's education contributes to the good health of their children of EAG state of India.
- To explore the relationship between women literacy rate and infant mortality rate, as well as highlight this relationship at the rural and urban levels also.
- To know correlation between child sex ratio and women's literacy rate in EAG states.
- To know the trend of infant mortality rate in India.

## METHODS

This paper is based on mainly secondary data as census report 2011, NHP 2018 and SRS Statistical Report and National Sample Survey Office, 68th Round (July 2011-June 2012).etc. Simple Statistics is used for analysis of secondary data as correlation and regression. Data received from various sources first and then combined it in different tables according to the requirements of the study.

### Data Analysis

**State-wise (EAG State) Women Literacy Rate (WLR) & Infant Mortality Rate (IMR):** Table 1 shows the relation between Women literacy rate and Infant Mortality rate in EAG states.

**Table 1. State-wise (EAG State) Women Literacy Rate (WLR) & Infant Mortality Rate (IMR)**

S.N	States	Women Literacy Rate( WLR) <sup>1</sup>	Infant mortality rate (Imr) <sup>1</sup>
	India	65.46	34
1	Uttar Pradesh	57.18	43
2	Uttarakhand	70.01	38
3	Rajasthan	52.12	41
4	Orissa	64.01	44
5	Madhya Pradesh	59.24	47
6	Jharkhand	55.42	29
7	Chhattisgarh	64.24	39
8	Bihar	51.5	38
9	Assam	66.27	44

EAG states mean Empowered Action Group States which includes Uttar Pradesh, Uttarakhand, Rajasthan, Orissa, Madhya Pradesh, Jharkhand, Chhattisgarh, Bihar and Assam. With the table it represents that as per SRS 2016, the Infant Mortality rate in India is 34 and literacy rate in women as per census 2011 is 65.46%. Among EAG states Bihar has minimum women literacy rate 51.5% and Uttarakhand has maximum literacy rate 70.01%.

On the hand among EAG States the Infant Mortality rate in M P is maximum 47 and in Jharkhand Infant Mortality rate are minimum 29. Out of nine states of EAG state only four states Uttarakhand, Jharkhand, Chhattisgarh and Bihar are near to national level IMR means these states are working good in case of controlling IMR As well as women literacy rate is found to be higher than the national level only in Uttarakhand and the women literacy rate in Chhattisgarh, Assam and Orissa is close to the national level while IMR in those states are higher than national level. It means there is no any clear relation between women literacy rate and Infant Mortality rate.

**Table 1. 1. Correlation and Regression between Women Literacy Rate and Infant Mortality Rate**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.103a	.011	-.113	5.62787

a. Predictors: (Constant), WLR

**Correlation and Regression between Women Literacy Rate and Infant Mortality Rate:** Table 1.1 indicates result of correlation and regression between Women Literacy Rate (WLR) which is Independent Variable in this study and Infant Mortality Rate (IMR) is dependent variable. Among all EAG states there is no correlation between women literacy rate and Infant Mortality Rate and regression analysis shows that impact of literacy is only 0.1% upon Infant Mortality Rate. It means other factors have more impact on women Infant Mortality Rate.

**State-wise (EAG State) Infant Mortality Rate:** Table 2 indicates relationship between rural and urban women literacy rate and rural and urban Infant Mortality rate. Rural literacy of women is high in Uttarakhand among all EAG state and Rajasthan has lowest literacy rate in rural women respectively 66.16% and 42.20%.

**Table 2. Rural- Urban Women Literacy Rate (WLR) & Infant Mortality Rate**

S.N	States	Women Literacy Rate		Infant Mortality Rate	
		Rural	Urban	Rural	Urban
	India	58.75	79.92	38	23
1	Uttar Pradesh	48.48	60.92	46	34
2	Uttarakhand	66.16	68.96	41	29
3	Rajasthan	42.20	63.81	45	30
4	Orissa	59.95	74.31	46	34
5	Madhya Pradesh	48.49	69.46	50	33
6	Jharkhand	46.62	67.76	31	21
7	Chhattisgarh	55.15	73.39	41	31
8	Bihar	44.30	61.95	39	29
9	Assam	60.05	79.85	46	22

While in Madhya Pradesh rural infant mortality rate is highest and in Jharkhand this rate is lowest respectively 50 and 31. In context to urban women literacy rate Assam has highest literacy rate and in Uttar Pradesh urban women literacy rate is lowest among all EAG state respectively 79.85% and 60.92%. While in Orissa and Uttar Pradesh urban infant mortality rate is high and in Jharkhand this rate is less respectively 34 and 21. It means there is no any clear relation between urban women literacy rate and urban infant mortality rate. This picture is clear by the correlation and regression analysis.

**Correlation and Regression between Rural Women Literacy Rate (RWLR) and Rural Infant Mortality Rate (RIMR):** Table 2.1 indicates result of correlation and regression between Rural Women Literacy Rate (RWLR) which is Independent Variable in this study and Rural Infant Mortality Rate (RIMR) is dependent variable.

**Table 2.1 Correlation and Regression between Rural Women Literacy Rate (RWLR) and Rural Infant Mortality Rate (RIMR)**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.069 <sup>a</sup>	.005	-.120	5.77511

a. Predictors: (Constant), RWLR

**Table 2.2 Correlation and Regression between Rural Women Literacy Rate (RWLR) and Urban Infant Mortality Rate (UIMR)**

Model Summary				
Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.450 <sup>a</sup>	.202	.103	4.66634

a. Predictors: (Constant), UWLR

Among all EAG states there is weak correlation between rural women literacy rate and rural Infant Mortality Rate and regression analysis shows that impact of literacy is only 0.5% upon rural infant mortality rate. It means other factors have more impact on rural Infant Mortality rate in rural areas. Table 2.2 shows result of correlation and regression between Urban Women Literacy Rate (UWLR) which is Independent Variable in this study and Urban Infant Mortality Rate (UIMR) is dependent variable. Among all EAG states there is positive correlation between urban women literacy rate and urban Infant Mortality Rate and regression analysis shows that impact of literacy is 20.2% upon urban Infant Mortality rate. It means urban women literacy rate influence the rate of urban Infant Mortality. It means that literate women in urban areas are conscious to their children’s health and being literate they have also information about the health facilities prevail in their areas.

**State wise Women Literacy Rate and Infant mortality rate by sex:** Table 3 indicates relationship between women literacy rate and Infant Mortality rate in male and female infant. Literacy of women is high in Uttrakhanad among all EAG state and Bihar has lowest literacy rate in women respectively 70.01% and 51.5%.

**Table 3. State wise Women Literacy Rate and Infant mortality rate by sex**

S.N	States	Women Literacy Rate	Infant mortality rate	
			Male	Female
	India	65.46	33	36
1	Uttar Pradesh	57.18	41	45
2	Uttrakhand	70.01	36	41
3	Rajasthan	52.12	39	44
4	Orissa	64.01	44	44
5	Madhya Pradesh	59.24	49	44
6	Jharkhand	55.42	27	31
7	Chhattisgarh	64.24	39	38
8	Bihar	51.5	31	46
9	Assam	66.27	43	45

**Table 3.1 Correlation and Regression between Women Literacy Rate (WLR) and Male Infant Mortality rate (MIMR)**

Model Summary				
Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.255 <sup>a</sup>	.065	-.052	6.76459

a. Predictors: (Constant), WLR

**Table 3.2 Correlation and Regression between Women Literacy Rate (WLR) and Female Infant Mortality rate (FIMR)**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.139 <sup>a</sup>	.019	-.103	5.15057

a. Predictors: (Constant), WLR

While in Madhya Pradesh infant mortality rate is highest in male infant and in Jharkhand this rate is lowest respectively 49 and 27. While in Bihar Female infant mortality rate is high and in Jharkhand this rate is less respectively 46 and 31. It means there is no any clear relation between women literacy rate and infant mortality rate by sex. This picture is clear by the correlation and regression analysis.

**Correlation and Regression between Women Literacy Rate (WLR) and Male Infant Mortality rate (MIMR):** Table 3.1 shows result of correlation and regression between Women Literacy Rate (WLR) which is Independent Variable in this study and Male Infant Mortality Rate (MIMR) which is dependent variable.

**Table 4. State-wise (EAG State) Women Literacy Rate and Child Sex Ratio**

S.N	States	Women Literacy Rate	Infant mortality rate	
			Male	Female
	India	65.46	33	36
1	Uttar Pradesh	57.18	41	45
2	Uttrakhand	70.01	36	41
3	Rajasthan	52.12	39	44
4	Orissa	64.01	44	44
5	Madhya Pradesh	59.24	49	44
6	Jharkhand	55.42	27	31
7	Chhattisgarh	64.24	39	38
8	Bihar	51.5	31	46
9	Assam	66.27	43	45

**Table 4.1 Correlation and Regression between Women Literacy Rate and child Sex Ratio**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.158 <sup>a</sup>	.025	-.097	29.92789

Among all EAG states there is very weak positive correlation between women literacy rate and Male Infant Mortality Rate and regression analysis shows that impact of literacy is 6.5% upon Male Infant Mortality rate. It means women literacy rate has no influence upon Male Infant Mortality.

**Correlation and Regression between Women Literacy Rate (WLR) and Female Infant Mortality rate (FIMR):** Table 3.2 shows result of correlation and regression between Women Literacy Rate (WLR) which is Independent Variable in this study and Female Infant Mortality Rate (FIMR) is dependent variable. Among all EAG states there is no correlation between women literacy rate and Female Infant Mortality Rate and regression analysis shows that impact of literacy is 1.9% upon Female Infant Mortality rate. It means women literacy rate has no influence upon Female Infant Mortality. It means other factors have more impact on Female Infant Mortality rate in EAG states. Table 4 shows the relation between literacy rate of women and Child Sex Ratio. By the table it is clear that at India level women literacy rate is 65.46 % and Child Sex Ratio in India is 919 while women literacy rate is high in Uttrakhand and Child Sex Ratio is high in Chhattisgarh respectively 70.01% and 969. In some state women literacy rate is high Child Sex Ratio is also high and some state has high literacy rate in women but low child sex ratio. This means there is no any clear relationship between women literacy rate and child sex ration in EAG states. It is more visible by the regression analysis.

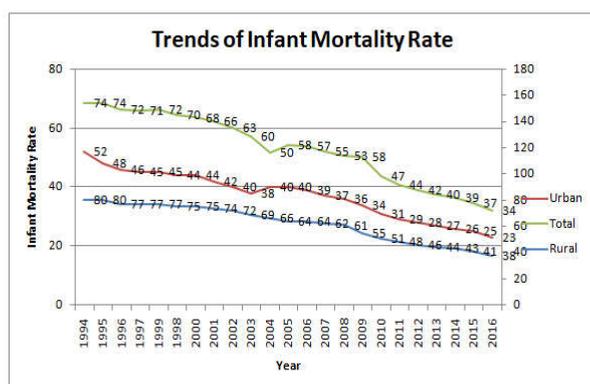
### Correlation and Regression between Women Literacy Rate and child Sex Ratio:

Table 4.1 shows result of correlation and regression between Women Literacy Rate (WLR) which is Independent Variable in this study and Child Sex Ratio which is dependent variable. Among all EAG states there is very weak correlation between women literacy rate and Child Sex ratio and regression analysis shows that impact of literacy is only 2.5% upon Child Sex Ratio. It means women literacy rate has no influence upon Child Sex ratio. It means some other factors are responsible for Child Sex ratio in EAG states.

**Table 5. Trends and Growth rate of Infant Mortality Rate by residence**

Year	Infant Mortality Rate			Growth Rate of IMR		
	Rural	Urban	Total	Rural	Urban	Total
1994	80	52	74	0.0	0.0	0.0
1995	80	48	74	0.0	-8.3	0.0
1996	77	46	72	-3.9	-4.3	-2.8
1997	77	45	71	0.0	-2.2	-1.4
1998	75	44	70	-2.7	-2.3	-1.4
1999	77	45	72	2.6	2.2	2.8
2000	75	44	68	-2.7	-2.3	-5.9
2001	74	42	66	-1.4	-4.8	-3.0
2002	72	40	63	-2.8	-5.0	-4.8
2003	69	38	60	-4.3	-5.3	-5.0
2004	66	40	50	-4.5	5.0	-20.0
2005	64	40	58	-3.1	0.0	13.8
2006	64	39	57	0.0	-2.6	-1.8
2007	62	37	55	-3.2	-5.4	-3.6
2008	61	36	53	-1.6	-2.8	-3.8
2009	55	34	58	-10.9	-5.9	8.6
2010	51	31	47	-7.8	-9.7	-23.4
2011	48	29	44	-6.3	-6.9	-6.8
2012	46	28	42	-4.3	-3.6	-4.8
2013	44	27	40	-4.5	-3.7	-5.0
2014	43	26	39	-2.3	-3.8	-2.6
2015	41	25	37	-4.9	-4.0	-5.4
2016	38	23	34	-7.9	-8.7	-8.8
Average Annual Growth Rate of IMR				-3.5	-3.8	-3.9

Source: SRS Bulletin, O/o Registrar General of India.



**Graph No. 1 trends of Infant Mortality Rate in India since 1994 to 2016**

Table 5 and Graph no.1 shows the trends of Infant Mortality Rate in India since 1994 to 2016. Through this table and graph it is clearly depicts that overall trends in IMR in India is decreasing and thus headed in the right direction.

Even so, there is variation between rural and urban IMR in absolute term while average annual growth rate of IMR showing slightly variation in rural, urban and total IMR.

## DISCUSSION

In this study there is no any obvious relation between women literacy rate and infant mortality rate regarding to EAG states, while many studies has been conducted in various country and showing different-different results. Some results are same to this study and some shows contradictory to present study. A study done by Hanmera et al. (2003), found that female literacy by itself cannot be the whole and sole influencing factor of infant mortality. Another study conducted in Bangladesh by Mandal et al. (2006), has depicted that immunization, breast feeding, mother's age at birth and birth interval are most important factors which are responsible for infant mortality. A study done by Ijaz Z (2012) in Pakistan found that female literacy had not been successful in reducing infant mortality. Shetty and Shetty (2014) conducted a study in India and found that there were only four states that showed a rise in the IMR in the Census 1991. With the above discussion it is clear that women literacy is not most important factor to reducing IMR. It seems that many other factors are responsible for reducing infant mortality.

### Conclusion & Suggestions

The results of this study show that urban women literacy rate influence the Urban Infant Mortality Rate. While on the other hand rural women literacy and rural Infant Mortality Rate is not much correlated as well as no any impact of literacy rate upon Infant Mortality rate and Child Sex Ratio. It seems that in urban women has information of health facilities which are no doubt better to rural areas. It means infant mortality based upon others factor it may be immunization of child, breast feeding, mother's age of marriage, mother's age at birth of child and birth interval. In this regards there is need to nutritional education to women in rural areas as well as increase social awareness about necessity immunization, birth interval and breast feeding. In all EAG State's Government should prepare and implement policies for reducing infant mortality rate particularly in rural areas.

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