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STATUS OF MATERNAL AND CHILD HEALTH IN EMPOWERED ACTION GROUP OF INDIAN STATES: A SPATIO-TEMPORAL ANALYSIS

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ABSTRACT

The Empowered Action Group (EAG) of States in India includes Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Uttarakhand, Rajasthan, Odisha and Assam. These States are in fact the backward ones in the field of human development in the country. The condition of maternal and child health in these States are extremely poor in comparison to the southern States of Kerala, Andhra Pradesh, Tamil Nadu and Karnataka. The maternal mortality ratio is high due to the absence of the ante-natal and post-natal care of the mothers. The low institutionalization of child deliveries have resulted into high infant and child mortality rates in these States. The prevalence of female infanticide, under-age marriage and negligence of girl children are frequent phenomenon in the conservative male-dominated societies of these States. The research endeavor tries to throw spotlight on the health conditions of women during and after pregnancy. The maternal health condition invariably affects and controls the health of the neonate before and after birth which has also been considered for study.

INTRODUCTION

India with a total population of 1,210 million as per the latest census of 2011 is divided into 29 States and seven Union Territories among which 17 are the major States with a population size of 20 million and above. Among these 17 major States eight States barring Uttarakhand are included under the special category of Empowered Action Group (EAG) of States based on high population growth, low literacy rate especially female literacy rate, prominent gap in literacy rate among both the genders followed by poor status of maternal and child health. In fact the EAG States were formerly known as the BIMARU States exclusive of the States of Odisha and Assam. During the mid 1980s famous economic analyst Ashish Bose has coined the term known as BIMARU in a study submitted to the then Prime Minister (Som *et al*. 2014). The word BIMARU strongly resembles the Hindi word *Bimar* which means sick. This term was used to denote the state of backwardness of some of the major Indian States including undivided Bihar, undivided Madhya Pradesh, Rajasthan and Uttar Pradesh.

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The population growth in these States was much higher than the Indian average during this period coupled with extremely low female literacy rate. The income disparity between BIMARU and other Indian States were sharp and these States were characterized by high fertility rate along with high maternal and child mortality rates. These States with low human development along with two other major eastern States of Odisha and Assam were together identified as EAG States by the Registrar General of India in the later years.

Objectives of the Study

The study has been initiated to fulfill the following objectives:

- To understand the health status of women during and after the critical phase of pregnancy
- To assess the health condition of children below six years of age
- To investigate the reasons behind low status of women in society associated with its consequences
- To make an inter-State comparison of health condition of mothers and children in order to find out their true position among each other

- To highlight the strong contrast in maternal and child health condition among the EAG States especially with that of the southern State of Kerala

Area under Study

The research endeavor focuses on the nine EAG States of India including Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Uttarakhand, Rajasthan, Odisha and Assam. Among these nine States barring Uttarakhand the rest eight States are the major States with population size of 20 million and above as identified by the Registrar General of India. The States of Bihar, Jharkhand, Odisha and Assam are included under the category of major eastern States while Madhya Pradesh and Chhattisgarh are the major States in the Central region of India and last but not the least, Uttar Pradesh and Rajasthan are parts of northern major States of the country. There are a total of 284 districts under the EAG States. These districts have been delineated based on their low level of socio-economic development inclusive of low social status granted to women, male-dominated society, high crude birth and death rate, high maternal mortality ratio and under-five child mortality rate along with low economic prosperity.

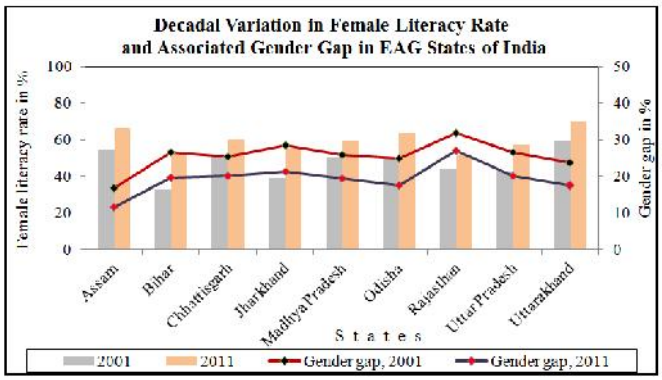
MATERIALS AND METHODS

The work is based on the analysis of the secondary data gathered from various Government sources. The secondary sources of data and information include the Sample Registration System published by the Registrar General of India and Primary Census Abstract published by the Directorate of Census Operations under the Government of India. A number of factsheets published by the Ministry of Health and Family Welfare (MoHFW) under the Government of India have also been collected for the purpose. Various articles published by the World Bank and World Health Organization (WHO) have been incorporated to provide a strong framework to the study. Besides, a number of journals and unpublished manuscripts including International Journal of Humanities and Social Science and Baroda Citizen's Council Report have also been consulted to enrich the literary background of the study. The data thus collected have been tabulated to facilitate the process of execution of cartographic and statistical techniques for an effective visual representation. This was followed by proper interpretation and analysis. At the final phase of the work a concrete inference has been derived to show the actual status of maternal and child health in the nine EAG States of India.

RESULTS AND DISCUSSION

The results and discussion of the research endeavor have been categorized under the following sub-heads for an effective depiction of the true picture prevalent in the nine EAG States of India.

Demographic Scenario and Status of Female Literacy: In India, the total female population has gone up from 496.5 million in 2001 to 587.5 million in 2011. A substantial proportion of this huge population resides in 640,867 number of villages under 640 districts in the country. Among the nine EAG States, the number of districts is highest in Uttar Pradesh (71) and lowest in Uttarakhand (13). The total female population is also highest in the same State (95.3 million) as well as lowest in the similar State (4.9 million) in 2011. In fact among the nine EAG States, eight are considered as the major or bigger States of the country with a population size of 20 million and above. Uttarakhand is one of the smallest States in the country sliced out of Uttar Pradesh in the year 2001 comprising of the Himalayan terrain of beautiful mountains and hills. The major State of Uttar Pradesh has the highest rural population of 155.3 million while Uttarakhand has only seven million rural population as per the latest census of 2011. In Bihar, the rural population (92.3 million) is comparatively higher than Jharkhand (25 million) while Madhya Pradesh has more rural population (52.5 million) than Chhattisgarh (19.6 million) in 2011. The overall scenario of distribution of rural population in the nine EAG States of India has revealed that the concentration of rural population is higher in the northern EAG States of Uttar Pradesh and Rajasthan in comparison to the eastern EAG States except Bihar. These States have in reality dominance of rural economy with low degree of industrialization and tertiarization of economic sector. Not only the economic sector, level of social development is also extremely lagging in these States in comparison to the socially developed southern States of Kerala, Andhra Pradesh, Karnataka and Tamil Nadu. The status of literacy especially female literacy has direct bearing on the fertility rate which in turn affects the health of the mother and the child. Studies have revealed that a woman who is educated at least to the primary level has an awareness of the consequences of repeated child bearing. Despite this fact, the overall literacy rate in the EAG States is low with prominent gender gap observed in all of them.

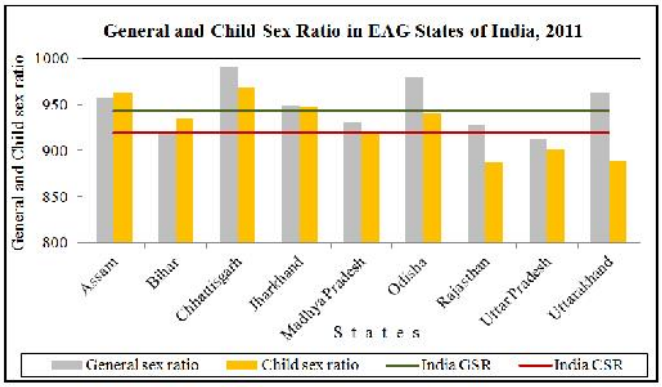


Data source: Census of India, 2001 and 2011

Fig. 1.

The female literacy rate has improved in all these States especially in Uttarakhand over time. The status of female literacy was somewhat in a shameful condition in the State of Bihar (51.5%) and Rajasthan (52.1%) in 2011 (Fig.1). The gender gap in literacy rate has declined in all these States with highest decline recorded in the State of Odisha as per the last census. The gender gap has been acutely high in the State of Rajasthan depicting the low social status granted to women in a patriarchal society. In case of sex ratio, the child sex ratio in the age group of 0-6 years in the country was 927 in 2001 which has further declined to 919 in 2011. Among the nine EAG States, the child sex ratio was lowest in Uttarakhand in 2001 (908) which have recorded a drop in 2011 (890) as well. The condition of child sex ratio is equally pathetic in other EAG States of Rajasthan and Uttar Pradesh where there is a prominent prevalence of incidences of female infanticide and killing of girl children below six years of age (Fig.2). The child sex ratio is relatively higher than the national value in 2011 in the States of Assam (962), Chhattisgarh (969), Bihar

(935), Jharkhand (948) and Odisha (941). The general sex ratio in India has improved from 933 in 2001 to 943 in 2011. Seven out of nine EAG States have general sex ratio higher than the national value. The highest general sex ratio was recorded in the State of Chhattisgarh (991 in 2011) while the lowest value was observed in Uttar Pradesh (912 in 2011). Uttar Pradesh and Bihar along with Rajasthan have sharp existence of heinous crimes against women including dowry related deaths of women and honour killing of girls. Most of these atrocities against women are part of the long list of cognizable crimes punishable as per the Indian constitution but in reality a substantial portion of these offences are not recorded in police stations.

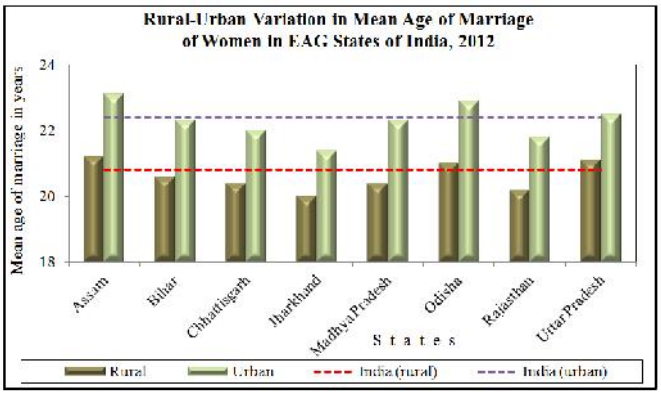


Data source: Census of India, 2001 and 2011

Fig. 2.

Age of Marriage of Female: The age of marriage is directly related to the total fertility rate of a woman and therefore is of crucial significance. The legal age of marriage of female in the country is 18 years while that of the male it is 21 years. Though there is a prominent gap observed among the mean age of marriage of female in the rural and urban areas of India. In rural India in 2012, the mean age of marriage of girls was 20.8 years while it was 22.4 years in the urban areas. The EAG States have relatively low age of marriage both in the rural and urban areas in comparison to the socially developed States of the south including Kerala where the rural age of marriage in 2012 was 22.8 years while the urban age of marriage was 23.1 years. The rural age of marriage in 2012 was lowest in Jharkhand (20 years) and highest in Assam (21.2 years). The EAG States having rural mean age of marriage of female below the national Figure includes Bihar (20.6 years), Chhattisgarh (20.4 years), Madhya Pradesh (20.4 years) and Rajasthan (20.2 years) in the same year (Fig.3). In case of urban mean age of marriage of female the national Figure in 2012 was 22.4 years. Assam is the State with the highest urban mean age of marriage (23.1 years) while Jharkhand is the State with lowest urban mean age of marriage (21.4 years). The States of Rajasthan (21.8 years), Chhattisgarh (22 years) have pitiable urban mean age of marriage.

Expectation of Life at Birth: This parameter acts as a distinguishing feature of human development between developed and developing countries. In case of a developing country like India the projected level of expectation of life at birth during the period 2016-2020 has been calculated to be 68.8 years for men and 71.1 years for women. This life expectancy is assumed to improve during the period 2021-2025 for both the male (69.8 years) and female (72.3 years) population. Though the expectation of life at birth has overall improved in the country with the advancements made in the field of science and medicine, it does not however depicts the vulnerability of population dying out of sudden and accidental injuries, fatal diseases and other health related hazards. In case of the EAG States of India, the expectation of life at birth seems to be appreciably high in Bihar for both male and female population. It is above the national Figure also. The expectation of life at birth for male is below the national Figure in the States of Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand i.e. seven out of the nine EAG States have the Figure below the national level. In case of women's expectation of life at birth only Rajasthan (73.1 years) has exhibited a Figure above the national level of 72.3 years. The rest of the eight EAG States have women expectation of life at birth below the national Figure (Table.1).



Data source: MoHFW, Govt. of India

Fig. 3.

Table 1. Gender-wise Projected Level of Expectation of Life at Birth in EAG States of India

States	2016-2020		2021-2025	
	Expectation of life at birth in years			
	Male	Female	Male	Female
Assam	65.6	66.8	67.1	68.8
Bihar	69.6	70.2	70.6	71.4
Chhattisgarh	65.0	68.0	66.5	69.5
Jharkhand	68.5	68.0	69.5	69.5
Madhya Pradesh	66.5	67.3	68.0	69.3
Odisha	66.3	69.6	67.8	71.6
Rajasthan	68.6	71.9	69.6	73.1
Uttar Pradesh	67.5	69.2	68.7	71.2
Uttarakhand	67.5	71.0	68.5	72.2
India	68.8	71.1	69.8	72.3

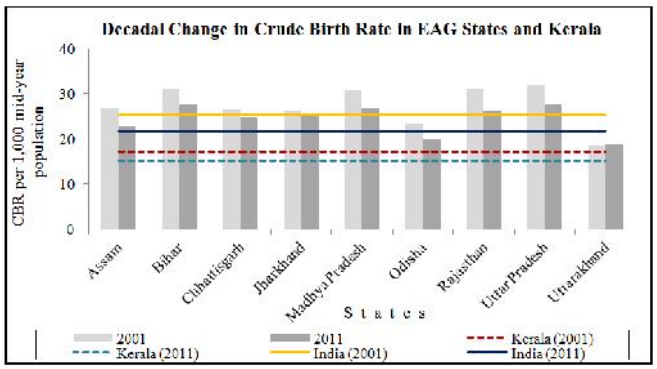
Source: MoHFW, Government of India

Ante-natal Care and Institutionalization of Child Birth: The ante-natal care includes regular health check up of the mother and her baby in the womb as well as providing information regarding proper dietary habits, exercises and life style to be followed during the critical phase of pregnancy. There has been a poor outreach of maternal health services and not more than 40-50 per cent of all pregnant women in India are estimated to receive any antenatal care (Singh *et al*. 1988). The complexities in pregnancy which can culminate into reproductive morbidity and sometimes to fetal deaths can only be averted through proper supervision during the pre-partum period. The physical examinations have found out that 92 per cent of women in India suffer from one or more gynecological diseases. Despite this high prevalence, only eight per cent had undergone gynecological examination and treatment in the past. High incidences of Reproductive Tract Infections have been recorded in rural and urban areas of Madhya Pradesh and Rajasthan (CORT, 1994). The District level Household and

Facility Survey-III (DLHFS), 2007-08 has revealed the scenario of antenatal care in the EAG States of India where it was observed that the northern EAG States of Uttar Pradesh (21.8%) and Rajasthan (27.6%) have failed to provide the pregnant women with medical care during pre-partum period. In case of Odisha (54.5%), Jharkhand (30.5%) and Bihar (26.3%) the situation have been equally shameful. The institutionalization of child delivery has appreciably improved in the country with declining percentage of domiciliary deliveries conducted by untrained health personnel. There is a prominent rural-urban gap noticed in the situation of child births carried out in health care institutions by doctors and trained health staffs. The percentage of institutional births have increased in the EAG States of Assam (69.6%) and Odisha (67.68%) during the period 2006-2007 to 2011-2012 though it stands nowhere with the fantastic achievements made by the southern States of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh in this context. The situation is pitiable in the States of Jharkhand (43.9%) and Chhattisgarh (35.6%) where the dominance of child births in households is still extremely high.

Fertility Parameters: The fertility parameters depict the increase of population as well as the causes behind it. These parameters have been discussed under the following heads.

a) Crude Birth Rate: The crude birth rate is defined as number of births per 1,000 mid-year population in a particular area. From 2001 onwards, the decline in Crude Birth Rate (CBR) has been somewhat rapid in India with the Figure ultimately reaching to 21.8 in 2011. The highest rural CBR in 1991 was registered in the backward States including Madhya Pradesh (35.8) followed by Uttar Pradesh (35.7) and Rajasthan (35.0). In 2011, these EAG States inclusive of Uttar Pradesh (27.8), Bihar (27.7), Madhya Pradesh (26.9) and Rajasthan (26.2) have once again exhibited high CBR with poor socio-economic condition and extremely low level of human development. On the contrary, the southern State of Kerala occupying leading position among all the Indian States in the field of human development has a crude birth rate of 15.2 in 2011 (Fig.4).



Data source: MoHFW, Govt. of India

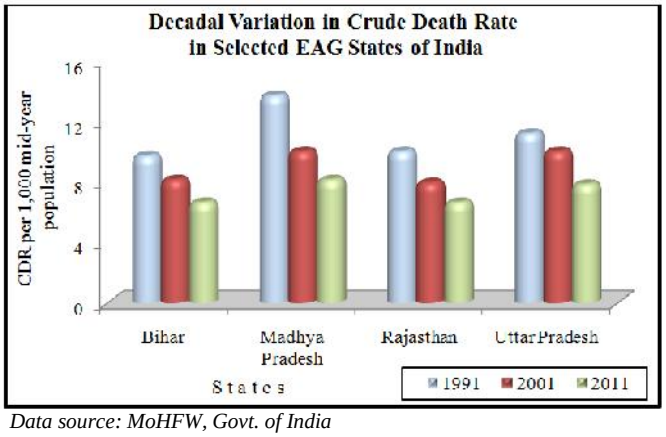
Fig. 4.

b) Total Fertility Rate: The total fertility rate (TFR) is expressed as number of children per woman. Uttar Pradesh is one of the northern EAG States in the country which has maintained its leading position both in rural as well as urban TFR during the period of 2005-2010.In 2012, the TFR in the EAG State of Bihar has been as high as 3.6 among rural women and 2.5 for urban women. In case of Jharkhand the situation has been slightly better. The TFR in the rural areas of the State was 3.0 while for the urban areas it was 2.0 in 2012. As stated earlier, TFR is directly related to the status of female literacy and age of marriage therefore the TFR has been found to be relatively high among illiterate women in the EAG States of Assam, Bihar, Jharkhand, Madhya Pradesh, Rajasthan and Uttar Pradesh. On the other hand, in the developed southern State of Kerala the TFR was lowest in the country in the same year.

c) Gross Reproduction Rate: The gross reproduction rate (GRR) is the average number of daughters that would be born to a woman during her reproductive period between 15-49 years. The urban areas of Assam in the year 2006 have a GRR of 0.7 which was 1.4 in the rural areas. Such a clear distinction exists in Chhattisgarh as well, where the urban GRR was 1.0 while the rural GRR was 1.8 in 2006. In a number of States like Odisha and Rajasthan, the GRR in both the rural and urban areas have declined over time. The rate has been relatively lower in the developed States of Kerala and Andhra Pradesh in comparison to the backward EAG States in the year 2013.

Mortality Indicators: The mortality indicators included in the study are crude death rate, maternal mortality ratio, infant mortality rate below one year of age and under-five child mortality rate. These have been elaborated below.

i) Crude Death Rate: The crude death rate is defined as the number of deaths per 1,000 population in any area in a particular year. The crude death rate (CDR) has been quite high in the EAG States in comparison to the southern States of Kerala and Andhra Pradesh. In Madhya Pradesh the rate was highest in 1991 among other EAG States with the rate declining in 2011 (Fig. 5). This was followed by Uttar Pradesh and Rajasthan. All the EAG States have recorded a decline in CDR in recent years. The CDR of eastern major States of Bihar and Jharkhand is much higher in comparison to another eastern major State of West Bengal. This high rate reflects the existence of poor health care infrastructure in these States.



Data source: MoHFW, Govt. of India

Fig. 5.

ii) Maternal Mortality Ratio: The maternal mortality ratio is expressed in per 100,000 live births. The EAG States of India have recorded high maternal mortality ratio throughout in comparison to the southern States of Kerala, Andhra Pradesh and Tamil Nadu. The backward EAG States have exhibited relatively lower percentage of child births carried out in medical institutions by trained health personnel. On the contrary, majority of the child delivery processes especially in the rural areas are still carried out in the households by

untrained health personnel including the untrained *dais*, friends and relatives. This contributes to the death of the mother during the process of child birth. The States including Assam, Bihar, Madhya Pradesh, Rajasthan etc have recorded high maternal mortality throughout the period ranging from 1999-2001 to 2011-2013 (Table 2). The dominant causes identified behind high maternal deaths are sepsis and excessive blood loss due to hemorrhage which can be prevented through proper ante-natal care and post-natal check-ups following delivery and identification of complications in pregnancies in time.

of India owing to their huge population size barring Uttaranchal. These States are in fact the most backward in the field of human development especially in terms of health and education. The low female literacy rate reflects the socio-economic status of women in the male-dominated societies of these States. Here women are married at an early age with a substantial portion of the women population forcefully married before attaining the legal age of 18 years. They are compelled to conceive at an early age and repeatedly for a male child. This adversely affects the health of the woman as well as her neonate.

Table 2. Maternal Mortality Ratio-wise Position of EAG States of India in Different Years

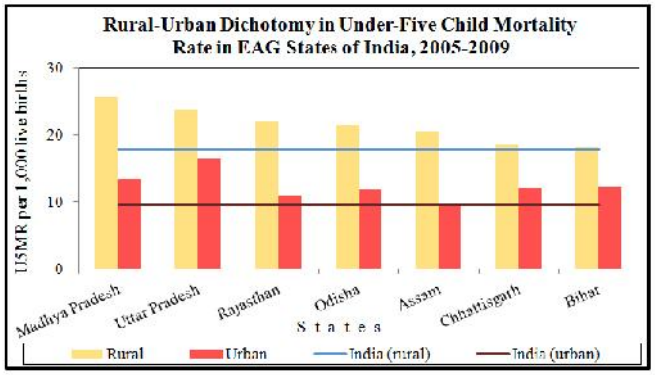
EAG States	MMR (per 100,000 live births) 1999-2001	EAG States	MMR (per 100,000 live births) 2011-2013
U.P.* + Uttarakhand	539	Assam	300
Rajasthan	501	U.P. * + Uttarakhand	285
Odisha	424	Rajasthan	244
M.P.**+ Chhattisgarh	407	Odisha	222
Bihar + Jharkhand	400	M.P. ** + Chhattisgarh	221
India	327	India	115

**U.P.= Uttar Pradesh **M.P.= Madhya Pradesh*

Source: Computed from the data provided by Registrar General of India

iii) Infant Mortality Rate: The infant mortality rate (IMR) is a count of deaths of infants under one year of age (<1 year) per 1,000 live births in a definite area in a particular year. The State-wise analysis in the country depicts a wide gap between the progressing southern States and the so-called backward EAG States. Odisha is one of the EAG States with a clear rural-urban dichotomy in IMR. The rural blocks of the State had IMR of 53 while the urban areas have recorded IMR of 38 in 2013. The IMR has been persistently high in the central EAG States of Madhya Pradesh and Chhattisgarh. In 2011, Madhya Pradesh has registered an IMR of 59 while for Chhattisgarh it was 48. The condition is indeed pitiable when compared with the southern State of Kerala where the IMR in 2011 was as low as 11 per 1,000 live births. In 2013, in the rural areas of Bihar the percentage of infant deaths to total deaths was 17.8 while the same for Rajasthan was 20.3. In case of the urban areas in the same year, the percentage was highest (14.9%) in Uttar Pradesh followed by 13 percent in urban Bihar.

iv) Under-Five Child Mortality Rate: The under-five child mortality rate (U5MR) is defined as the number of child deaths below the age of five years per 1,000 live births in a particular year in any area. The Figure no.6 exhibits that U5MR has been consistently high in the EAG States of Assam, Madhya Pradesh, Uttar Pradesh, Odisha and Rajasthan during the period between 2005 and 2009. In the year 2013 the highest rural-urban disparity is observed in the State of Assam where the rural U5MR was as high as 77 while the urban U5MR was 34. Similar disparity could be seen in case of Madhya Pradesh and Odisha States. The prevalence of gender based discrimination and negligence of the girl children below five years of age in these backward States are also some of the reasons contributing to high U5MR here. The exhibition of rural-urban dichotomy in U5MR reflects the strong existence of underdeveloped health care infrastructure in these EAG States in comparison to the southern States of the country.



Data source: MoHFW, Govt. of India

Fig. 6.

Findings of the Study

The EAG States were previously known as the BIMARU States with Assam and Odisha being its two new member States. All these States have been identified as the major States

The incidences of illegal abortions are high in these States. The illegal abortions have been identified as the third leading cause behind maternal death and account for 13 per cent of all global maternal deaths (The Times of India, July, 2016). The women in these States also become victims of botched surgeries leading to deaths out of sepsis and other inflammatory infections. The incidences of sex-selective feticide and female infanticide are high in the EAG States of Bihar, Uttar Pradesh and Rajasthan. The condition of women in the rural areas of these States is even worse in comparison to their urban counterparts. In case of general sex ratio, the situation is praiseworthy in the States of Chhattisgarh and Odisha while the situation is miserable in the States of Rajasthan and Uttar Pradesh. The situation of child sex ratio is alarming in the States of Rajasthan, Uttar Pradesh and Uttaranchal. The incidences of killing girl children at a tender age have been the major contributory factor behind low child sex ratio in these States. The total fertility rate is high among the rural women in the States of Uttar Pradesh, Bihar and Rajasthan. The total fertility rate is comparatively low in the eastern EAG State of Odisha. The maternal mortality ratio expressed in per lakh live births in extremely high in the States of Assam, Madhya Pradesh and Uttar Pradesh. There is low rate of institutionalization of child deliveries with strong dominance of domiciliary deliveries seen in the rural areas. In the villages the child birth process is still carried out by

untrained *dais* and relatives causing the death of the mother due to hemorrhage and sepsis as well as the neonate. The incidences of medical termination of pregnancy are also high coupled with low degree of post-natal care after child birth in these States. The high infant and under-five child mortality rates prove the shocking state of child health in these States. The infant mortality rate has remained to be persistently high in the EAG States of Madhya Pradesh and Chhattisgarh. There has been a wide difference between the infant mortality rates of the EAG States with that of the southern major States of Kerala and Andhra Pradesh. The under-five mortality rate has also been alarming in the rural areas of Madhya Pradesh, Uttar Pradesh, Rajasthan and Odisha. There is a strong contrast observed in under-five mortality rate among the rural and urban areas of the EAG States. The rate has been somewhat under control in the urban areas owing to the presence of health care infrastructure while in the rural areas there is absence of adequate medical institutions including the referral transfer. Often the critical patients inclusive of the pregnant women writhing in labour pain die on the way to health care centres and clinics.

Conclusion

The EAG States have been a cause of concern for the planners of India since they have always reflected a state of backwardness in the field of socio-economic development. Some of these States inclusive of Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand and Odisha have acted as the 'Red Corridor' owing to the strong Maoist-Naxalite insurgency activities. These States have experienced socio-political disturbance over a long period of time which has also contributed to their miserable condition. Much of the areas in the 'Red Corridor' are inhabited by the indigenous tribal population with low standard of living. The population growth rate has been high coupled with the strong existence of illiteracy and poverty. The condition of the female population has been even more shocking. These States have prominent stratified societies with caste based feudal mindset. The *dalits* here have been tortured and underrated over ages and still the news of violence against them continues to hit mass media every now and then. The index of backwardness calculated in the year 2013 by the then Chief Economic Advisor of the Ministry of Finance under the Government of India has placed Odisha in the last position and Madhya Pradesh and Bihar jointly in the second last position (The Hindu, August, 2015). In the economic and financial front, these EAG States of the country have exhibited slow but promising economic growth in recent years with the improvement of the gross state domestic product (GSDP). Much of the credit behind such development can be attributed to the development of transport and communication system in these areas especially some of these States enjoy the benefit of the Golden Quadrilateral and the East-West Corridor.

The education system in these States has improved which has exerted influence on the overall literacy rate in general and female literacy rate in particular. The life expectancy which was once shameful in these States has now increased appreciably. The total fertility rate and the maternal mortality ratio which are some of the crucial indicators of maternal health have started to decline especially in the urban areas which have been welcomed by the demographers as the first sign of maternal health development. Over the years, the performance of various maternal and child health related welfare programmes have really proved to be fruitful in improving the maternal and child health condition in these States. Some of these programmes include the Integrated Child Development Services Scheme, *Janani Suraksha Yojana* and *Ayushmati* Scheme. These welfare schemes have tried to improve the status of ante-natal and post-natal care along with popularizing the institutionalization of child births in these States. In Odisha, the provision of *Nischay Yan* or referral transport has been ensured by the State Government especially for the pregnant and ailing mothers. Thus the above mentioned improvements in the socio-economic front and endowments granted by the Government at both the Central and State level have provided the planners of the country with a sigh of relief since these once extremely underdeveloped States have now exhibited signs of development in recent years. The grouping of these States under the special category has further ensured proper and adequate attention by the Government of India.

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