

# Maternal Mortality Rates and Health Status of Women: A Block Level Study in Hojai District of Assam

**\*Rupjyoti Bordoloi,**

Assist. Professor, Dept. of Economics, Rabindranath Tagore University, Assam

**\*\* Meghali Baruah,**

Research Scholar, Dept. of Earth Science, Assam University, Silchar

DOI: 10.29322/IJSRP.10.11.2020.p10707

<http://dx.doi.org/10.29322/IJSRP.10.11.2020.p10707>

**Abstract:** *Health is an important component for achieving physical peace and happiness of an individual. The present study has focused on the health status of women by considering the maternal mortality rates as an indicator in selected district of Assam. Purposive sampling technique has been used to select the desired sample population. This study is based on both primary and secondary sources. The predetermined objective of the study has been fulfilled by using descriptive statistical tools and techniques. We have observed that besides the health related factors some social occurrences like religious belief, economic conditions, food habits, social customs, early motherhood, effective marriage age, educational attainment of pregnant women are accountable for the growing maternal deaths.*

**Index Terms:** *Health Status, Maternal Mortality, Religious belief, Early Motherhood, etc.*

## 1. Introduction

Health is the most important assets than anything in one's life. Healthy life brings peace, prosperity and happiness to an individual. In common perspective good health implies free from any kind of diseases related with physical and mental conditions of an individual. Ensuring better health facilities to its citizens is the prime importance for the modern welfare states. Therefore government have allocated sufficient amount of public money for providing better health infrastructure facilities in the entire country. Improved health condition has increased the economic prosperity of an individual through increasing his or her capacity to involve in an economic activity and decreased the chances of morbidity as well as mortality. It has been proved that the higher life expectancy at birth has associated with the higher per capita income in developed nations.

In our present discussion, we are concerned with the health status of women which is 48.5% of the total population and the workforce participation rate is 25.51% against 53.26% against males. (Census census 2011)

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Women occupy nearly half of the total population of our country. They are providing workforce to the nation and at the same time brings future generations. Therefore, ensuring better health condition to the women is the prime focus of every nation in the present world. To measuring health status of women is a complex phenomenon. The most common and widely used indicators of measuring health status is life expectancy at birth, infant mortality rate, birth rates, death rates, maternal mortality, disability adjusted life years including incidence of malaria etc. (World Health Statistics). Among the various indicators, we are considering one indicator which is Maternal Mortality Rates to measure women health. Maternal mortality means the “death of a woman while pregnant or within 42 days of termination of pregnancy” (WHO, 2004) While the maternal mortality ratio is the ratio of number of maternal death during a given period per 1, 00,000 live birth. On the other hand, maternal mortality rate is the number of maternal death during a given period per 1, 00,000 of women at reproductive age. (WHO, 2010)

The risk of dying from the causes associated with child birth and other complications of pregnancy are measured by the maternal mortality rate. Such type of female death arises from puerperal causes (Sinha *et al.* 2019). Death occurs during the reproductive age group 15-49 is an important determinant for the health status women.

Health status of women is different across states, regions and on the basis of the religious beliefs of people. The present paper has focused on women health status in the state Assam as a whole and especially to a particularly one district i.e. Hojai. According to the Census of India 2011, the total population of Assam stands at 3,12,05576 person out of which 1,52,66133 female and 15939443 male with a density of 398 person per square and an average 72.2 percent literacy level. Assam has posses a strong demographic position both in terms of total as well as female population size.

## 1.2 Objectives of the study

This study has concentrated on the following objectives.

- a. To examine the maternal mortality rates of Assam with few other states of India.
- b. To examine the maternal mortality rates and institutional delivery rates in the selected study area.
- c. To measure the health status of pregnant women in terms of hemoglobin level, body weight and number of birth order in the selected population.

## Hypothesis

There is association between the age groups of pregnant women and their level of hemoglobin.

## 2. Review of Literature

We have reviewed few selected theoretical and empirical literatures to clear the concept related with the study. The above mentioned objectives are set after going through those literatures. Kamalapur et al. (2013) has mentioned that the women health status depends on the social status of women. The researcher has mentioned that the widespread ignorance about health related matters; low levels of literacy, limited exposure to mass media and access to money are responsible for poor health status. Kushwah (2013) has found that educational attainment level of women and place of residence has direct role in morbidity and mortality in our country. It has mentioned that women resides in rural places has received less medical facilities than in urban places. Joe et al. (2015) observed that economic growth does not commensurate with the maternal mortality rates. It has been observed that investment is important for strengthening the health system, education and empowering women. Singh et al. (2018) have observed that not only the hospital based factors but also some social factors are increasing mortality rates in our country. Their studies have shown that socio-economic disparity, rural-urban differences, education level of women, caste and gender-based inequity etc. are a real hurdle to any attempt made to reduce maternal deaths in the country.

### **3. Methodology**

#### **3.1 Selection of the study area**

In the year 2015, Government of Assam has bifurcated five new districts from the existing districts. In the initial stage, among the five districts, we have purposively selected one of them considering the population size and ratio of female population.

The newly formed Hojai district is one among the five districts. In terms of population size, this district is one of the largest districts of Assam. (Total population 9, 31,218 and 48.8% Female Source: Office of the Registrar General of India and Census Commissioner, 2011) The density of population in the district is 885 persons, (per square kilometer) higher than the state as a whole. Therefore in the second stage, we have selected Hojai district as the study area.

National Rural Health Mission (NRHM) has divided the district into three Health Development Blocks i.e. Jugijan, Lanka and Kathiatali. In the third stage, we have selected Jugijan Block because it has covered 3, 67,288 population which is nearly forty 40% of the district population. Besides these, that block has registered highest number of pregnancy and maternal death in comparison to the other two blocks in the district.

#### **3.2 Selection of Primary Health Center**

The Jugijan Block has been classified into twenty eight (28) Primary Health Centers. In the fourth stage, we have selected the Primary Health Center from the Block. Primary Health Centers are selected on the basis of the number of recorded pregnant women and number of maternal and infant deaths rates in the last five years. Among the health centers we have found that the Hojai Public Health Center (PHC) cum First Referral Unit (FRU) has recorded highest number of pregnancy in the last five years along with the number of infant death rates as well as maternal deaths. Therefore, Hojai Primary Health Center has been selected in the present study.

### **3.3 Selection of sample population**

We are concerned with the health status of women during pregnancy period. The selected health center has covered 3 villages namely Kulibasti 1, Kulibasti 2 and Gopalnagar including 6,320 number of population. Among the three villages Kulibasti 1 and Kulibasti 2 has recorded highest number of pregnancy rates in the last five years. In the year 2019-20 the total 91 pregnancy cases registered in the respective villages. This is recorded as the highest in number in comparison to the others. Therefore, in the final stage, we have selected the above mentioned villages and required information has been collected through Anganbadi, ASHA and ANM engaged in the sample villages. The total number of sample size is low therefore as a rule of thumb, we have collected primary information related with our study in all the pregnant women from both the villages in the year of 2019 and the early period (January to March) of 2020.

### **3.4 Data Sources**

The present paper is purely based on primary as well as secondary data. Primary information is collected from the selected sample population ASHA worker Auxiliary Nursing Midwifery (ANM) incorporated in the selected area. The secondary information are collected from the published report by Central and State government at different time period. We have focused on the NITI Aayog report about the already selected indicator for determining women health status in the study area.

### **3.5 Tools and Techniques**

Considering the first objectives of the study, we are using cross tabulation and graphs to compare the maternal mortality rates of Assam with the other selected states of our country. Multiple Bar diagram has been used to show the difference between institutional delivery in different year period and the effective age of

marriage of women with the maternal mortality rates. We calculate Maternal Mortality Ratio and Neonatal Death Rates of the Juginan block by using the standard formula as mentioned below.

$$\text{Maternal Mortality Ratio (MMR)} = \frac{\text{MD}}{\text{Births}} \times 100000$$

$$\text{Neonatal Death Rate} = \frac{\text{Number of Infant Death}}{\text{Number of Live Birth}} \times 1000$$

Tabular presentation and percentage method has been used to analyze the second objective of the study. Spearman’s Rank Correlation technique has been used to examine the relationship between the number of birth order and educational attainment of the pregnant women in the study area.

To accomplish the third objective of the study, we have chosen pie chart to represent the hemoglobin level among the selected sample population. Chi-square test has been used to measure the level of hemoglobin among the different age group of pregnant women.

#### 4.1 Maternal Mortality Ratios in Assam and Selected States of India

The maternal mortality rate is a crucial factor to determine the women health status of a country. In the very outset, we are reviewing the maternal mortality rates of Assam in the last few years and make a comparison to other states of our country. Such comparison is made to clear the present position of our state that has reflected the health status enjoyed by the women. The selection of states is made on the basis of HDI rank and size of population. Those states are classified into three categories i.e. higher, medium and average stage of human development during the year period 2016-17.

We have compared the maternal mortality ratio of Assam with a few developed states considering the attainment level of human development stages. States are classified into higher, average and lower HDI rank attained in the last three year period. Those selected states are Maharashtra, Tamil Nadu (High HDI) West Bangle, (Medium HDI) Bihar and Uttar Pradesh Average HDI). It has been found that the maternal mortality ratio is low among the higher human development states than the medium and average states.

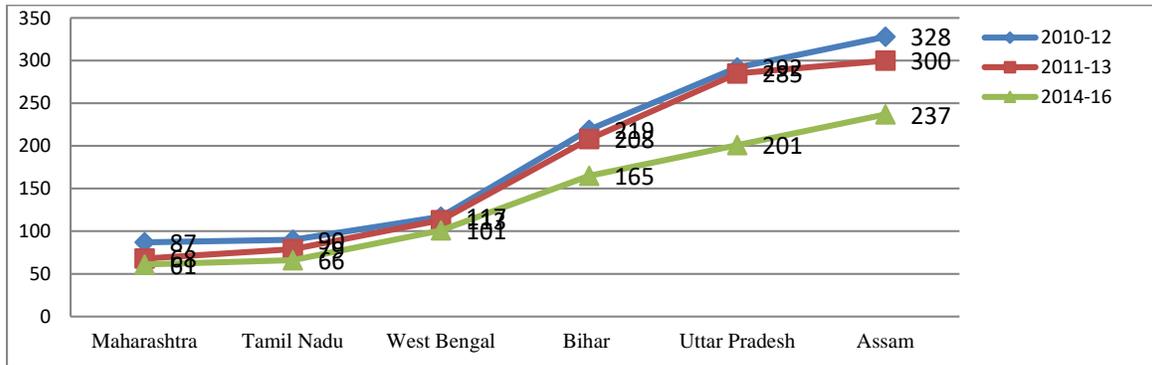
Table no. 1: Maternal Mortality Ratio in Assam and Selected States of India

S.N	Name of the State	Year		
		2010-12	2011-13	2014-16
1	Maharashtra (High HDI)	87	68	61
2	Tamil Nadu (High HDI)	90	79	66

3	West Bengal (Medium HDI)	117	113	101
4	Bihar (Average HDI)	219	208	165
5	Uttar Pradesh (Average HDI)	292	285	201
6	Assam (Average HDI)	328	300	237

Source: NITI Aayog, Registrar General of India

Fig 1: Maternal Mortality Ratio of Assam and Selected Indian States



Source: Table no.1

Assam having an average HDI rank has received significantly higher mortality ratios in comparison to Bihar and Uttar Pradesh with similar human development rates. It has reflected a poor health status enjoyed by the women in our state during their crucial time of life. There are several factors responsible for such poor health status that includes inadequate medical infrastructure and health care facilities, lack of awareness about health related information, religious beliefs, socio-cultural and institutional factors etc. The first objective of our study has examined through the above discussions.

As we have mentioned that the maternal mortality ratio is influenced by various factors including women health related factors, medical infrastructure and some other social factors. Among those factors, we have considered mainly two factors namely effective age of marriage among women and institutional delivery (Hospital Delivery) rates in percent of the total in Assam. One is related with socio-cultural views and other is with the availability as well as accessibility of health infrastructure facilities. Secondary information is collected about social factors that has related with the maternal death.

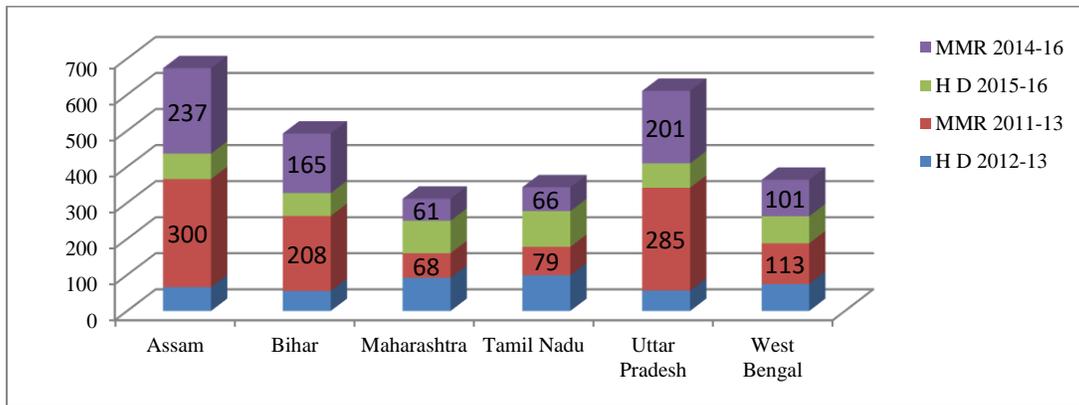
We have observed from the table and diagram given below that maternal death rates and the institutional delivery percentage of women has opposite relationship in the year period. The maternal death rates decreases in those states where the rates of hospital delivery is high. Thus our second objective has been accomplished and we can consider that the increasing number of institutional delivery (Hospital Delivery) can reduced the chances of maternal death rates.

Table no 2: Socio Cultural factors and MMR of the selected states of India

SN	States	Institutional Deliveries	MMR	Institutional Deliveries	MMR	Female Literacy	Effective age of marriage
		2012-13	2011-13	2015-16	2014-16	2011	2015-16
1	Assam	65.9	300	70.6	237	66.3	22.4
2	Bihar	55.4	208	63.8	165	51.5	20.0
3	Maharashtra	92.0	68	90.3	61	75.9	22.6
4	Tamil Nadu	99.0	79	99.0	66	73.4	24.4
5	Uttar Pradesh	56.7	285	67.8	201	57.2	23.5
6	West Bengal	74.6	113	75.2	101	70.5	23.4

Sources: Census Report, 2011, Social Publication on maternal mortality in India, Registrar General of India

Fig 2: Maternal death and Hospital delivery ratio in selected states of India



Source: Table no. 2

# HD: Hospital Delivery, MMR; Maternal Mortality Rates

We have observed the effective age of marriage of women and the maternal deaths. In most of the developed nations the mean marriage of female is 24.9 whereas, in less developed countries female marriage age is 21.4. In our study we have compared the trend of maternal death rates with the female marriage age. It reveals that the states like Tamil Nadu having highest female marriage age have lowered the maternal death rates during 2014-16 periods. States like Bihar and Assam have lower female marriage age has increased maternal death rates. Thus maternal death ratios can be reduced through increasing the effective age of marriage. As the lower age of female has a greater chance of maternal deaths.

#### 4.2 Maternal Mortality Ratio in Selected Sample Area

In the selected sample block Jugijan under Hojai district has covered 3, 67,288 population. The total number of pregnancy and maternal death registered in the last three years are shown in the table below.

Table no. 3: Maternal Health in Survey Block 2019-20, Assam

(Number of Hospital Delivery included Govt. Hospitals and Private Nursing Homes)

S N	Year	Pregnancy Recorded	Govt. Hospital Delivery		Home Delivery		Private Hospital		MD	MMR	Infant Death	NND
1	2016-17	8797	6480	73%	537	6.10%	1780	20%	11	156	71	10.11
2	2017-18	8536	6541	76%	526	6.16%	1469	12%	11	155	106	14.99
3	2018-19	8302	6517	78%	362	4.36%	1423	17%	09	130	70	10.17

Source: Field Survey, Jugijan block, 2019-20

# MD: Maternal Death, MMR: Maternal Mortality Ratio, NND: Neonatal Death Rate

We have observed that the number of maternal mortality has decreased with the increase in percentage of hospital delivery. On the other hand the neonatal death rate is high in that block. The high neonatal and maternal deaths rate have influenced by medical infrastructure related as well as socio-cultural factors. In the present study the nature of health infrastructure facilities in the selected block of the district has been observed.

Table no. 4

Health Infrastructure Facilities in Jugijan Block, Hojai, Assam

S.N	Types of Facilities	Number
1	Number of Health Center	28
2	Number of Medical Officer	25
3	Number of Lady Medical Officer	03
4	Gynecologist	03
5	Lady Gynecologist	01
6	Obstetrics	03
7	GNM	22
8	ANM	64
9	ASHA	294
10	Anganbadi	530
11	Delivery Table/Bed	12
12	Baby Incubator	04
13	Blood Bank	01

Source: Field Survey, Jugijan Block, 2019-20

It reveals through the primary investigation conducted during the study that the health infrastructure facilities are inadequate as the number of medical practitioner available is more than one thousand. (WHO norms 1:1,000 doctors) The insufficient number of physician has negatively influenced in female health care facilities as well as decreased the rates of institutional delivery. On the other hand, availability of Gynecologist is very small in number. The other related facilities like delivery bed, baby incubator, blood bank etc. which are inadequate in comparison to the total population size. Thus the health infrastructure is inadequate in nature which is become an important factor for the increasing rates of infants and maternal deaths.

### 4.3 Health Status in Selected Sample Village

Our study has been carried out in the two urban (basti) areas namely Kulibasti 1 and Kulibasti 2. The total population of the two areas is 2100 and 1540 and the total eligible couples in both the villages are 219 and 108 number. We have found that the mean age of pregnancy among the married women is 23.18 years. It implies that the marriage age of the women is lower than the pregnant age. Thus the women got married at an early age and have greater risk of maternal and neonatal deaths. We have received information during field survey that the women at the age of 19 become pregnant which has indicates the negative influence of socio-cultural beliefs as well as lack of awareness about health.

Table no 5: Results of Descriptive statistical analysis, 2019-20

S.N	Results	Age of the pregnant women	Hemoglobin Level (Per/DL)	Weight (In K.G.)
1	Total Number of Observation (N)	91	91	91
2	Mean (Average)	24.18	9.72	44.65
3	Standard Deviation (SD)	3.175	0.756	4.68
4	Variance (V)	10.79	80.46	21.98

Source: Field Survey data, 2019-20

In order to accomplish the third objective of the study we are analyzing the relationship of birth order, educational qualification and family income level. The birth order has been classified into three categories. If the number of birth is one then it is considered as low birth order and if it is two then average, and if it is three and above than it is high birth order. Similarly, educational qualifications are classified as illiterate, literate, upto class VIII, up to H.S Passed, up to Graduate and above. Incomes of the respondents are classified as below poverty (BPL Card Holder) above poverty, middle income and rich class.

To observe the nature of relationship among the categorical (ordinal) data we are using the Spearman's Rank correlation. We observed that the educational qualification with birth order has negative and significant relationship. The high birth order has influenced by the low educational level of the pregnant women in the study area.

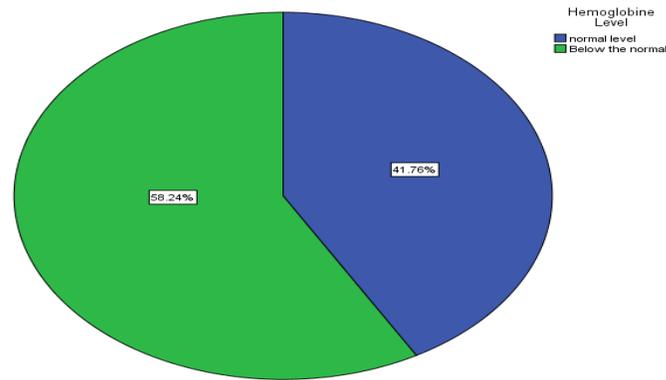
Table no 6: Spearman's Rank correlation results  
 (Educational Qualification and Family Income & Birth Order)

S.N	Results	Family Income	Birth Order	Birth order & Income
1	Total number of Observation (N)	91	91	91
2	Strength of the relationship	0.580	-0.381	-0.339
3	Level of Significance (p-value)	0.001**	0.001**	0.001**

\*\* Correlation is significant at 0.01 levels

Similarly, birth order and income level has negatively significant. The number of birth order has decreased with the increase in income level of the family. The poor family has the possibility of high birth order and low level of education. The high birth order and poor income level has decreased hemoglobin level and increased the chances of maternal and neonatal deaths.

Fig 3: Pie chart of Hemoglobin level of pregnant women



Source: Field survey, 2019-20

The hypothesis of the present study has been tested by using chi-square test through classified different age group of pregnant women and their hemoglobin level. The calculated value of chi-square is 1.84 less than tabulated at 5% level. Our analysis shows that there is no such kind of association between the age groups of the pregnant women and their level of hemoglobin. We have observed that 58.24% of the total pregnant women have less than the normal range of hemoglobin. They have the chances of suffering from anemia in the later stage of the duration. As it has been proved that the anemia is a common symptom during the stage of pregnancy and the cause of maternal deaths. The greater number of women having low level of hemoglobin indicates the poor health and nutritional facilities.

## 5. Conclusion

Health lifestyle, good habits and knowledge about health is important enough besides the availability of health infrastructure facilities. In a state like Assam the rapidly growing population pressure and lack of popularity and adaptability of family planning measure has resulted grater prospects of increasing deaths among women and child during their critical period of life. Proper education about health and nutrition, number of birth order, age of pregnant women and economic condition are important issues that become significant in reducing maternal and neonatal deaths. The medical facilities along can't resolve such a big issue. Public awareness regarding different health related challenges is a better medicine for improving overall health status of our society.

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