Prevalence of Adverse Pregnancy Outcomes in the State of Assam and the Factor Associated with it: Findings from the National Family Health Survey 4 (2015-16)

By

Disha Agarwalla

Dissertation submitted in partial fulfillment of the requirements of the degree

MBA Hospital and Health Management

Academic year, 2018-2020

The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: **www.iihmr.edu.in**

Prevalence of Adverse Pregnancy Outcomes in the State of Assam and the Factor Associated with it: Findings from the National Family Health Survey 4 (2015-16)

By

Disha Agarwalla

Dissertation submitted in partial fulfillment of award of

MBA Hospital and Health Management

Academic year, 2018-2020

National Health Mission, Rajasthan

The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: **www.iihmr.edu.in**

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "**Prevalence of Adverse Pregnancy Outcomes in the state of Assam and the factor associated with it: Findings from the National Family Health Survey 4 (2015-16)"** submitted by **Disha Agarwalla** (Enrolment No. IIHMR-U/01/2018-20/0742) under the supervision of **Ms. Piyusha Majumdar** for award of MBA in Hospital and Health of the University carried out during the period from 11/03/2020 to 10/06/2020 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

Signature

DECLARATION

I do hereby declare that I am a student of 2nd year, MBA in Hospital and Health Management, IIHMR University, Jaipur, Rajasthan session 2018-2020. I would like to state that I have carried out my dissertation on the topic **"Prevalence of Adverse Pregnancy Outcomes in the state of Assam and the factor associated with it: Findings from the National Family Health Survey 4 (2015-16)".** This Project work is my own and has not been submitted to any to the other institute or University for award of any degree or diploma.

Disha Agarwalla
MBA Hospital and Health Management
2018-20

ACKNOWLEDGEMENT

I would like to take this opportunity to acknowledge my sincere thanks to our institute, Institute of Health Management and Research, Jaipur for providing me this platform to gain enough knowledge and skills in different aspect of health management.

I would like to express my gratitude and regards to **Dr. Jalaj Vijay** (SPM, NHM Rajasthan) for his guidance and immense support throughout my dissertation.

I would also like to express my deepest gratitude to my mentor **Ms Piyusha Majumdar (**Assistant Professor, IIHMR University) for her constant support and encouragement that helped me to complete this project.

Lastly, I wish to thank all the people and my colleagues whose insights and experiences have shaped the content of this report.

I hope I can build upon the experience and knowledge that I have gained and make a valuable contribution towards public health in coming future.

Table of Contents

List of Figures

List of Figures:

List of Symbols and Abbreviations

NFHS- National Family Health Survey

AHS- Annual Health Survey

MMR- Maternal Mortality Ratio

ANC- Antenatal Care

SES- Socio Economic Status

TT- Tetanus toxoid

SRS-Sample Registration System

SPSS-Statistical Package for Social Science

CI – Confidence Interval

OR- Odds Ratio

SDGs- Sustainable Development Goals

RCH- Reproductive and Child Health program

Abstract:

Background: Maternal death is a serious concern for all the countries. Adverse Pregnancy Outcome is also a major concern as it ultimately leads to maternal deaths. The primary aim of the study was to assess the prevalence of adverse pregnancy outcomes in the state of Assam with the help of the NFHS 4 data and to find the factors which are associated with it. The second aim was to find the association between demographic and socioeconomic factors with pregnancy outcomes.

Methodology: This study is based on secondary data analysis of NFHS 4 (2015-16). For the analysis of data, SPSS version 22 was used, where tables, cross tabulations were performed and for finding the factors associated with adverse pregnancy outcome logistic regression was used.

Results: The result revealed that as the age increases the odds of getting an abortion, miscarriage and stillbirth are more likely (P<0.001). The age group 25-29 year (OR 18.02, 95%CI 13.6-23.7 P<0.001) and 30-34 year (OR 18.32, 95%CI 14.07-23.85 P<0.001) have higher odds of getting an abortion, miscarriage, and stillbirth in comparison to 15-19year (OR 1, 95% CI P<0.001) and 20-24year (OR 9.17, 95%CI 5.7-14.5 P<0.001). The odds of having adverse pregnancy outcome is higher in illiterate female than an educated female. The odds of having adverse pregnancy outcome is higher in the female who consumes alcohol (OR 1.288, 95%CI 1.13-1.468 P<0.001) than in female who doesn't consume alcohol.

Conclusion: Lack of awareness and information should be addressed at all the sub-districts level and among the general public regarding stillbirth, miscarriage, and abortion with the help of effective health intervention, programs, and schemes. The finding of this study provides a framework for formulating health programs and bringing some changes in the policy. It suggest that adverse pregnancy outcome is more common in illiterate females and those who comes alcohol during pregnancy.

About The Organisation

The National Health Mission (NHM) was launched on 1st May 2013 by Government of India that circumscribes two sub-mission as National Rural Health Mission (NRHM launched in 2005) and National Urban Health Mission (NUHM launched in 2013).

It is a national effort at ensuring provision of effective healthcare through a range of interventions at individual, household, community, and critically at the health system levels.

Vision:

"Attainment of Universal Access to Equitable, Affordable and Quality health care services, accountable and responsive to people's needs, with effective inter-sectorial convergent action to address the wider social determinants of health."

Objectives:

- Reduction in Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR).
- Universal access to public health services such as Women's health, child health, water, sanitation & hygiene, immunization and Nutrition.
- Prevention and control of communicable and non-communicable diseases, including locally endemic diseases.
- Access to integrated comprehensive primary healthcare.
- Population stabilization, gender and demographic balance.
- Revitalize local health traditions and mainstream.
- Promotion of healthy life styles.

1. Introduction:

1.1 Background: Maternal death is a serious concern for all the countries. If we talk about a country like India with population of 1.3 billion, maternal death is a paramount problem. Many programs like Reproductive and Child Health program (RCH) were launched back in the year 1997 when our maternal death rate was 398 per 100000 live births. We have come a long way from RCH to RMNCH+A and our MMR has reduced to 122 per 100000 live births but the major concern for maternal death still remain the same. Despite the progress, the Sustainable Development Goals (SDGs) still seems like a pipeline dream to achieve. Among all the state of India, Assam has the highest MMR (229 per 100000 live births). Adverse Pregnancy Outcome is also a major concern as it ultimately leads to maternal deaths[i]. Adverse Pregnancy outcome are the result of conception which include other than live birth i.e. miscarriage, stillbirth and abortion and results into neonatal death, maternal death, etc.

Stillbirth is an outcome in pregnancy in which a baby is born at or after 28 weeks of gestation without any sign of life. The number of still birth babies born every year is 2.6 million[ii] and of which three- fourth occurred in the south Asian and sub Saharan region. Abortion is another outcome in pregnancy in which the embryo is removed from the uterus before it can survive without it. World data on Abortion [iii] shows that one in five pregnancy results into unsafe abortion. Miscarriage is an outcome in pregnancy in which sudden loss of Pregnancy takes place before 20th week. There is a strong association between still birth and miscarriage and the rate of miscarriage differ between different groups of female[iv]. 9.8% of the India's pregnancy end into miscarriage, abortion and still births whereas 10.4 % of Assam's pregnancy ends into miscarriage, abortion and still births[v].

1.2 Aim of the study: The primary aim of the study was to assess the prevalence of adverse pregnancy outcomes in the state of Assam with the help of the NFHS 4 data and to find the factors which are associated with it. The other aim was to find the relationship between demographic and socioeconomic factors with pregnancy outcomes.

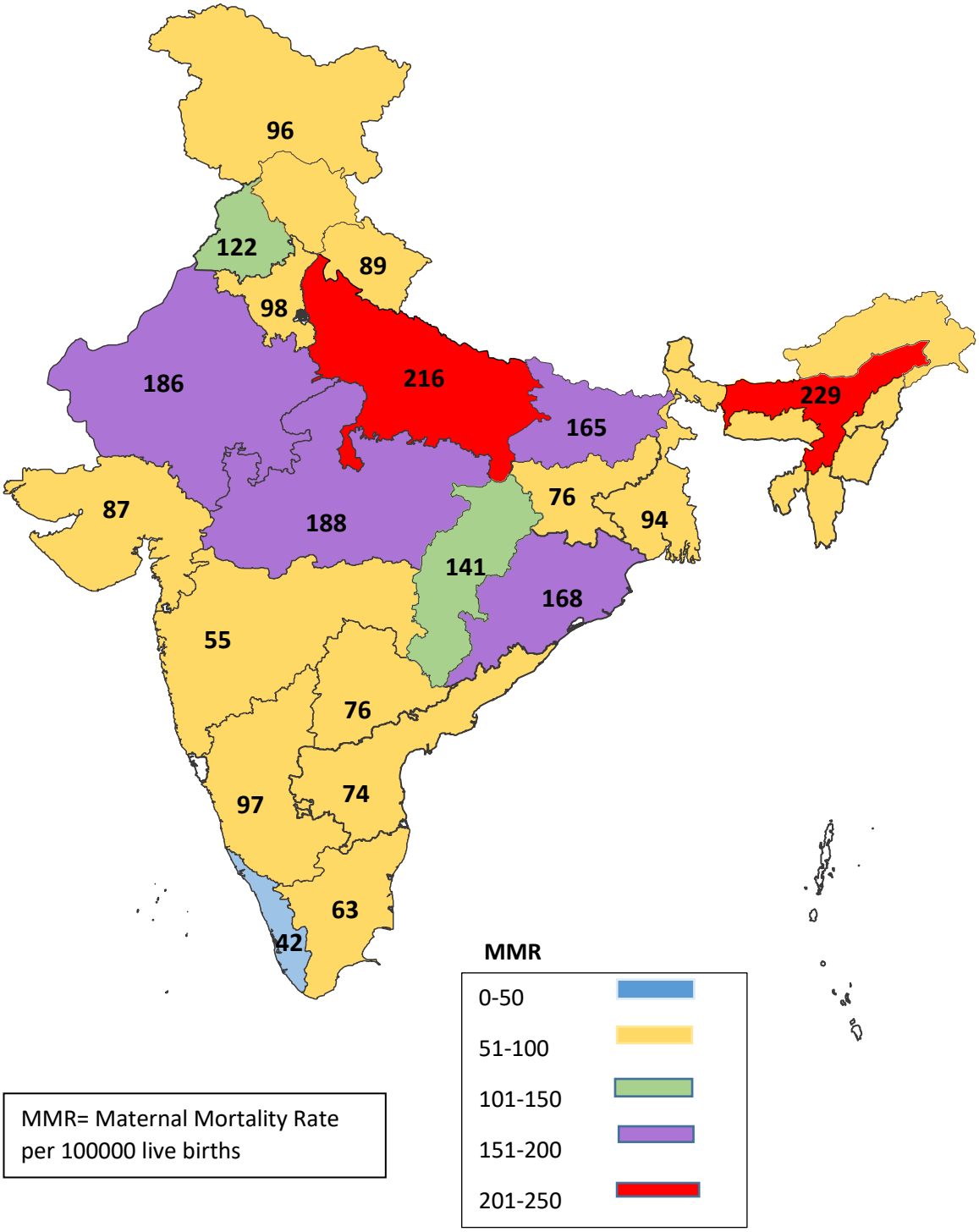
1.3 Objectives of the study:

- To assess the Prevalence of adverse pregnancy outcomes in the state of Assam
- To examine the factors associated with adverse pregnancy outcomes.

- To find the association of maternal age and adverse pregnancy outcomes.

1.4 Rationale: As the maternal death of India is very high and especially in the state of Assam (229 per 100000 live births). There is a strong association of adverse pregnancy outcomes with maternal deaths. So it is very important to find the factors associated with it and to formulate policy and health intervention accordingly.

MMR OF ALL THE STATES OF INDIA



2. Literature Review:

One of the study on examining the prevalence and co relation of tobacco use during pregnancy in rural area of India suggested that there is very poor knowledge about the adverse health effects due to tobacco use. Overall, 15% of the women used tobacco during their pregnancy. There is a significant association between use of tobacco during pregnancy with age factor and poor awareness of adverse health effects. During pregnancy[vi] one of the major factor associated with use of tobacco is lack of knowledge among the females.

Another study Population based estimates of still birth, abortion and miscarriage in the state of Bihar[vii] suggested that highest level of education received by the female and her husband plays a major role in pregnancy outcome. Apart from that place of residence also influence in miscarriage and abortion.

Study to find out association between maternal anaemia and pregnancy outcome was done in Assam[viii] and it suggested that 35% of the women in the cohort selected had severe and mild anaemia. The study also showed that women with severe anaemic condition had greater chances of perinatal death. There was lack of awareness and knowledge among the females regarding the outcome of severe anaemic condition.

An epidemiological predictor variable association with pregnancy outcome study was conducted in urban setting of Pune[ix] and the major finding suggested that association with an adverse pregnancy outcome were education of parents, income, socioeconomic status (SES), obstetric complications, physical activity of mother, rest taken by the mother during pregnancy, registration of ANC and then ANC visits, eating habits, iron consumption, tobacco consumption and any form of passive smoking and age at pregnancy.

Study based on factors associated with adverse pregnancy outcome in Ethiopia[x] suggested that there is a strong association of socioeconomic and demographic factors on adverse pregnancy outcomes. Higher age of mother at the time of pregnancy, no education or primary education of mother and sexual intercourse at a small age indicates a significant association with adverse pregnancy outcome. Mother with no education have higher chance of going through adverse pregnancy outcome in comparison to mother with higher education.

Another study based on factors associated with adverse pregnancy outcome and perception on risk factors among reproductive age women in Kaduna[xi] state suggested that risk factors associated with outcomes are multiple pregnancies and delayed commencement of antenatal care. There was poor perception of adverse pregnancy outcomes. The study recommended frequent community health talks, early commencement of antenatal and Utilization of Family planning services.

There is a strong association of early age and old age pregnancy with adverse pregnancy outcome and living in rural area also plays major role in adverse pregnancy outcome (Mungoba TN et al)[xii].

A study was done from data of National Family Health Survey (NFHS 3) to find the impact of economic impact on maternal health i.e. the impact of Wealth index [xiii] on maternal health. The independent variable selected were the wealth index, literacy, and age at first child birth. The number of antenatal care (ANC) visits increased as the wealth index increased and there was a pattern for choice of place of delivery on the basis of wealth index. It showed that the wealth index is the leading key independent determinant for three or more ANC received: Tetanus toxoid (TT) received before delivery, iron tablet/syrup taken for more than 100 days, and institutional delivery. Mother's literacy was the leading independent key determinant for early antenatal registration. The study suggested that along with the mother's literacy, the wealth index that is an important predictor of maternal health care can be added for categorization of the districts for providing differential approach for maternal health care services.

A study to find the risk and risk factors in women of nine states regarding still birth from AHS data was conducted. The major finding was that Indicators of socioeconomic deprivation were strongly associated with an increase in stillbirth[xiv] : rural residence, female illiteracy low socioeconomic status, schedule caste background and woman not in paid employment. Women from minority religious groups were at higher risk than the Hindu majority (Muslim Christian). While a few women smoked, around 9% reported chewing tobacco, which was associated with an increased odds of stillbirth.

A study on Maternal alcohol intake prior to and during pregnancy and risk of adverse birth outcomes (UK)[xv] suggested that Nearly two-thirds of women before pregnancy and over half in the first trimester reported alcohol intakes from the cohort. Associations with birth outcomes were strongest for intakes >2 units/week before pregnancy and in

trimesters 1 and 2 compared to non-drinkers. Women should be advised to abstain from alcohol when planning to conceive and throughout pregnancy.

According to a study conducted among a tribe named Bodos[xvi] in Assam regarding the taboos and myths associated with pregnancy stated that many nutritional rich foods like apple, cucumber, papaya, pumpkin are avoided during pregnancy due to the myths associated with it. The main reason for avoiding the food can be lack of awareness regarding the nutritional intake and rate of literacy. So this type of socio-cultural beliefs regarding health concerns are still prevalent in the society.

A study on the marriage and higher education among the Mishing tribe[xvii] and Deori tribe of Assam suggested that the most of the females are illiterate and early marriage takes place among them. Family burden, household chores are the main reason of their school dropout.

According to an epidemiological study based on co relation between alcohol and tobacco consumption among tea garden[xviii] workers of Assam suggested that non-smoke tobacco is very common among the females and the respondents are multi user of both tobacco and alcohol. Education, occupation are the main factors associated with the use of alcohol and tobacco.

3. Methodology:

3.1 Research Questions:

- What is the Prevalence of adverse pregnancy outcome in the state of Assam?
- What are the factors associated with adverse pregnancy outcome?
- Is maternal age is associated with adverse pregnancy outcome?

3.2 Research Design:

Secondary analysis of cross sectional data from National Family Health Survey (2014-16)

3.3 Data source:

The data source used for the study was NFHS4 data that was requested and then downloaded from DHS website.

3.4 Sampling Design and Study Population:

A two-stage sampling design is used in NFHS 4 and for the selection of sampling frame of PSU, the Census 2011 data was used. In rural areas, villages were considered as PSUs and in urban areas Census Enumeration Blocks (CEBs) were considered as PSUs. PSUs with less than 40 units were connected to the closest PSUs. Probability proportional to size (PPS) is used for the selection of villages from rural zones. All the villages are selected and divided based on the percentage of population belonging to scheduled castes and tribes. The same process was also followed for CEBs. All the Sampling techniques and sampling weights are referenced in NFHS 4 report.

The NFHS survey gathered sample from 6, 99,686 females. As our study needs the data of Assam and we only require the data of female who became pregnant in the last five year, so we have selected Birth Recode (BR) file. It consist of sample of 51,952 women of Assam.

3.5 Measures:

3.5.1 Dependent Variable: Women with Adverse Pregnancy outcome

3.5.2 Independent Variable:

Socio-demographic variables: Age of the female, female's education, religion of the female, place of residence, Wealth Index

Behavioural variables: Alcohol and Tobacco consumption status, smoking in presence of the female

Other Variables: anaemic status, number of ANC visits, time of first ANC visit

3.5.3 Operational Definition:

Adverse Pregnancy outcome are the result of conception which include other than live birth i.e. miscarriage, stillbirth and abortion and results into neonatal death, maternal death, etc.

Still birth: Stillbirth is an outcome in pregnancy in which a baby is born at or after 28 weeks of gestation without any sign of life.

Miscarriage: The spontaneous loss of a woman's pregnancy before the twentieth week that can be both physically and emotionally painful.

Abortion: Abortion is another outcome in pregnancy in which the embryo is removed from the uterus before it can survive without it.

Live Birth: Live Birth is one of the outcome of Pregnancy in which foetus is extracted from mother's body irrespective of its gestational age and shows sign of life.

3.6 Statistical Analysis:

The data of female of Assam was taken from NFHS 4.For analysis SPSS version 22 was used. First of all, all the potential factors were identified from the data for the study. Different cross-tabulations were run and frequency tables were made to find the potential factors which are identified from the literature review. A bivariate logistic regression was applied to see the association between all the potential variables and adverse pregnancy outcomes. Enter method was used and to check the significance Hosmer Lemeshow goodness of fit test was applied.

The logistic regresssion model is:

$\pi = P(Y = 1 | X1 = x1, X2 = x2 \ldots Xp = xp)$

$$P = \frac{e^{a+bX}}{1+e^{a+bX}}$$

Where $a+bX = \beta 0 + \beta 1x1 + \ldots + \beta pxp$ is the logit transformation of the logistic regression model. The importance of this transformation is that a+bx has many of the desirable properties of a linear regression model.

Four variable didn't show significant association with our dependent variable, number of ANC visits, Religion, Tobacco consumption and occupation. All other independent variables which were significant ($P<0.005$) were then analysed based on their Odds Ratio and Confidence Interval (CI) 95%. Further interpretation were done based on these outcomes. (Table 2)

3.7 Ethical Consideration: No ethical consideration was required as the data was collected from open source.

4. Result:

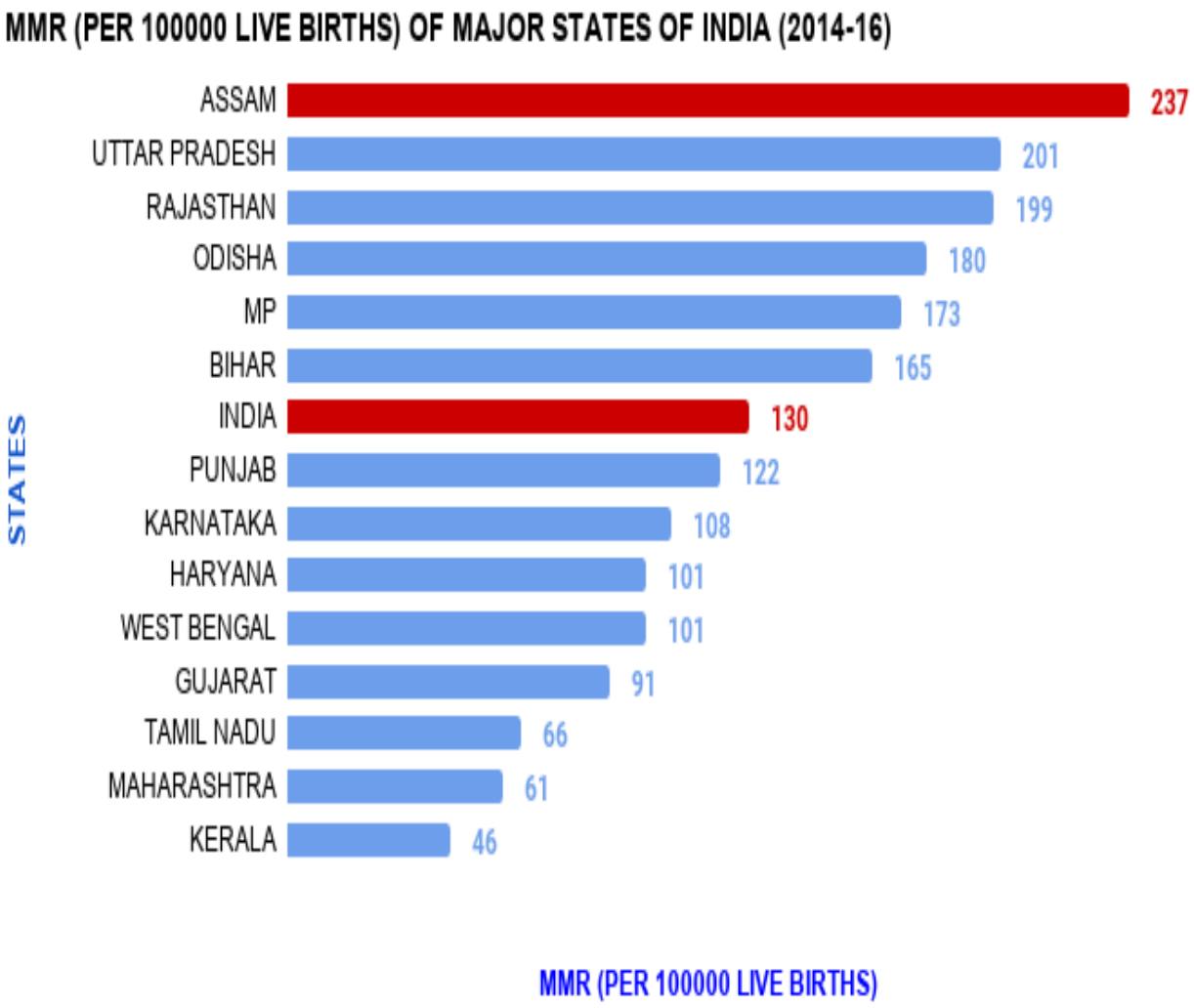


Figure 1: Maternal Mortality Ratio (MMR) of the major state of India (Source: SRS Bulletin 2014-2016)

The figure defines the MMR of different state of India of the year 2014-16. According to the figure MMR of India as a whole is 130 per 100000 live birth whereas there are many states whose MMR is higher than the India. The top five states in the list are Assam, Uttar Pradesh, Rajasthan, Odisha and Madhya Pradesh. The MMR of Assam is highest among the state which is 237 per 100000 live births in the year 2014-16. If we consider the recent SRS bulletin (2015-17), then also Assam top the list with 229 per 100000 live births.

Figure 2: Maternal Mortality Ratio (MMR) of districts of Assam (Source: Annual health Survey 2010-11)

The figure shows the MMR of different districts of Assam division wise in which the Upper Assam division have the highest MMR in comparison to all the division. According to NFHS 4 data, Karbi Anglong district from Hills and Barak valley Divison has the highest adverse pregnancy outcome. Goalpara from Lower Assam has the highest adverse pregnancy outcomes. Dhemaji from North Assam Division has the highest adverse pregnancy outcomes and Sivasagar from Upper Assam Division has the highest adverse pregnancy outcomes.

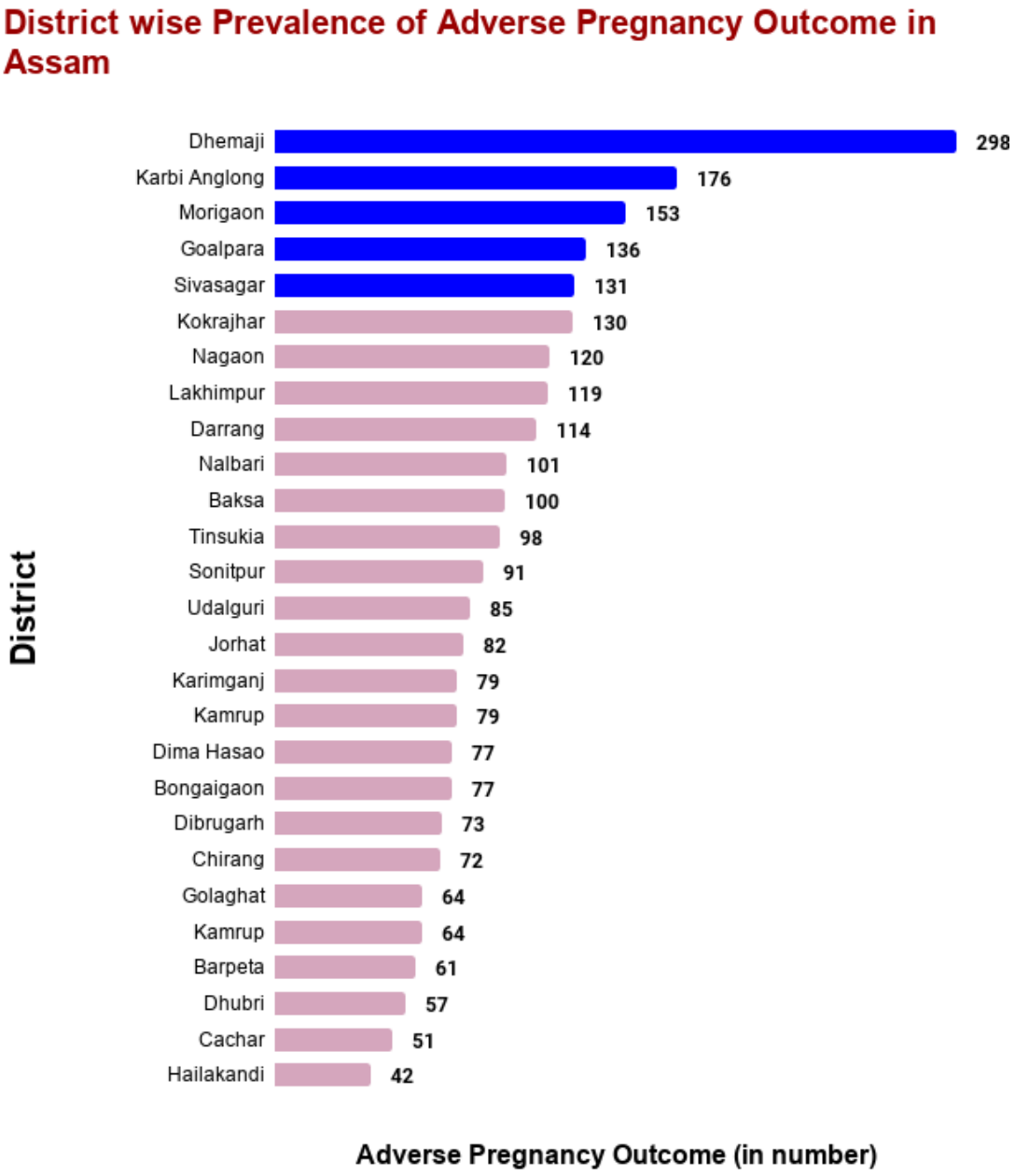


Figure 3: District-wise Prevalence of Adverse Pregnancy outcome in Assam

The figure shows all the district of Assam with their adverse Pregnancy outcome in numbers. The data is collected from NFHS 4 survey. The top 5 district with the highest outcomes are Dhemaji (298), Karbi Anglong (176), Morigaon (153), Goalpara (136) and Sivasagar (131). All the other state has low adverse Pregnancy outcome in comparison to the top 5 districts.

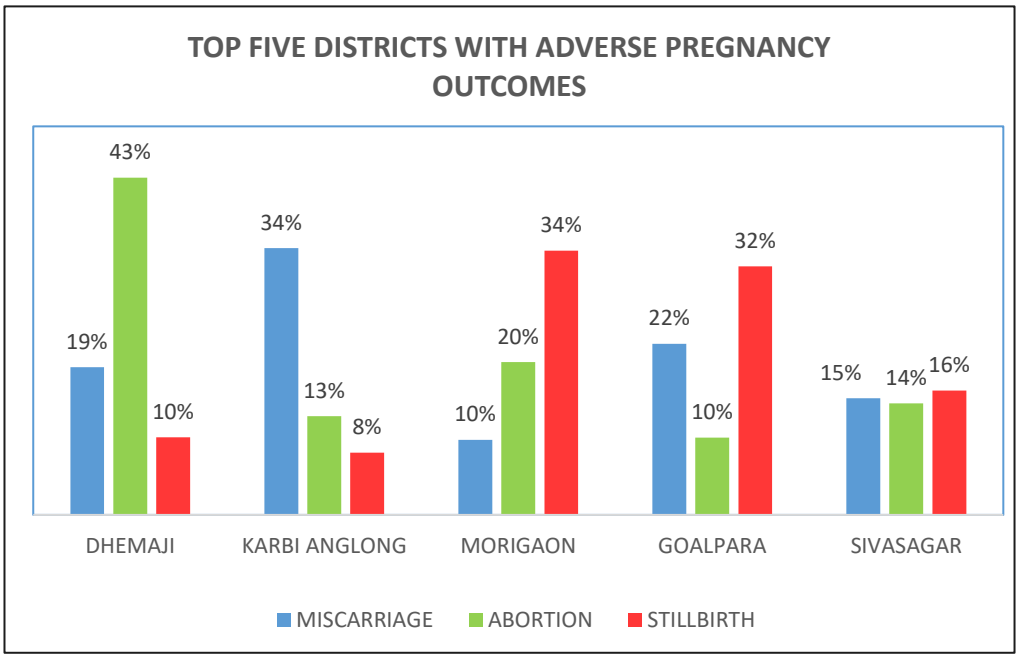


Figure 4: Top five district with Adverse Pregnancy Outcome (Miscarriage, Abortion and Still Birth)

Dhemaji has 43% of cases which is the highest percentage of abortion cases. Karbi Anglong has the highest miscarriage cases (34%). Morigaon has 34% of still birth cases which is highest among all the districts.

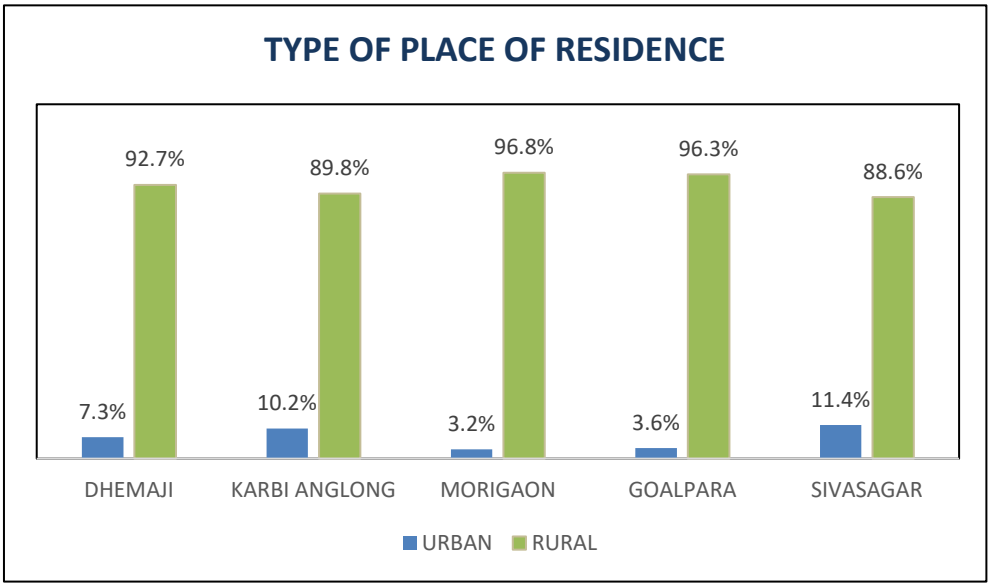


Figure 5: Place of Residence (Urban and Rural)

The figure shows the place of residence of the population with adverse pregnancy outcomes in the different districts. More than 90% of the population from all the five districts stays in rural area whereas the remaining population stays in urban areas.

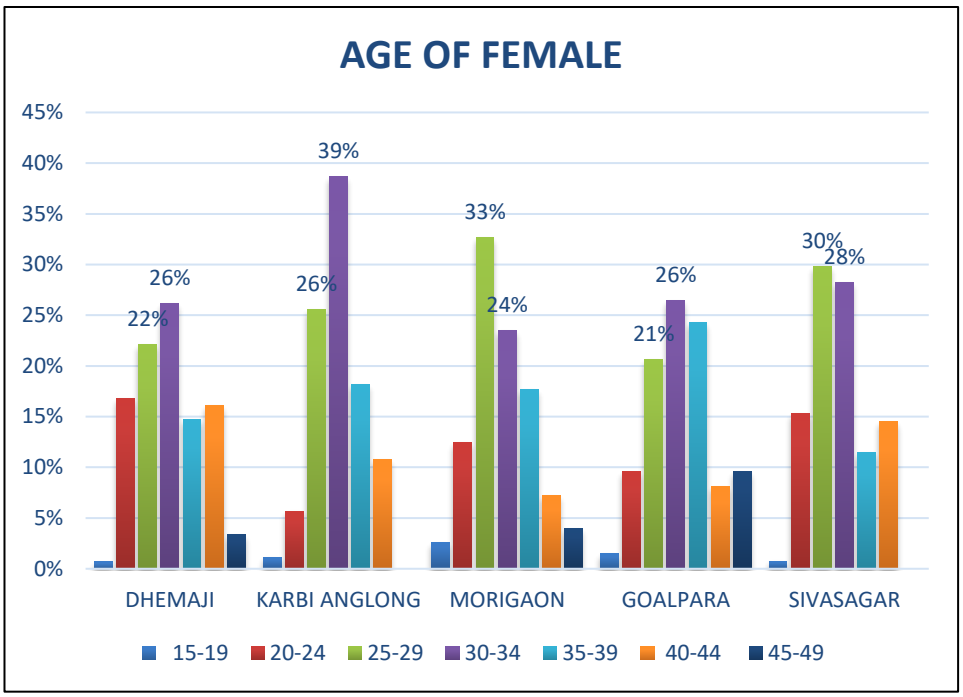


Figure 6: Age-wise distribution of female with adverse Pregnancy outcome

The above figure shows the age wise distribution of female of the districts. 26% of female of Dhemaji is of 30-34 year of age. 39% of female of Karbi Anglong is of 30-34 year of age. In Morigaon and Sivasagar the highest percentage of women are of 25-29 age group.

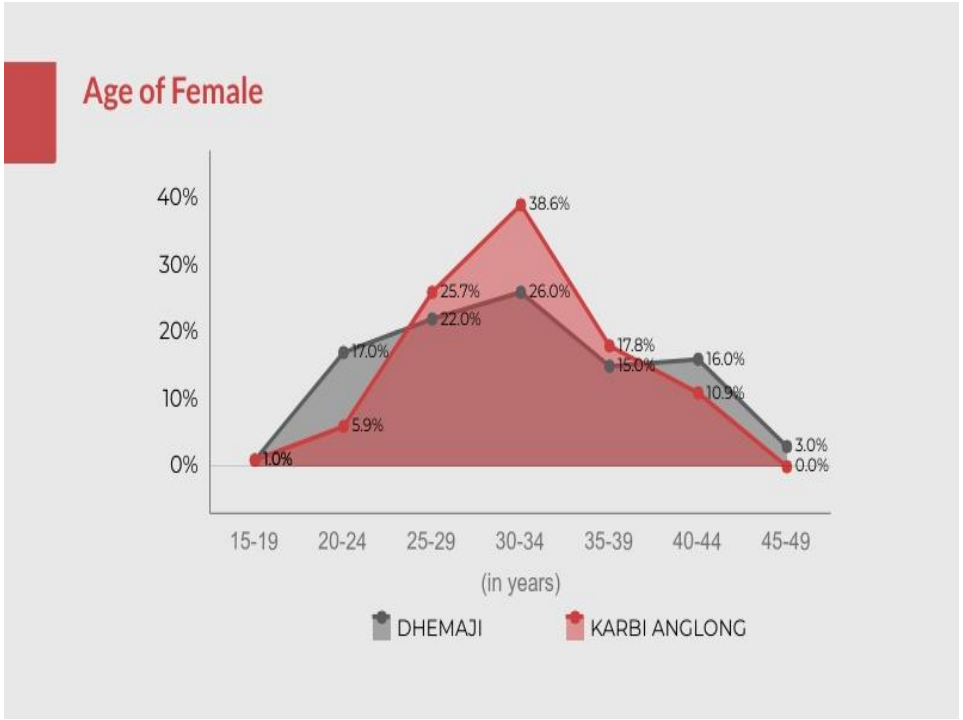


Figure 7: Age wise distribution of female of the district Dhemaji and Karbi Anglong

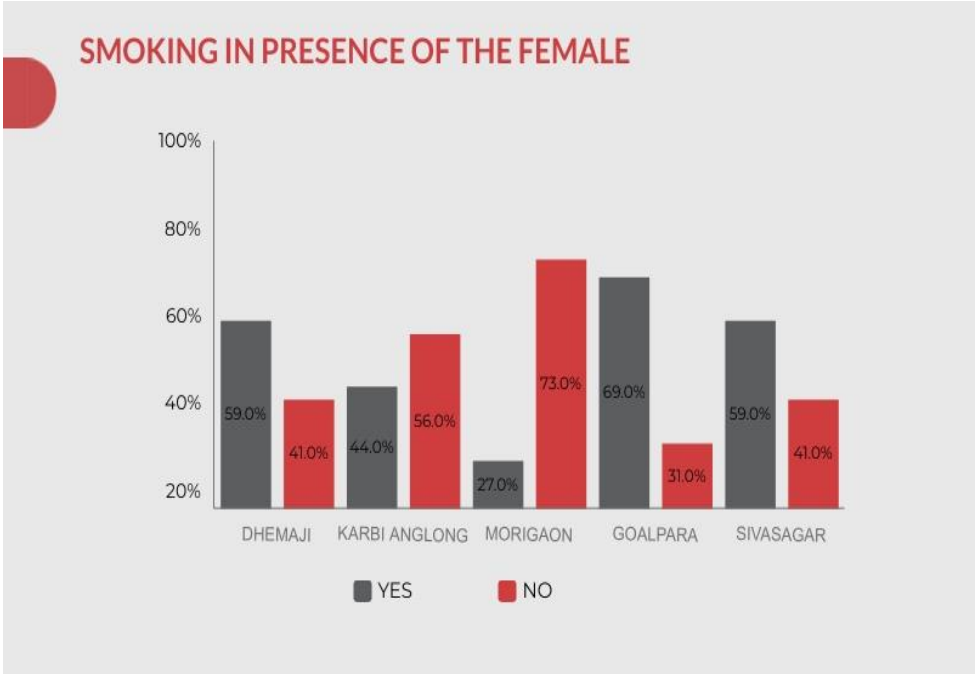


Figure 8: Smoking in presence of female facing Adverse Pregnancy Outcome

The figure above shows passive smoking or smoking in presence of the female either by their family member or in their surroundings. 59% of the female were expose to smoking in the Dhemaji district. 69% of the female of Goalpara district were exposed to smoking.

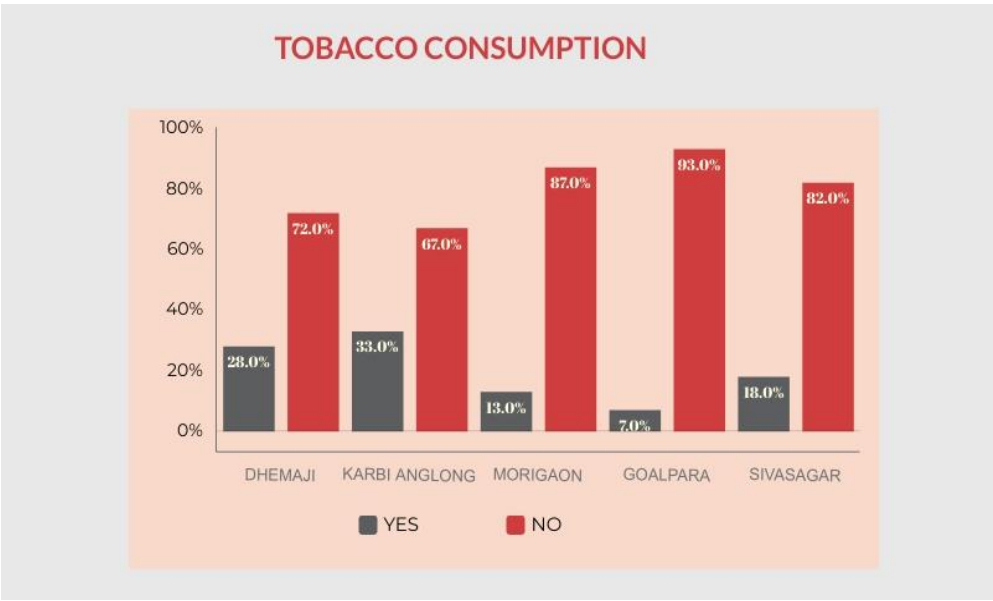


Figure 9: Consumption of Tobacco by the female

The figure shows that around 28% of female of Dhemaji district were consuming tobacco either in the form of smoke or chewing. 33% of female of Karbi Angling district were consuming tobacco.

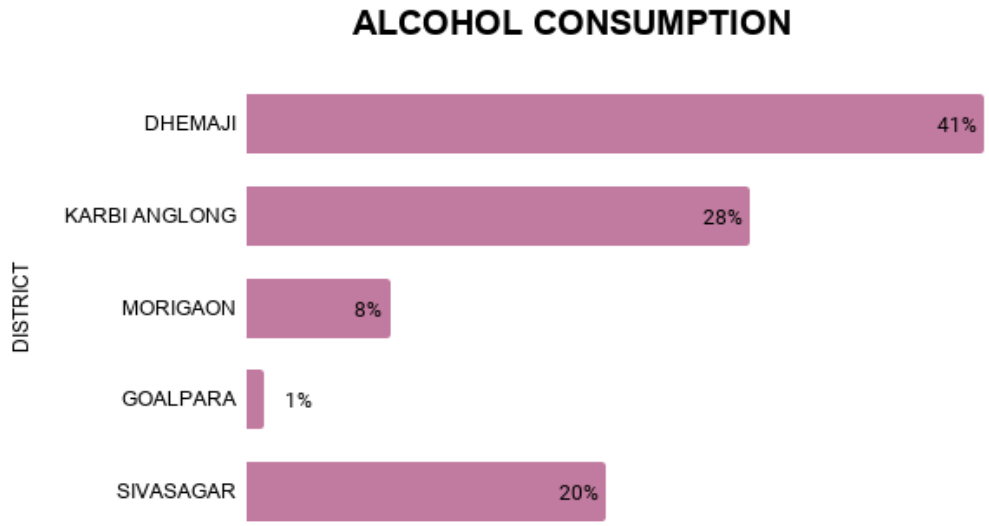


Figure 10: Consumption of Alcohol by the female

The figure shows that around 41% of the sample women with adverse pregnancy outcome of the Dhemaji district were consuming alcohol. Around 28% and 20% of female of Karbi Anglong and Sivasagar district were consuming alcohol.

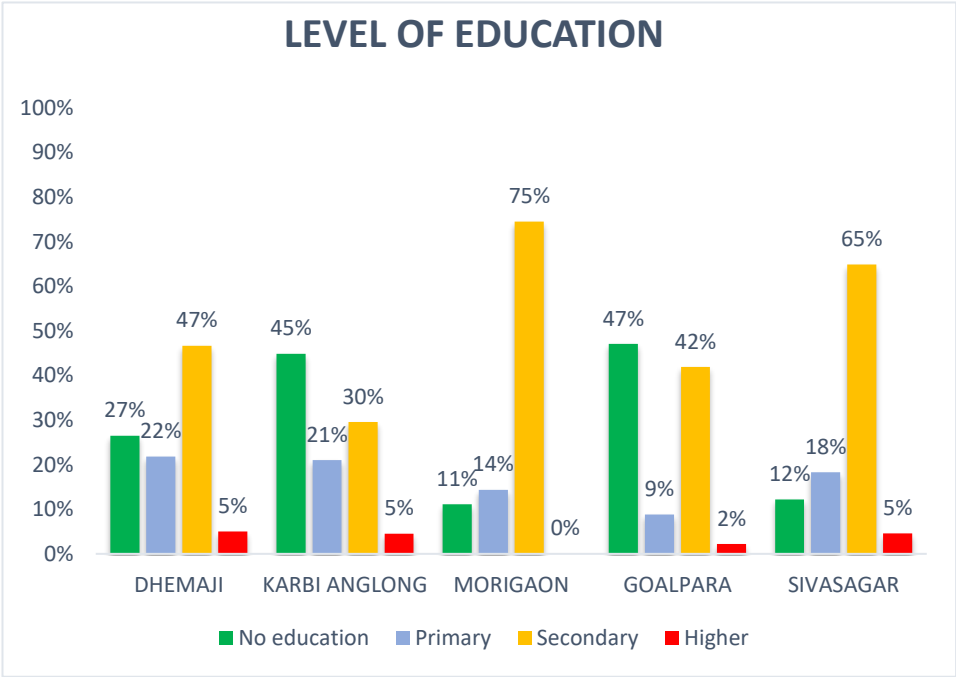


Figure 11: Level of Education of the Females

The figure above shows that very few female have received education above secondary level. Most of the female of Karbi Anglong and Goalpara district are illiterate. No female of Morigaon have received any higher education or professional degree.

Table 1: The association between adverse pregnancy outcome and socioeconomic, behavioural and Demographic factors: frequencies, Odds Ratio (ORs)

Variables	Adverse Pregnancy Outcome N=2730 Frequency (%)	Live Birth N= 49222 Frequency (%)	P value	Odds Ratio (ORs)
Maternal age				
15-19	30 (1.1)	512(1.0)	.000	1.00 (Ref)
20-24	408(14.9)	3572(7.3)	.000	9.17
25-29	801(29.3)	7030(14.3)	.000	18.02
30-34	725(26.6)	8177(16.6)	.000	18.32
35-39	462(16.9)	10278(20.9)	.000	14.15
40-44	237(2.5)	9164(18.60	.000	7.23
45-49	67(0.6)	10489(21.3)	.000	4.23
Place of Residence				
Urban	314(11.5)	5024(10.2)		1.00 (Ref)
Rural	2416(88.5)	44198(89.8)	.052	.869
Highest education				
Illiterate	736(27)	19742(40.1)	.000	1.00 (Ref)
Primary level	477(17.5)	8793(17.9)	.000	.526
Secondary level	1410(51.6)	19544(39.7)	.000	.598
Tertiary level &above	107(3.9)	1143(2.3)	.000	.663
Wealth index				
Poorest	806(29.5)	14586(29.6)	.071	1.00 (Ref)
Poorer	1028(37.7)	19964(40.6)	.637	1.06
Middle	522(19.1)	8422(17.1)	.686	.949
Richer	279(10.2)	4471(9.1)	.512	1.08
Richest	95(3.5)	1779(3.6)	.619	1.06
Alcohol consumption				
Yes	396(14.5)	5745(11.7)	.000	1.288
No	2334(85.5)	43477(88.3)	.000	1.00 (Ref)
Tobacco consumption				
Yes	81(19)	11298(23.0)	.979	.999

No	2211(81)	37924(77.0)		1.00 (Ref)
Religion				
Hindu	1746(64)	28824(58.6)	1.00 (Ref)	
Muslim	877(32.1)	18105(36.8)	.999	98506694
Christian	93(3.4)	2137(4.3)	.999	91280066
Sikh	4(0.1)	9(0.0)	.999	66102758
Buddhist	10(0.4)	114(0.2)	.999	13603837
Jain	0	21(0.0)	.999	1782809.7
Others	0	12(0.0)	1.00	1.156

Table 2: Districts of Assam with percentage of Miscarriage, Abortion and Stillbirth

Districts	Miscarriage (%)	Abortion (%)	Still birth (%)
Kokrajhar	5.5	4.4	3.0
Dhubri	0.4	2.8	7.1
Goalpara	5.8	3.8	9.5
Barpeta	2.4	1.9	4.2
Morigaon	2.6	7.5	10.1
Nagaon	3.5	5.1	4.2
Sonitpur	5.7	1.7	0.6
Lakhimpur	2.8	5.8	2.4
Dhemaji	5.0	16.5	3.0
Tinsukia	3.6	3.7	2.4
Dibrugarh	2.5	2.9	1.8
Sivasagar	4.0	5.5	4.8
Jorhat	2.6	3.4	3.0
Golaghat	2.1	2.6	1.8
Karbi Anglong	9.1	4.8	2.4
Dima hasao	3.6	2.2	3.0
Cachar	2.2	1.3	4.8
Karimganj	4.9	0.9	6.0
Hailakandi	2.9	0.2	3.6
Bongaigaon	3.7	2.2	1.8
Chirang	1.9	3.2	3.0
Kamrup	3.4	2.6	1.8
Kamprup Metropolitan	2.1	2.7	1.2
Nalbari	4.2	3.6	1.8
Baksa	3.5	4.1	0.6
Darrang	7.1	1.2	10.1
Udalguri	2.7	3.5	2.4

5. Discussion:

In India, the MMR of Assam is highest which is 237 per 100000 live births (2014-16) and 229 per 100000 live births (2015-17), which is so higher than the average of India

(122 per 100000 live births). The number of adverse pregnancy outcomes (stillbirths, miscarriage, and abortion) in the state of Assam is also high, and ultimately these results in maternal deaths. So for that reason we have selected Assam for our study purpose. In the state of Assam, we have identified five high priority district which has the highest adverse pregnancy outcome. The districts selected for our study based on the NFHS4 data of Assam are Dhemaji, Karbi Anglong, Morigaon, Goalpara, and Sivasagar.

DISTRICT	MISCARRIAGE	ABORTION	STILLBIRTH	TOTAL
DHEMAJI	6%	26%	1%	33%
KARBI ANGLONG	12%	8%	0%	20%
MORIGAON	3%	12%	1%	16%
GOALPARA	7%	6%	2%	15%
SIVASAGAR	5%	9%	1%	15%

Table 3: Percentage of Miscarriage, abortion and stillbirths of 5 districts

Different factors or variables were identified from the NFHS data which could be associated with Pregnancy outcome based on the literature review. In our study we found that the females with adverse outcome were more from the rural area in percentage in comparison to the urban area. 90% of the female were from rural area and the rest were from the urban area. The females were mostly from advanced age group i.e. 30-34 and 35-39 year age group. Some of the females were also exposed to smoking in their house or surrounding i.e. passive smoking. 69% of females were exposed to passive smoking in Goalpara and 59% in Dhemaji. It was found that around 28% of females of Dhemaji district were consuming tobacco in the form of smokeless tobacco. A study also suggested that non-smoke tobacco is very common among the females of Assam[xix]. 33% of females of Karbi Anglong district were consuming tobacco. 41% of the female of Dhemaji were consuming alcohol and around 28% of females of Karbi Anglong were consuming alcohol. We found that very few females have received education above the secondary level. Most of the females of Karbi Anglong and Goalpara district are illiterate. No female of Morigaon has received any higher education or professional degree. A study on the marriage and higher education among the Mishing tribe[xx] and Deori tribe of Assam suggested that the most of the females are illiterate and early marriage takes place among them. Family burden, household chores are the main reason of their school dropout. Mishing tribe are mostly resident of this districts.

Most of the females who faced adverse pregnancy outcomes either belonged to the poorest or poorer section of the society. Most of the females who faced adverse pregnancy outcomes belonged to the Hindu or Muslim community.

Many socio cultural beliefs and myths are also associated with in various tribes like Bodos[xxi], Mishing, deori regarding food intake, household works. The females are not allowed to take many nutritional food due to cultural myths and this hamper health outcome in pregnant women. Bodos[xxii], Mishing and Deori tribe are mainly settled in Dhemaji, Karbi Anglong, Sivasagar, and etc. districts of Assam.

Logistic regression was applied to see which factors are associated with adverse pregnancy outcomes. It revealed that as the age increases the odds of getting an abortion, miscarriage and stillbirth are more likely (P<0.001). The age group 25-29 year (OR 18.02, 95%CI 13.6-23.7 P<0.001) and 30-34 year (OR 18.32, 95%CI 14.07-23.85 P<0.001) have higher odds of getting an abortion, miscarriage, and stillbirth in comparison to 15-19year (OR 1, 95% CI P<0.001) and 20-24year (OR 9.17, 95%CI 5.7-14.5 P<0.001). The odds of having adverse pregnancy outcome is higher in illiterate female than an educated female. Odds of having an adverse outcome are not significantly associated with the wealth index. The richer section has chances of getting an abortion than the poorest class. The odds of having adverse pregnancy outcome is higher in the female who consumes alcohol (OR 1.288, 95%CI 1.13-1.468 P<0.001) than in female who doesn't consume alcohol. Odds of having an adverse outcome are not significantly associated with religion, tobacco consumption, occupation, and the number of ANC visits.

So, the major factors which we found are more associated with adverse pregnancy outcome in the district of Assam from the NFHS4 data area age factor, education, alcohol consumption, wealth index.

6. Conclusion and Recommendation:

The NFHS data provide insight about the different factors and their association with the Pregnancy outcome (miscarriage, abortion, and stillbirth). The majorly affected districts that we found from our study from adverse pregnancy outcomes are Dhemaji, Karbi Anglong, Sivasagar, Morigaon and Goalpara. The number of government health facilities in this districts are very less in comparison to other districts in the state. The number of CHC, PHC, and Sub-centres in Dhemaji district are 4, 22 and 98[xxiii]. There is no Sub-divisional Hospital in the district. Maybe this districts have less pressure on the government for setting health facilities. Lack of awareness and information should be addressed at all the sub-districts level and among the general public regarding stillbirth, miscarriage, and abortion with the help of effective health intervention, programs, and schemes. The finding of this study provides a framework for formulating health programs and bringing some changes in the policy. It suggest that adverse pregnancy outcome is more common in illiterate females and those who consumes alcohol during pregnancy. It suggests that approaching the illiterate females of the society should be the main concern of the grass-root health workers and things to be taken care of, as they are the most unaware sector of the society. The poor sector should be made aware of the different schemes, proper counselling should be provided to ensure complete maternal health facility utilization. Community engagement is necessary to reduce maternal mortality. All the stakeholders should be engaged while formulating and implementing programs.

- More health facilities should be set up in the majorly affected districts.
- IEC materials regarding food habits during pregnancy, harmful effects of alcohol and tobacco consumption during pregnancy, etc. should be developed in local languages.
- Community engagement activities should be designed for Illiterate Tribal women and their family members regarding the food habits during pregnancy, harmful effects of alcohol and tobacco consumption during pregnancy, etc.
- Street plays, local games, jingles, meetings should be arranged with informative messages regarding the health information by the frontline healthcare workers or local NGOs can be hired to perform these activities.
- Education and marriage at right age should be promoted to reduce adverse pregnancy outcome.

7. References

[i] Rahman M, DaVanzo J, Razzaque A. The role of pregnancy outcomes in the maternal mortality rates of two areas in Matlab, Bangladesh. International perspectives on sexual and reproductive health. 2010 Dec 1:170-7.

[ii] World Health Organization. International statistical classification of diseases and related health problems. World Health Organization; 2004.

[iii] Sedgh G, Singh S, Shah IH, Åhman E, Henshaw SK, Bankole A. Induced abortion: incidence and trends worldwide from 1995 to 2008. The Lancet. 2012 Feb 18;379(9816):625-32.

[iv] Hure AJ, Powers JR, Mishra GD, Herbert DL, Byles JE, Loxton D. Miscarriage, preterm delivery, and stillbirth: large variations in rates within a cohort of Australian women. PLoS One. 2012;7(5).

[v] Library M. India - National Family Health Survey. 2017:1-15. http://rchiips.org/NFHS/NFHS-4Reports/India.pdf. Accessed January 28, 2018.

[vi] Singh S, Mini GK, Thankappan KR. Tobacco use during pregnancy in rural Jharkhand, India. International Journal of Gynecology & Obstetrics. 2015 Nov 1; 131(2):170-3.

[vii] Kochar PS, Dandona R, Kumar GA, Dandona L. Population-based estimates of still birth, induced abortion and miscarriage in the Indian state of Bihar. BMC pregnancy and childbirth. 2014 Dec 1; 14(1):413.

[viii] Nair M, Choudhury MK, Choudhury SS, Kakoty SD, Sarma UC, Webster P, Knight M. Association between maternal anaemia and pregnancy outcomes: a cohort study in Assam, India. BMJ Global Health. 2016 Apr 1;1(1):e000026.

[ix] Shankar P, Pathania V. Epidemiological predictor variables in relation to the outcome of pregnancy in an urban setting. International Journal of Community Medicine and Public Health. 2018 Oct;5(10):4489.

[x] Kebede AS, Muche AA, Alene AG. Factors associated with adverse pregnancy outcome in Debre Tabor town, Northwest Ethiopia: a case control study. BMC research notes. 2018 Dec 1;11(1):820.

[xi] Sadiq AA, Poggensee G, Nguku P, Sabitu K, Abubakar A, Puone T. Factors associated with adverse pregnancy outcomes and perceptions of risk factors among reproductive age women in Soba LGA, Kaduna State 2013. The Pan African Medical Journal. 2016;25.

[xii] Mungoba TN, Mitonga HK, David SA, Musekiwa A, Nakale T. Factors associated with adverse pregnancy outcomes among women who delivered at intermediate hospital oshakati, Namibia.

[xiii] Goel MK, Roy P, Rasania SK, Roy S, Kumar Y, Kumar A. Wealth index and maternal health care: Revisiting NFHS-3. Indian journal of public health. 2015 Jul 1; 59(3):217.

[xiv] Altijani N, Carson C, Choudhury SS, Rani A, Sarma UC, Knight M, Nair M. Stillbirth among women in nine states in India: rate and risk factors in study of 886,505 women from the annual health survey. BMJ open. 2018 Nov 1;8(11):e022583.

[xv]Nykjaer C, Alwan NA, Greenwood DC, Simpson NA, Hay AW, White KL, Cade JE. Maternal alcohol intake prior to and during pregnancy and risk of adverse birth outcomes: evidence from a British cohort. J Epidemiol Community Health. 2014 Jun 1;68(6):542-9.

[xvi] Gogoi M. Taboos and myths associated with pregnancy among the Bodos of Assam. International Journal for Innovative Research in Multidisciplinary Field. 2016;2(10):4.

[xvii] Pal S, Hazarika L. Marriage and higher education of Mishing and Deori women in Assam. research journal of social sciences. 2018 May;9(5).

[xviii] Medhi GK, Hazarika NC, Mahanta J. Correlates of alcohol consumption and tobacco use among tea industry workers of Assam. Substance use & misuse. 2006 Jan 1;41(5):691-706.

[xix] Medhi GK, Hazarika NC, Mahanta J. Correlates of alcohol consumption and tobacco use among tea industry workers of Assam. Substance use & misuse. 2006 Jan 1;41(5):691-706

[xx] Pal S, Hazarika L. Marriage and higher education of Mishing and Deori women in Assam. research journal of social sciences. 2018 May;9(5).

[xxi] Gogoi M. Taboos and myths associated with pregnancy among the Bodos of Assam. International Journal for Innovative Research in Multidisciplinary Field. 2016;2(10):4.

[xxii] George SJ. The Bodo movement in Assam: unrest to accord. Asian Survey. 1994 Oct 1;34(10):878-92.

[xxiii] Nath A. Inter District Disparities in Health Care Service of Assam. Retrieved September. 2010;25:2013.