

Impact of Education on Various Social Indicators

Group Members:

Namit Arora, Roll No.: 34

Gorseet Paul Singh, Roll No.: 23

Jaideep Shekhar, Roll No.: 27

Table of Contents:

S. No.	Topic
1	The National Family Health Survey-5 (NFHS-5) 2019-2021
2	Dataset Description
3	Correlation of Attributes
4	Number of houses surveyed in each state of India
5	Now we would like to know the response to this survey from rural and urban areas per state, and we can do so using a bar chart.
6	Q. How does the literacy rates in India differ region-wise?
7	Q: What is the literacy rate of women vs men?
8	Q: What is the literacy rate of women vs men statewise?
9	Q: What is the literacy rate of men and women state-wise and area-wise?
10	Q. Based upon the given dataset, find which states/uts may have a higher chance of female foeticide/killing of newborn females. Does education have a role to play in female foeticides?
11	Q. What is the variability in the literacy rate of men and women?
12	Q. Does higher men and women literacy rates result in less underage marriages?
13	Q. For each state how many women who have ever attended school have also had schooling of more than 10 years?
14	Q. What impact does the education of parents have on the health of their newborn children?
15	Conclusion
16	Citations and References

The National Family Health Survey-5 (NFHS-5) 2019-2021

The National Family Health Surveys (NFHS) conducted under the aegis of the Ministry of Health & Family Welfare has played a crucial role in providing the Government of India and the stakeholders with reliable inputs to monitor the progress of various flagship programmes as well as achieve the vision of the National Health Policy. The NFHS-S, with a reference period 2019-2021 would provide vital information on reproductive and child health, fertility and family planning, health insurance, nutrition, HIV/AIDS, non-communicable diseases and many other related issues. The compendium of fact sheets covers India and 14 States/UTs in Phase-II. It provides a useful demographic and health database which will facilitate a stock taking of government programmes, and the progress made towards achieving the Sustainable Development Goals (SDG) by 2030.

Dataset Description

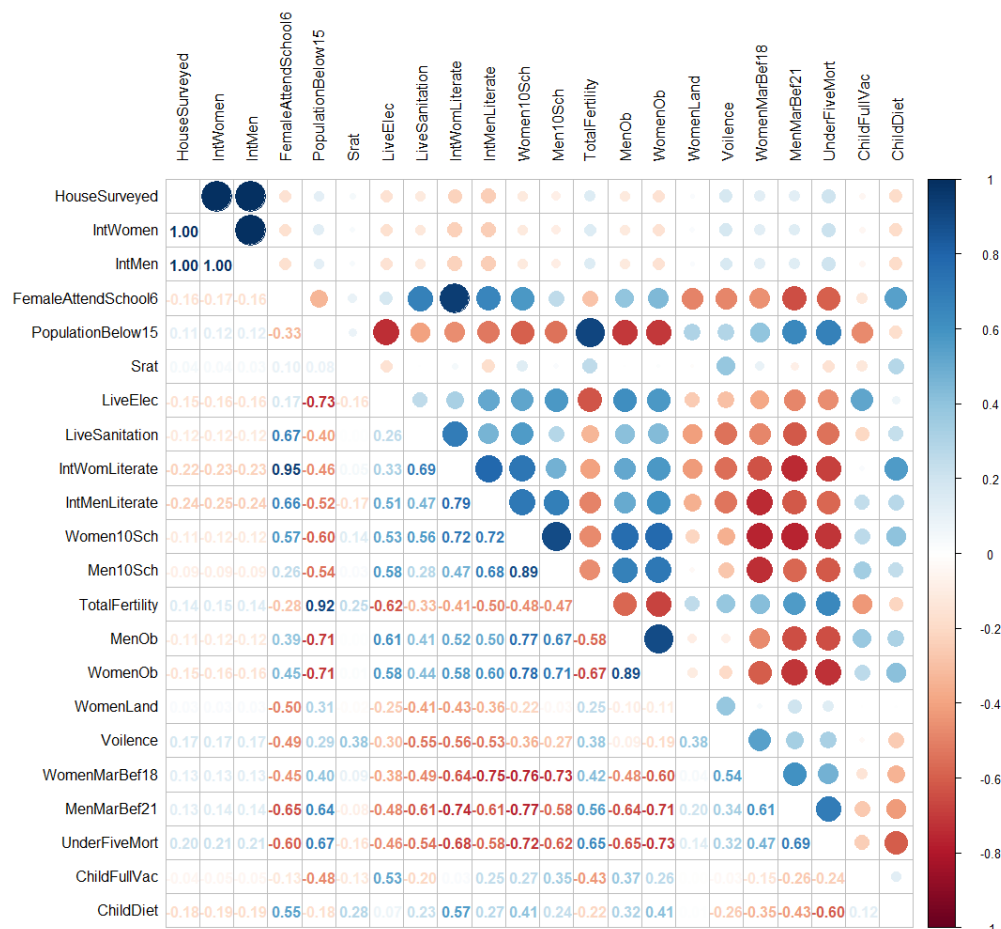
We will be taking a subset of the NFHS dataset for our analysis on Education. The attributes selected from the dataset are described as follows:

Short Name	Description	Type
States	All States and UT's of India	String
Area	Urban/Rural/Total	String
Women (15-49)	Women aged 15-49 who are interviewed.	Count
Men (15-54)	Men aged 15-49 who are interviewed	Count
Female school	Percentage of females above 6 years who attended school	Percentage
Population (<15)	Percentage of Population below the age of 15	Percentage
Sex Ratio	Number of females per thousand males	Ratio
Improved Sanitation	Percentage of people who think sanitation improved	Percentage
Literate women	Percentage of women (aged 15-49) who are literate	Percentage
Literate men	Percentage of men (aged 15-49) who are literate	Percentage
Female school (>10)	Percentage of women (aged 15-49) with 10 or more years of schooling	Percentage
Male school (>10)	Percentage of men (aged 15-49) with 10 or more years of schooling	Percentage

Women obese/overweight	Percentage of women with BMI ≥ 25 Kg/m ²	Percentage
Men obese/overweight	Percentage of men with BMI ≥ 25 Kg/m ²	Percentage
Domestic Violence	Percentage of ever-married women (aged 18-49) who have ever experienced spousal violence	Percentage
Women homeowners	Percentage of women who independently or jointly own land and/or house	Percentage
Total Fertility Rate	Number of children per woman	Ratio
Underage Married Women	Percentage of women (aged 20-24) who were married before 18 years of age.	Percentage
Underage Married Men	Men age 25-29 years married before age 21 years (%)	Percentage
UnderFiveMortRate	Number of deaths per 1000 newborn children under the age of five.	Percentage
ChildFullVac	Children age 12-23 months who have received all doses of vaccination.	Percentage
ChildDiet	Total children age 6-23 months receiving an adequate diet	Percentage

LiveElec	Population living in households with electricity	Percentage
----------	--	------------

Correlation of Attributes

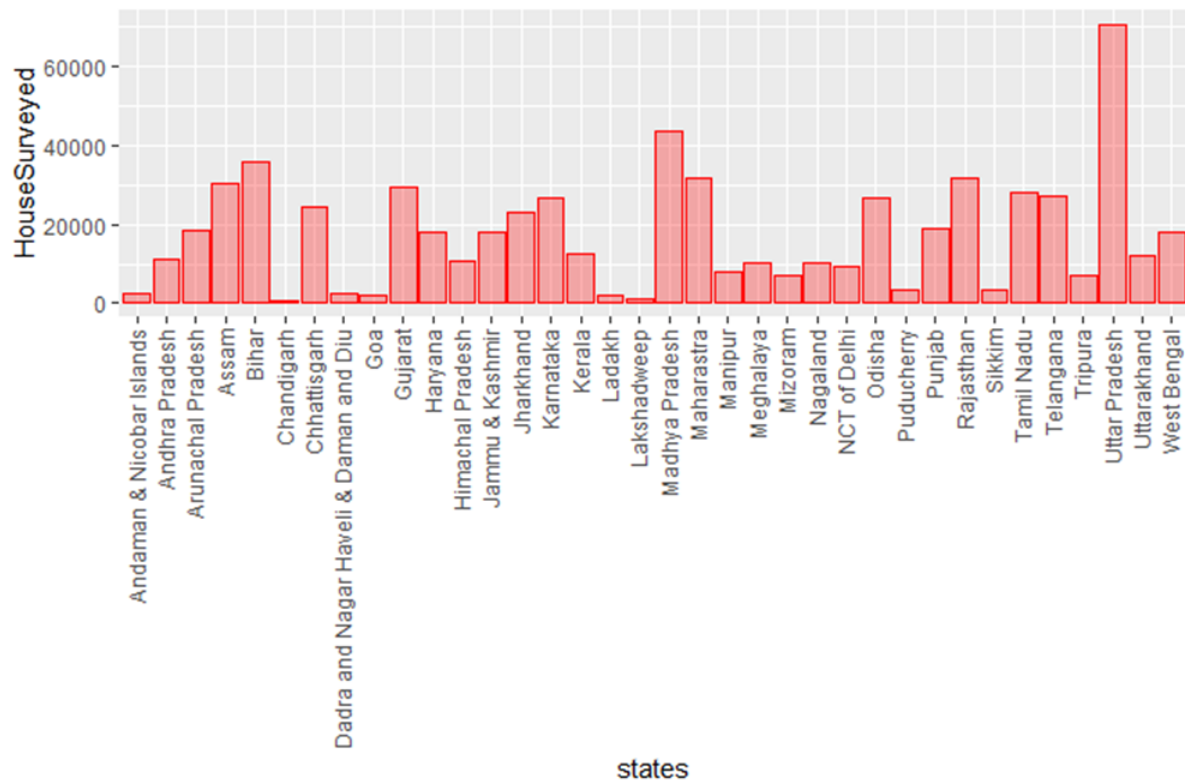


Analysis:

We can observe some high positive and negative correlations from the above matrix.

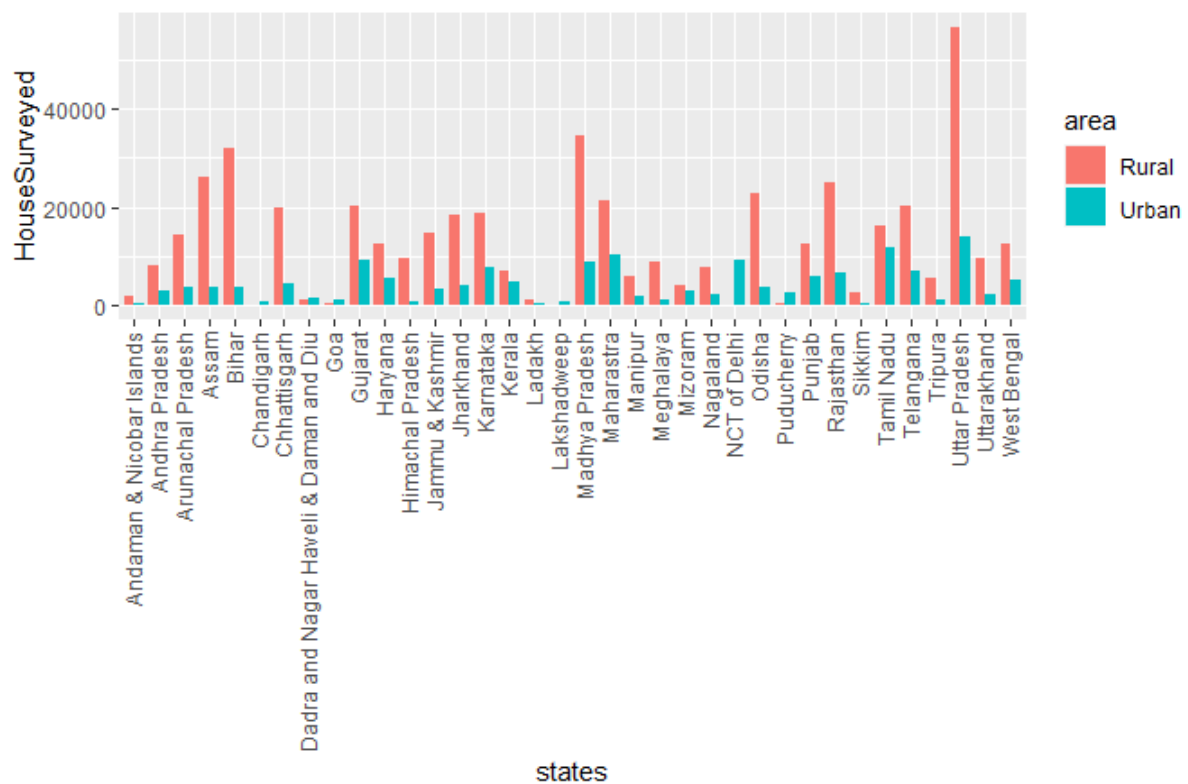
- The biggest one is the high correlation between a high total fertility rate and high percentage of population below 15 years of age.
- We can also see a high correlation between the number of women aged 6 years and above who attended school at least once and their literacy rate.
- Another important correlation is between obesity rate among men and obesity rate among women. This means that the obesity rate depends very little on gender.
- Coming back to the schooling, there is a high correlation between men who have completed 10 years of schooling and women who have completed 10 years of schooling. This means that there is almost nonexistent bias towards any gender in terms of education.

Number of houses surveyed in each state of India:



From above data we observe the maximum number of houses surveyed were from Uttar Pradesh and then Madhya Pradesh. This is expected and proportional to their state populations.

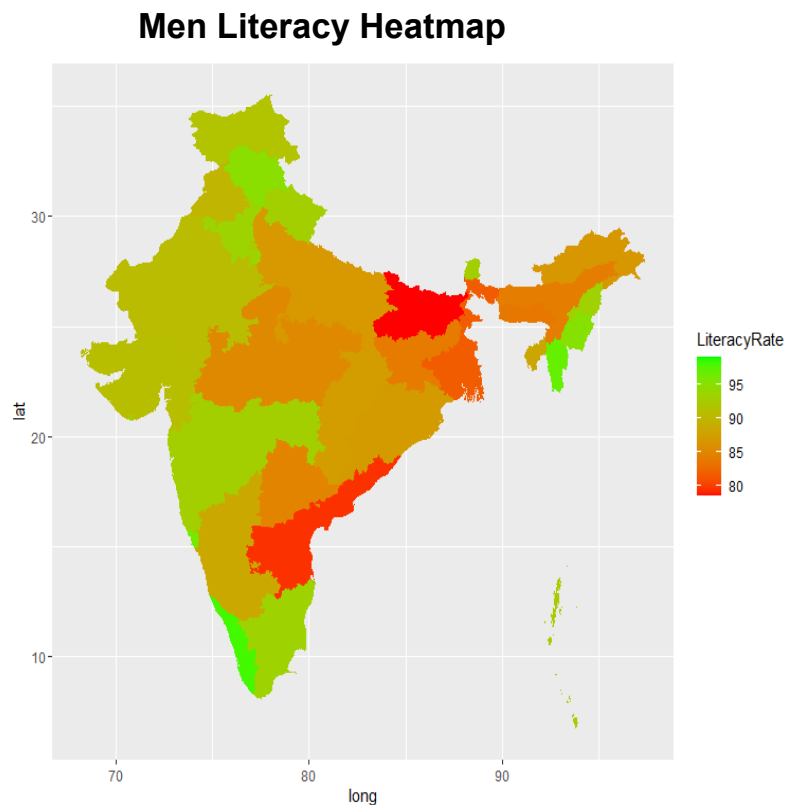
Now we would like to know the response to this survey from rural and urban areas per state, and we can do so using a bar chart.



From the above chart we can see that only NCT of Delhi had more urban houses surveyed than rural houses. This can be explained due to the fact Delhi is very small in size and is predominantly urban. Rest of the states have more rural houses surveyed.

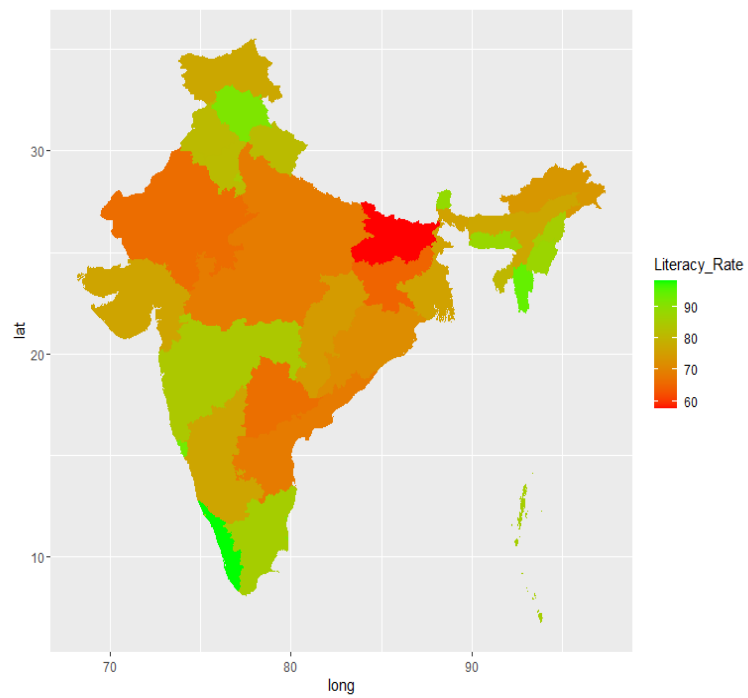
With our focus on education, naturally we would want to visualise the literacy rates in India intuitively.

Q. How does the literacy rates in India differ region-wise?



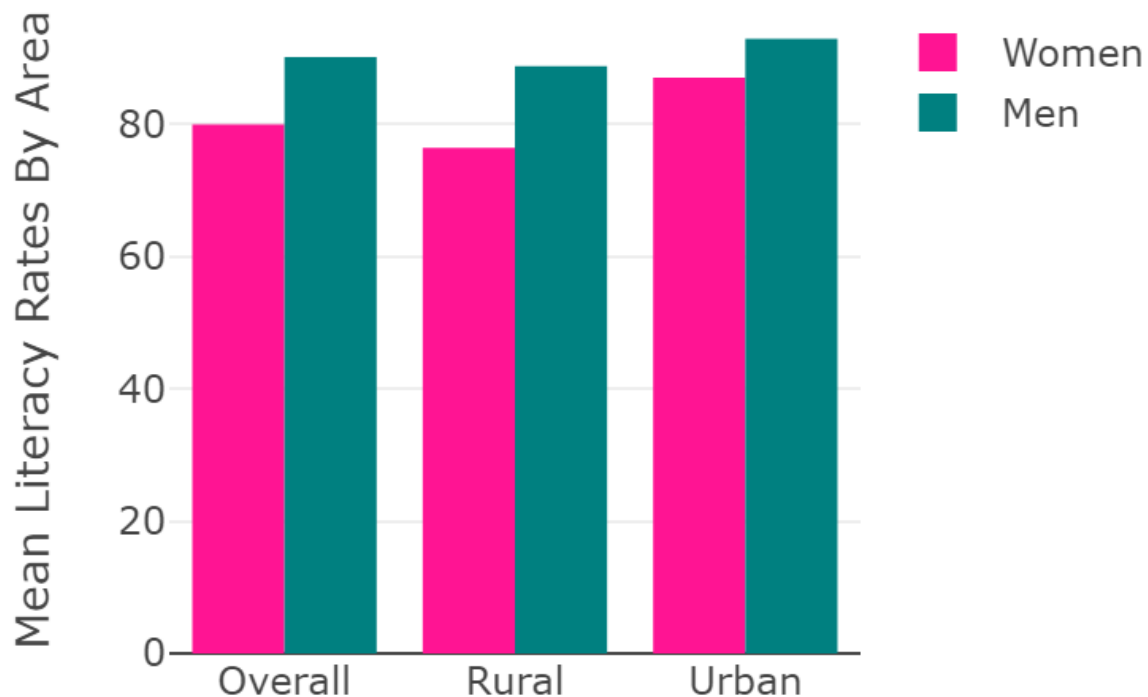
We observe that literacy rates of men change gradually in eastern India, showing that lower literacy rate there is a region specific and not a state specific issue. In western and southern India including parts of north eastern India, there is a good literacy rate which shows good initiative shown by these states in tackling illiteracy. Surprisingly, male literacy rate in Andhra Pradesh is lower than male literacy rate in West Bengal.

Women Literacy Heatmap



In contrast to men's literacy rate spread, women generally have a lower literacy rate across northern India (except Uttarakhand and parts of north east) and a higher literacy rate at the far south in Kerala and Tamil Nadu.

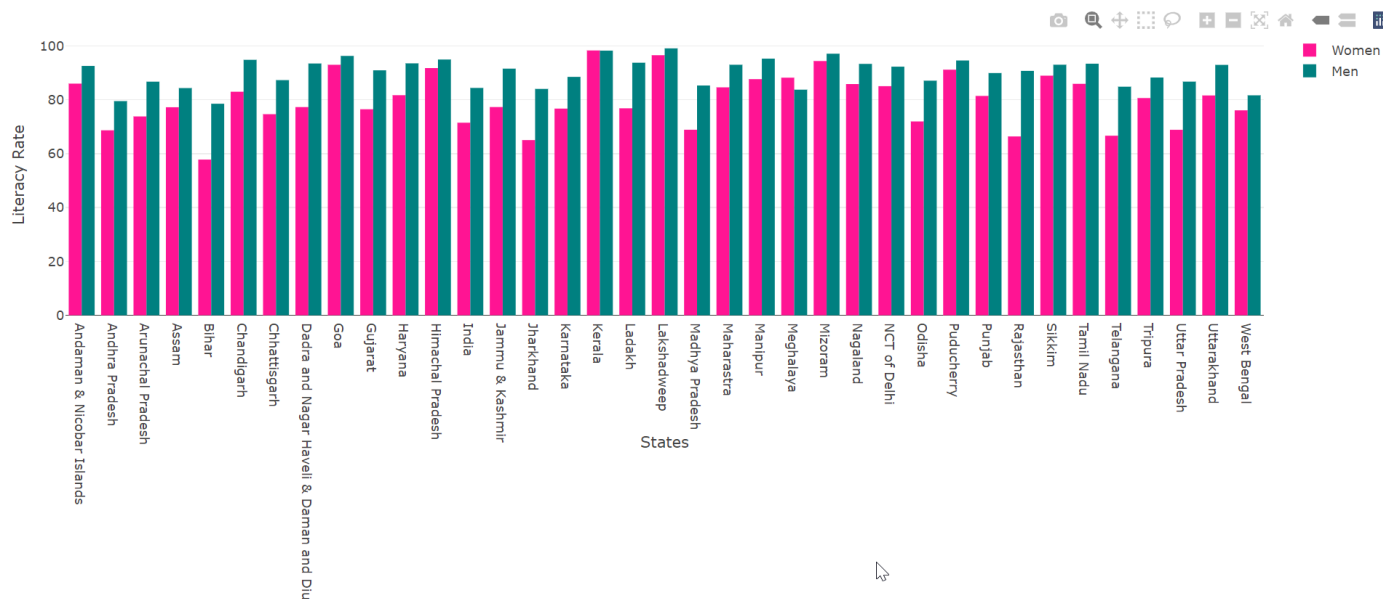
Q: What is the literacy rate of women vs men?



Analysis:

As we can see from the above graph, and as is expected, there is a sharper difference between male and female literacy rate in rural areas. On the other hand, both male and female literacy is higher in urban areas, with women lagging very little behind. However, the data on the whole is very positive and encouraging towards equality in education, which is necessary for any individual to unlock their true potential.

Q: What is the literacy rate of women vs men statewise?

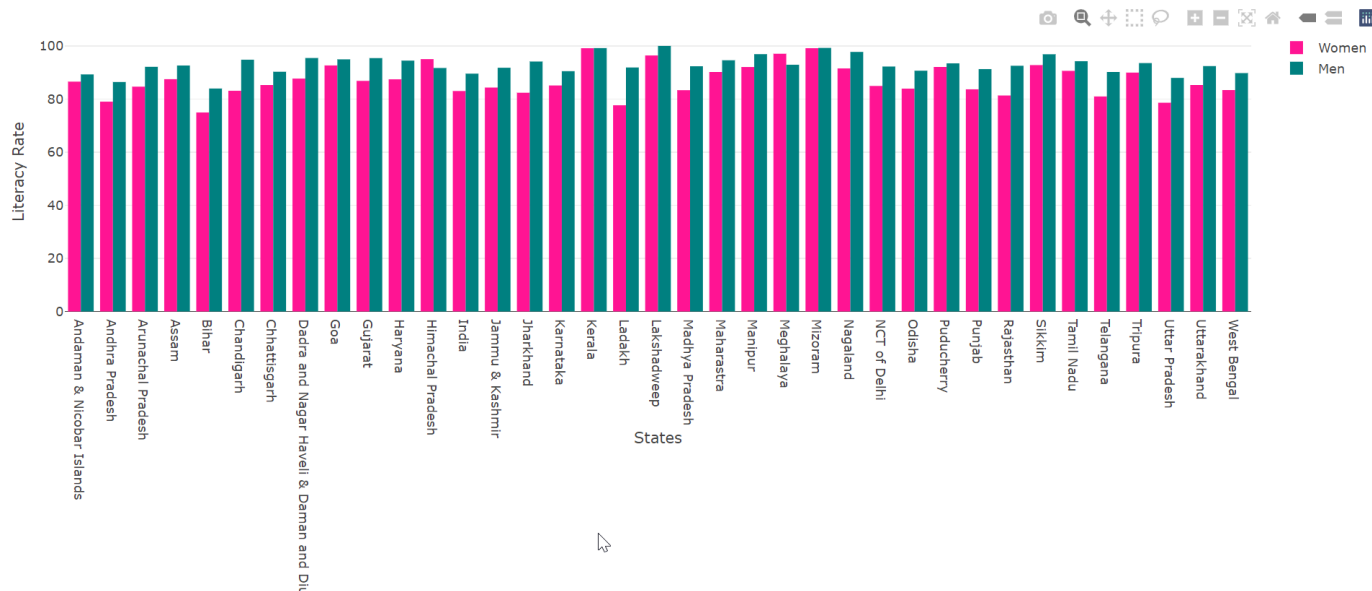


Analysis:

As evident from the graph, we can observe that in most states the literacy rate of men is higher than women. This difference is also bigger in states like Bihar, Jharkhand, Rajasthan and Madhya Pradesh. Only women in Meghalaya and Kerala have higher literacy rates than men. On an average, women are only about 10% behind. But what about the rural vs urban literacy rate divide?

Q: What is the literacy rate of men and women state-wise and area-wise?

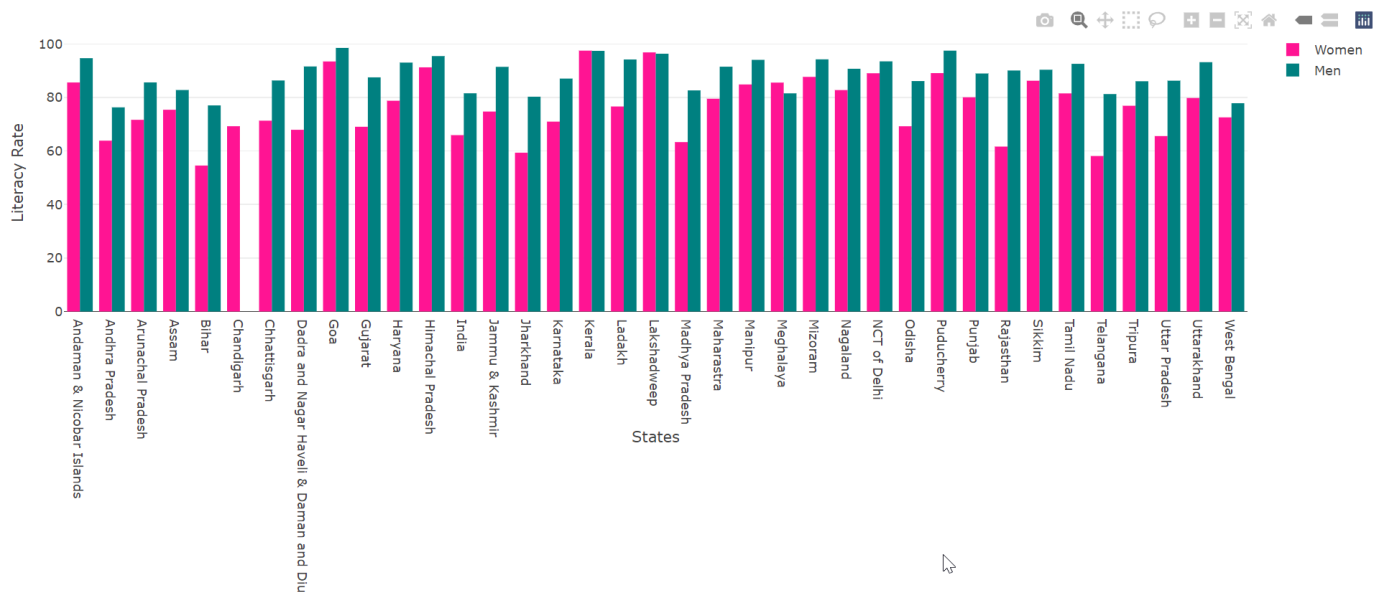
For Urban:



Analysis:

From the bar graph above it is evident that the literacy rates of men and women in the urban regions of India are close to each other. Most urban areas have a literacy rate greater than 80 percent. There is very little literacy variation by gender or state.

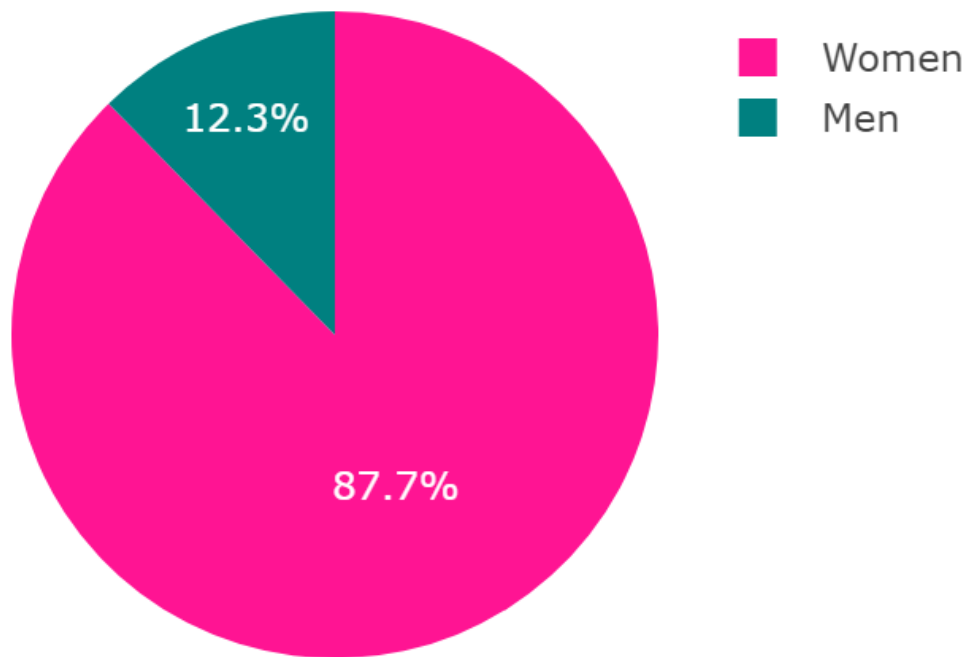
For Rural:



Analysis:

The difference in literacy rates between men and women is comparatively higher in rural areas of India. The only exceptions are Lakshadweep and Kerala where women have a slightly higher literacy rate. We can also observe marked differences and variation in literacy rates among the different states.

% of Men And Women Surveyed

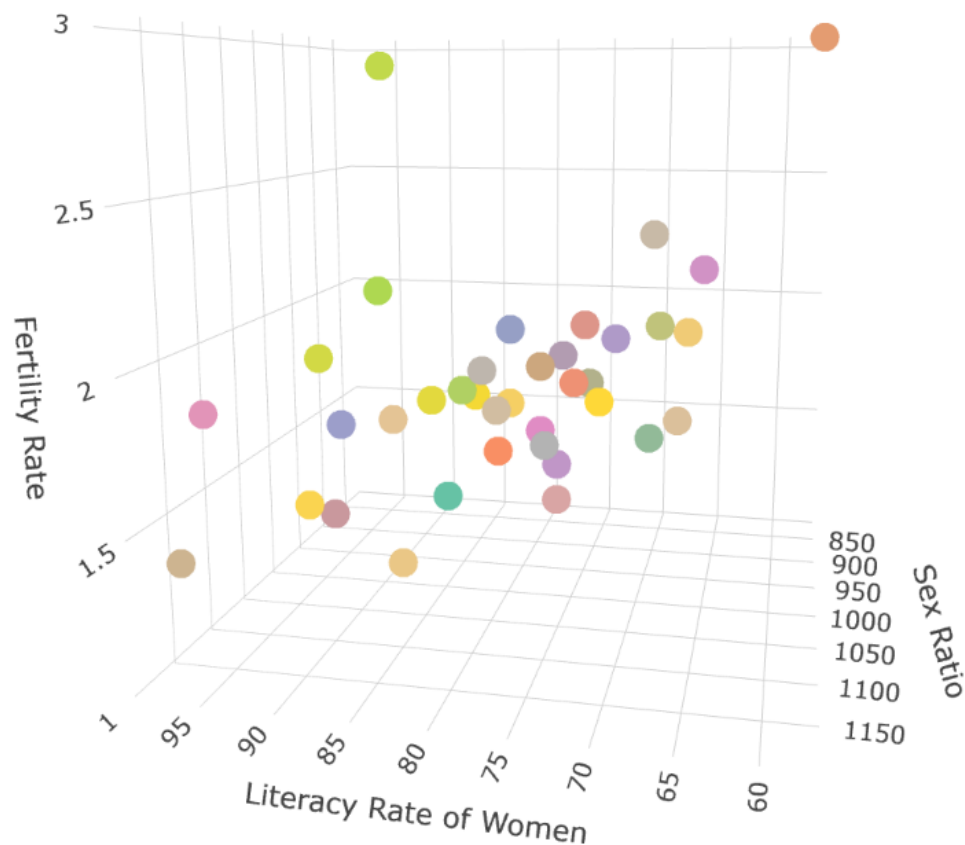


The number of men surveyed are less so the data may not give a good representation of male statistics.

Q. Based upon the given dataset, find which states/uts may have a higher chance of female foeticide/killing of newborn females. Does education have a role to play in female foeticides?

The states having higher fertility rates but low gender ratios are more susceptible to female foeticides. A higher fertility rate implies that enough infants are being born in a state but a low gender ratio means that some infants are being killed thereby decreasing the gender ratio.

We can show the relationship between gender ratio, fertility rate as well as literacy rate using a 3d scatter plot:

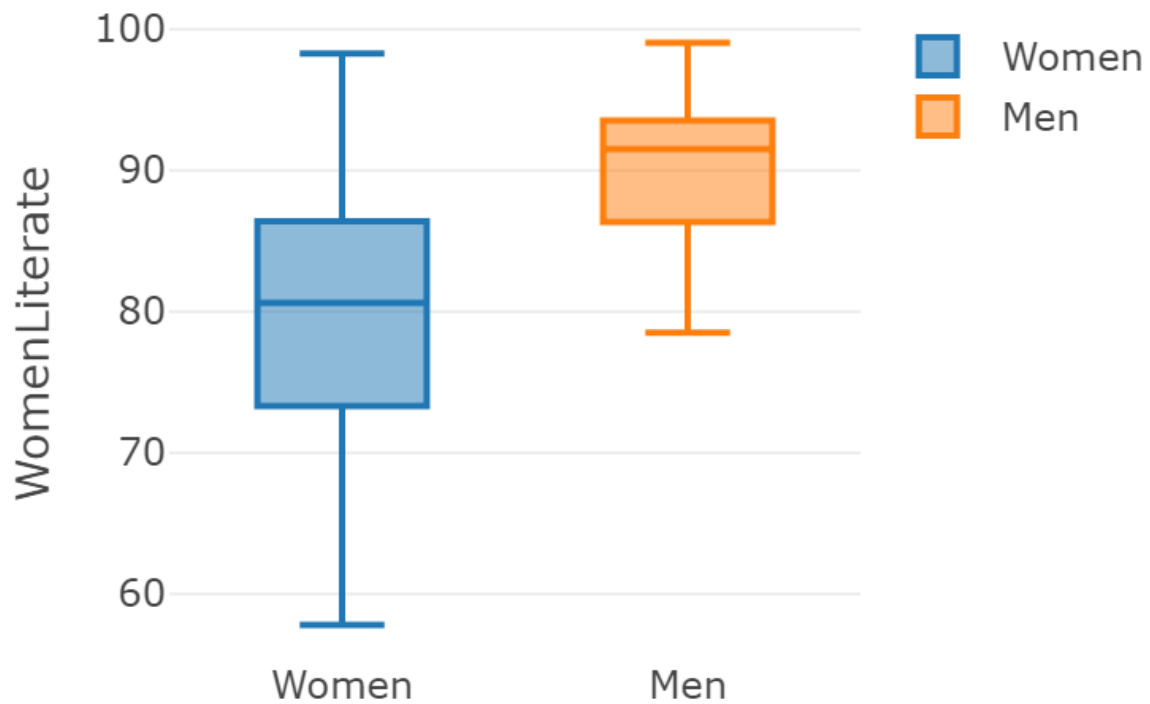


[Link to the 3d Interactive Scatter Plot](#)

It can be seen that Gujarat, Haryana, Arunachal Pradesh, and Madhya Pradesh have comparatively higher fertility rates and lower sex ratios. Also, the literacy rate of these states is relatively lower than other states so yes education may have a role in female foeticides/killing of the newborn girl child.

Q. What is the variability in the literacy rate of men and women?

By plotting a box plot we can visualise the variability in literacy rates of men and women statewise.



We can observe that men have less variation in literacy rates and a higher median than women. This can be explained due to the fact that in some states women don't have access to education as much as men do. This can be due to various reasons such as the patriarchal mindset of society.

Q. Does higher men and women literacy rates result in less underage marriages?

To answer this question we first need to find the necessary attributes which are:

Interviewed men that are Literate

Interviewed women that are Literate

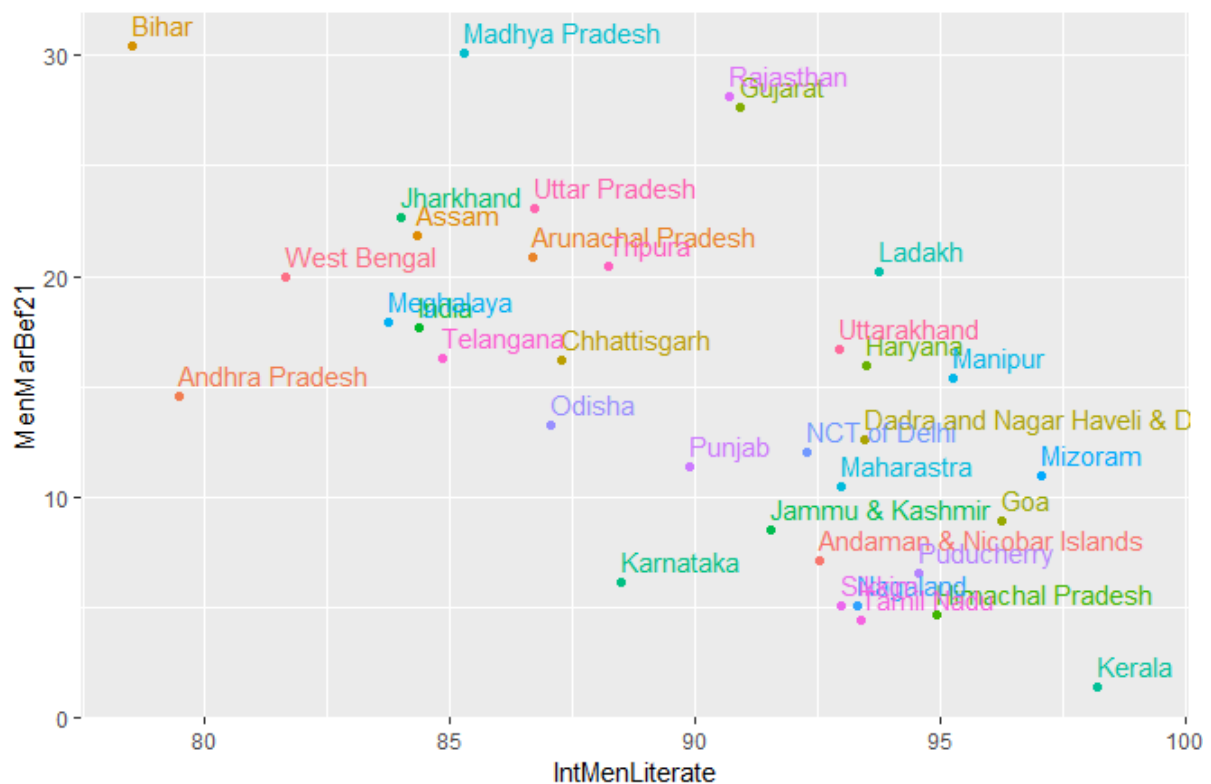
Percentage of Women aged 20-24 years married before 18 years of age

Percentage of Men aged 25-29 years married before 21 years of age

Now we plot the above attributes on a scatter plot to get the relationship between them.

Plot 1:

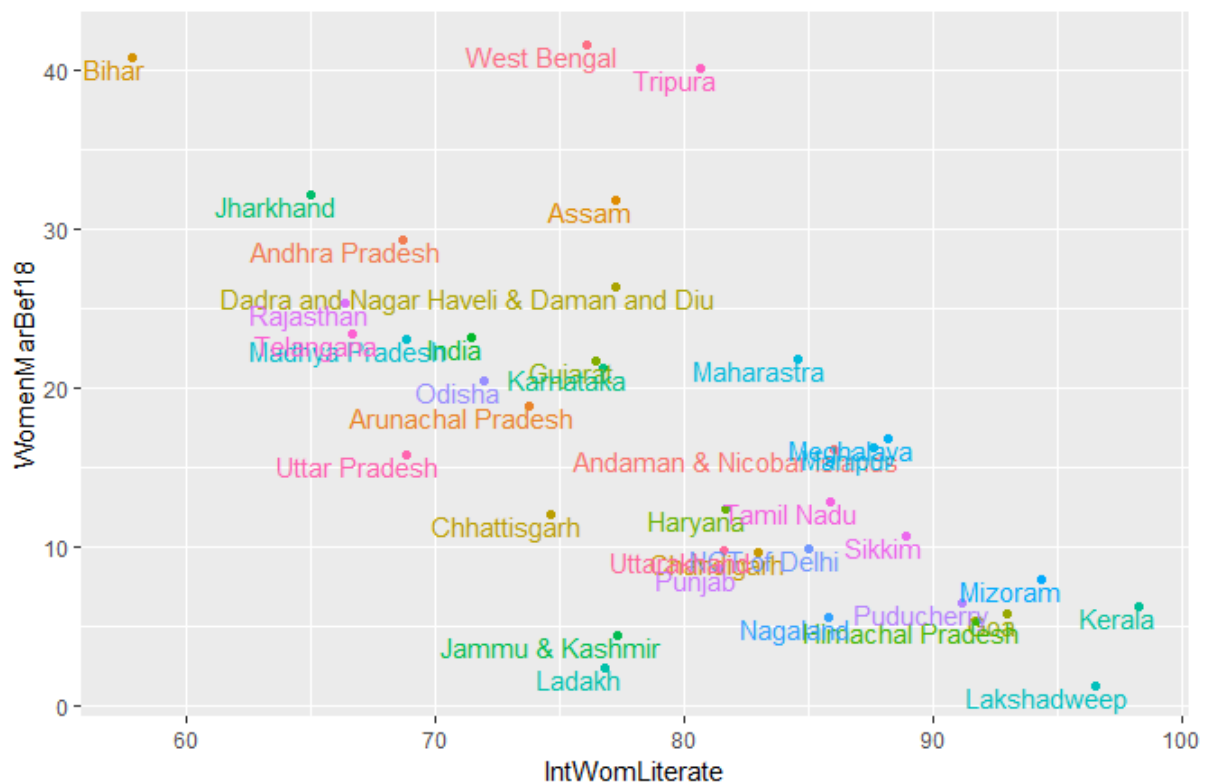
Interviewed men that are Literate vs Percentage of Men aged 25-29 years married before 21 years of age:



From Above scatter plot we can definitely see a trend of higher education leading to lesser underage marriages. Best example of this being Kerala where Men literacy is very high with Men married before 21 is also the lowest.

Plot 2:

Interviewed women that are Literate vs Percentage of Women aged 20-24 years married before 18 years of age:



Again we see a similar trend as the men literacy scatter plot. Here both Kerala and Lakshadweep have high women literacy and lower count of women married before the age of 18.

More Interesting things we can conclude from the above scatter plot is that Bihar has the lowest percentage of Men and Women literacy in India with Men being less than 80% and Women being less than 60% literate and highest underage marriages.

Conclusion:

There is indeed a good negative correlation between literacy rate and number of people married before legal age. We can conclude that better education

provides good opportunity and better mindset to both men and women thus leading to lower under age marriages.

Q. For each state how many women who have ever attended school have also had schooling of more than 10 years?

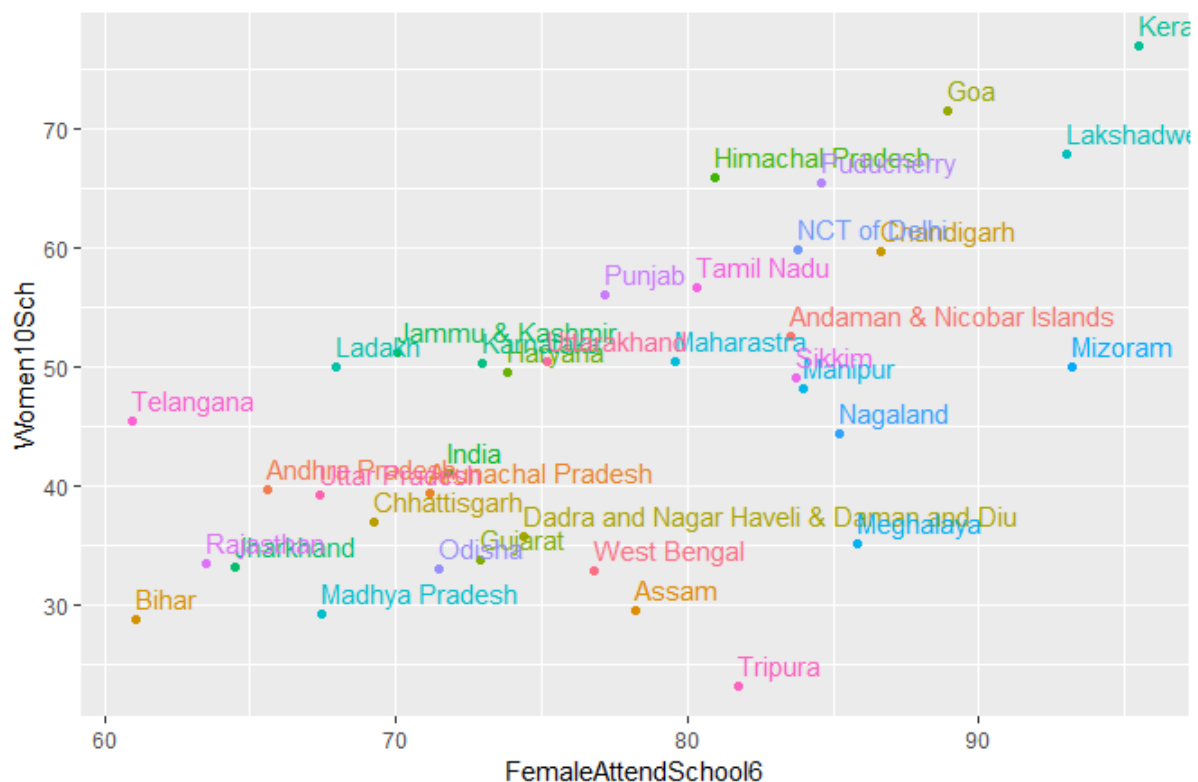
Attributes used:

Percentage of Female population aged 6 years and above who have ever attended school

Percentage of Women (aged 15-49) with 10 or more years of schooling

To answer the above question we build a scatter plot of the above attributes to see if a state has more percentage of females attending school as well as a high percentage of females who have more than 10 years of education.

Plot 1:



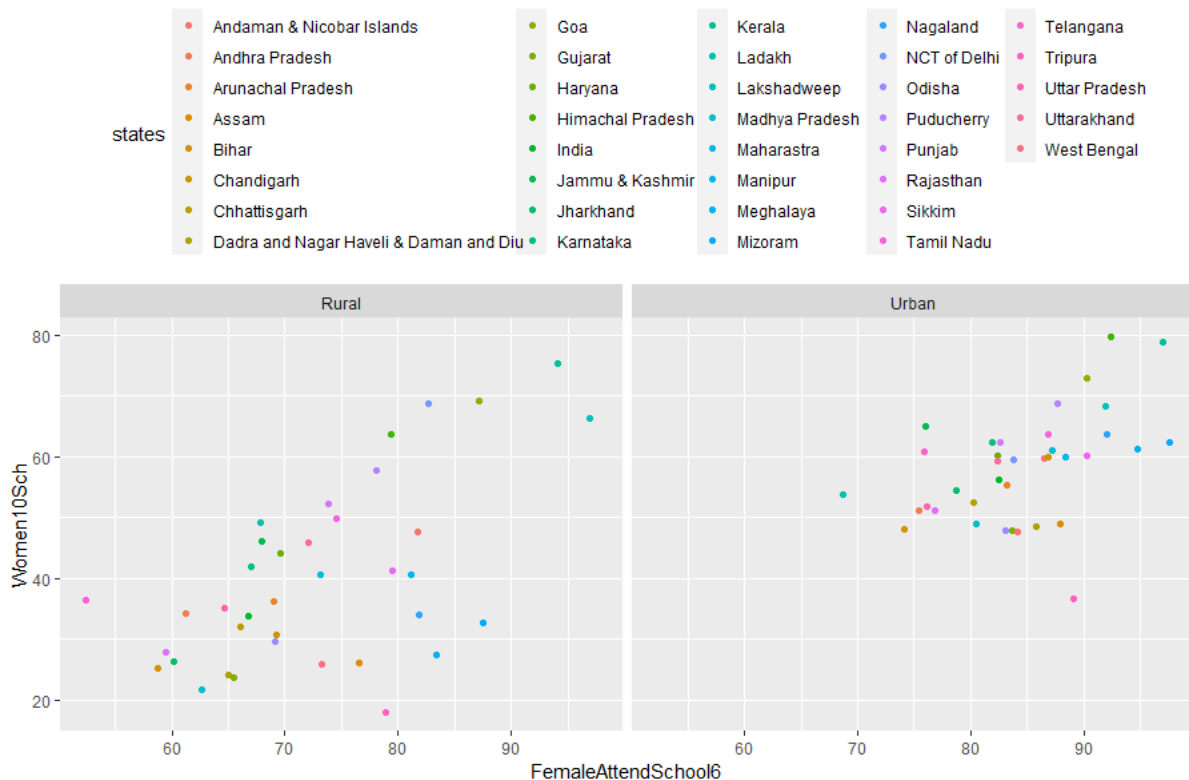
Again we observe Kerala being the state with the highest count of females ever attending school and also having more than 10 years of schooling.

We can see from the plot even though Kerala has more than 90 percent of females ever attending school but still the females who have more than 10 years of schooling is only above 75%. And other states are lower on both

attributes. This shows that even though a lot of women attend school, not many are able to continue studying to have more than 10 years of schooling.

We can analyse this situation further by looking at Rural and Urban area data separately.

Plot 2:

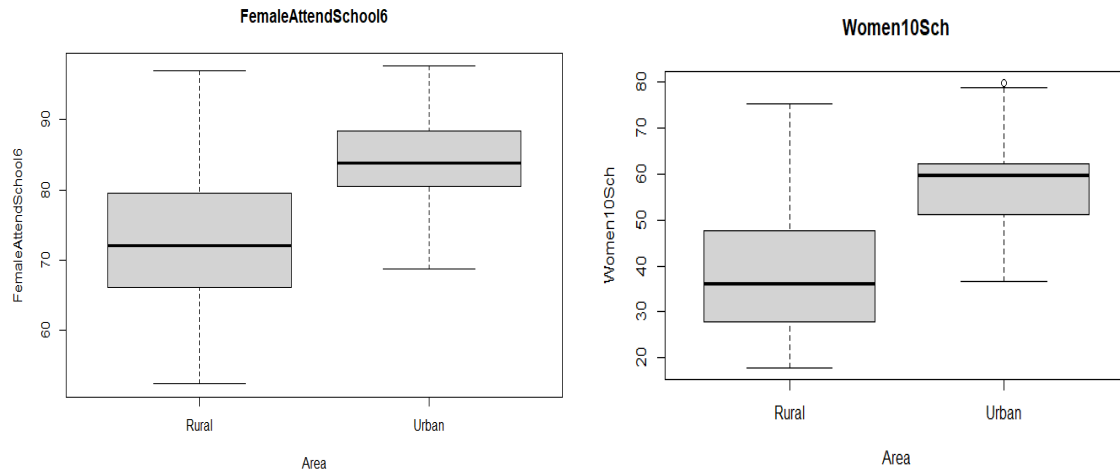


Observations:

Rural areas have a lower percentage of females ever attending school than urban areas.

Further notice that Urban areas form a tighter cluster. Urban areas data is higher in both females ever attending school and females having more than 10 years of schooling. But for rural areas it is more spread out. We can conclude that Urban areas provide a better environment for females to pursue higher education.

We can further explore above observations using boxplot and other methods:



Mean of female ever attending school after 6 years:

Urban : 84.45486

Rural : 72.90486

Mean of female having more than 10 year of education:

Urban : 58.15297

Rural : 40.04757

Standard deviation of female ever attending school after 6 years:

Urban : 6.58464

Rural : 10.07965

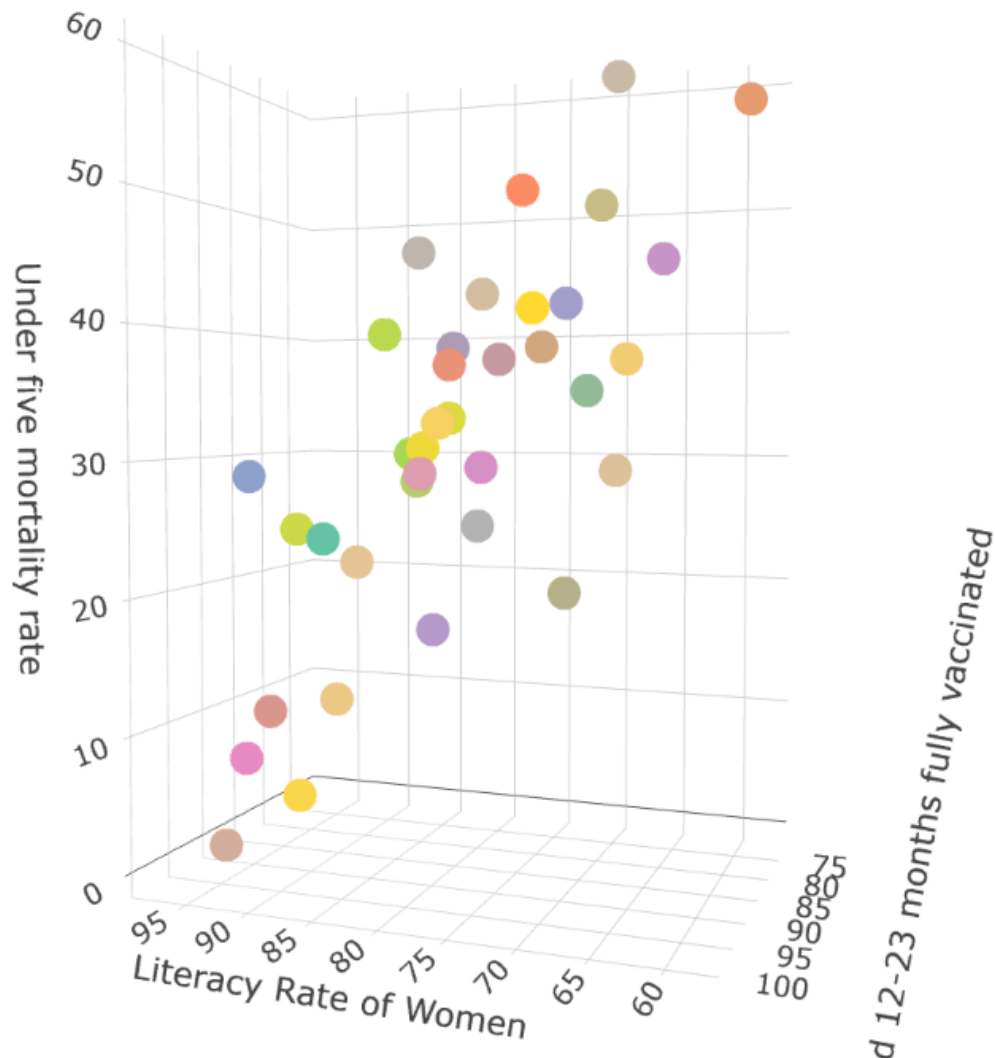
Standard deviation of female having more than 10 year of education:

Urban : 8.978419

Rural : 14.81914

From above data we can see that the mean, median of both attributes is greater in urban areas than rural areas. Furthermore rural areas also have high standard deviation for both attributes thus percentages are more spread out in rural areas.

Q. What impact does the education of parents have on the health of their newborn children?



[Link to the 3d Scatter Plot](#)

We can observe by drawing a 3d scatter plot that as the literacy rate increases the percentage of fully vaccinated children increases thereby decreasing the mortality rate. Thus we can conclude that better education leads to increased health awareness in parents with regard to their children and increased parental care.

Conclusion:

In the end, we can conclude that education and literacy rate does have significant impact on various societal indicators like total fertility rate, domestic violence, underage marriages and child mortality rate.

So the best way to lead our country to a better future would be to increase educational opportunities for both men and women. And despite modernization in various aspects of society, we see that women literacy rate and similar attributes are still lower than that of men.

Therefore, it will be better to focus on increasing educational opportunities for women.

Furthermore, there is still a drastic difference between education received by people of rural and urban areas of India. Although as a country we have come very far but there is still a long distance to cover in terms of education.

Citations and references:

Dataset:

<https://data.gov.in/resource/all-india-and-stateut-wise-factsheets-national-family-health-survey-nfhs-5-2019-2021>

NFHS-5 Factsheet

http://rchiips.org/nfhs/NFHS-5_FCTS/India.pdf

Libraries used:

Plotly library- <https://plotly.com/r/>