Milestone 3

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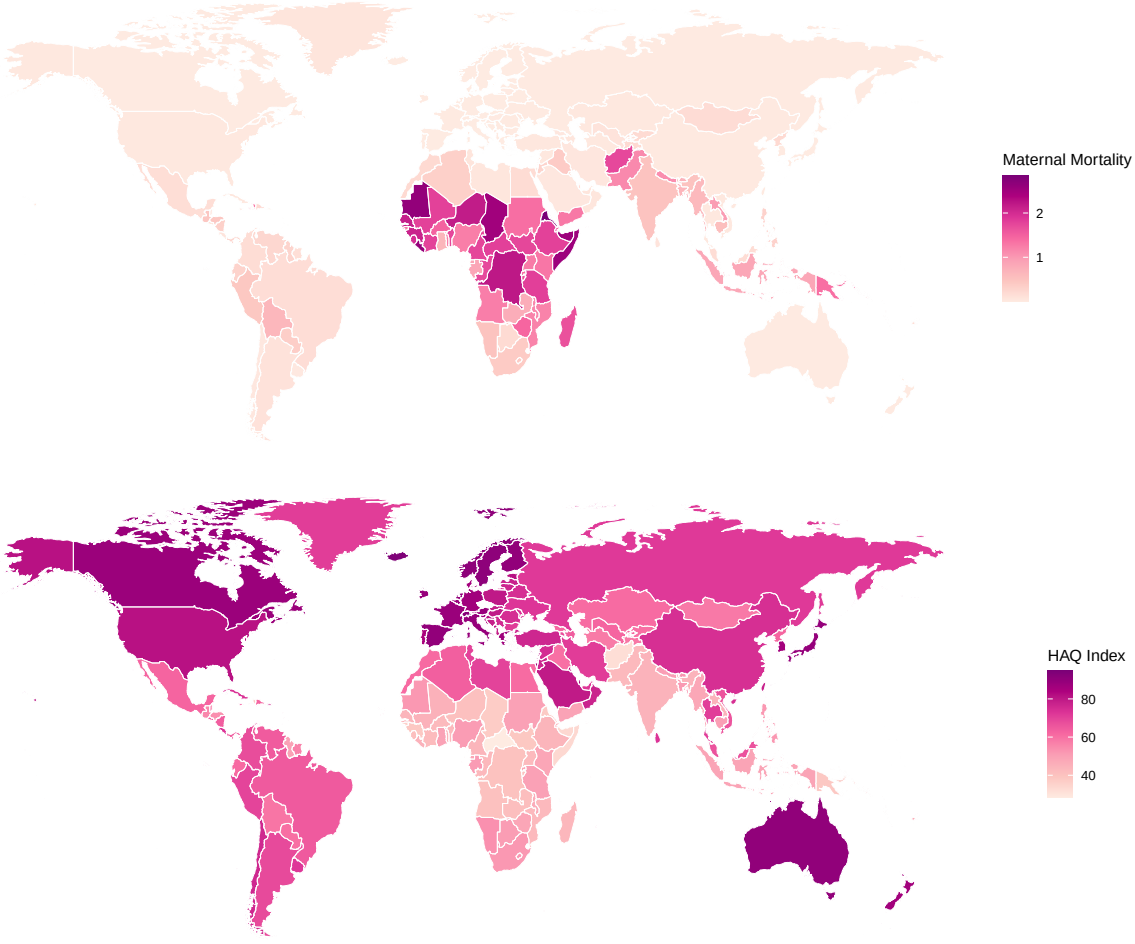
What Influences the Decision to Have or Not Have Children?

There are many reasons why women all over the world choose not to become pregnant and have children. Across different geographies, populations, and cultures, these reasons may be financial, social, physical or otherwise. This report aims to help visualize the reasons why women may not want to have children or become pregnant.

Maternal Mortality Rate and HAQ* Index by Country



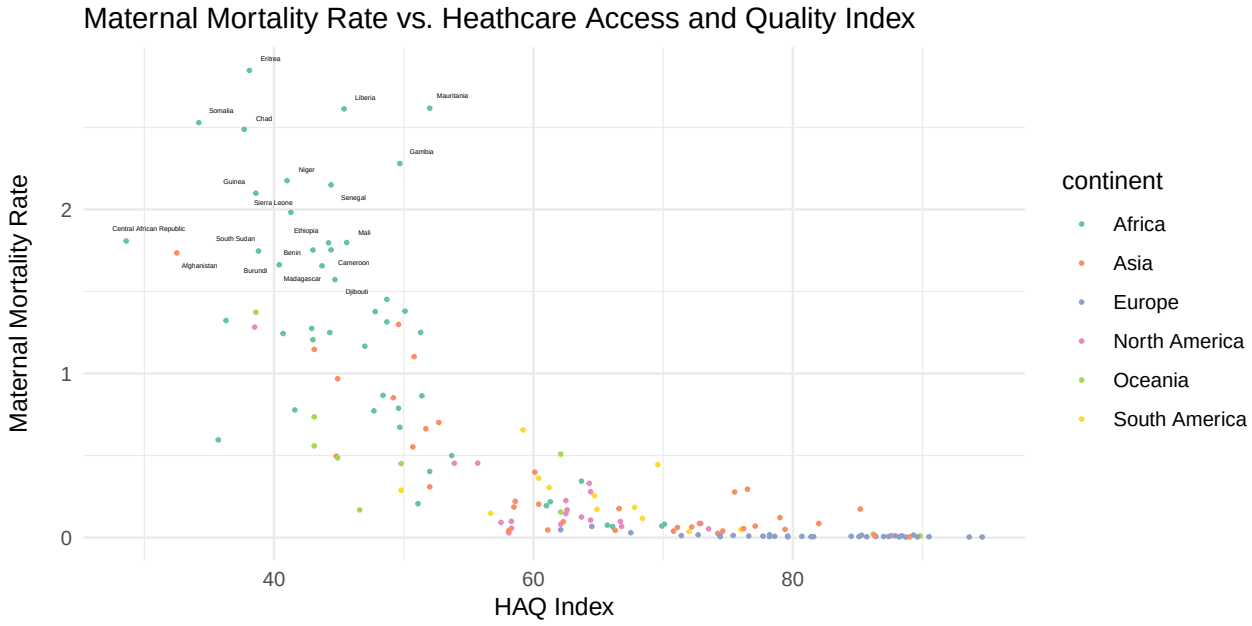
*HAQ stands for Healthcare Access and Quality

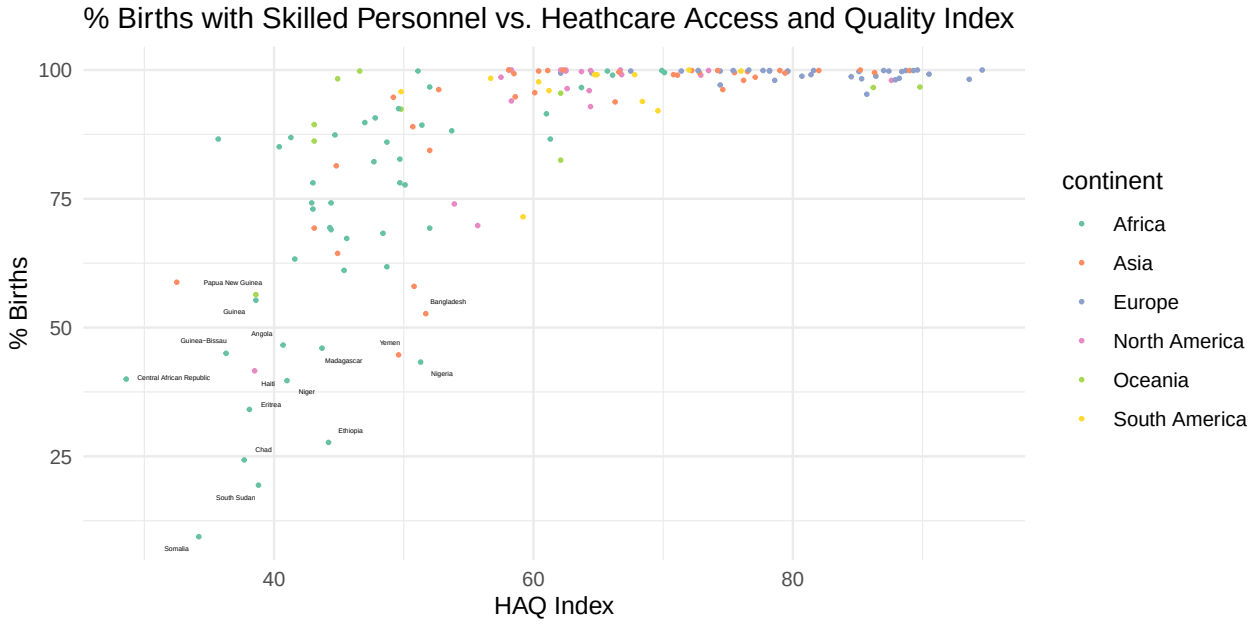
Access to Quality Healthcare

Though maternal health outcomes are improving by the day, huge disparity still exists in different areas of the world. Lower- and middle-income countries do not have the same access to quality healthcare facilities or medical professionals as upper-income countries.

The world maps shows how countries with lower Healthcare Access and Quality (HAQ) Indexes (represented by a lighter pink) are largely also associated with higher maternal mortality rates (represented by larger circles). The largest circles are also the lightest pinks, whereas the dark pink circles are much less perceptible.

The relationship between HAQ Index and Maternal Mortality Rate is also shown in the following scatterplot. Additionally, the relationship between HAQ Index and Birth Attendant Skill is also explored. Birth Attendant Skill refers to the percentage of births that were attended by skilled medical professionals.





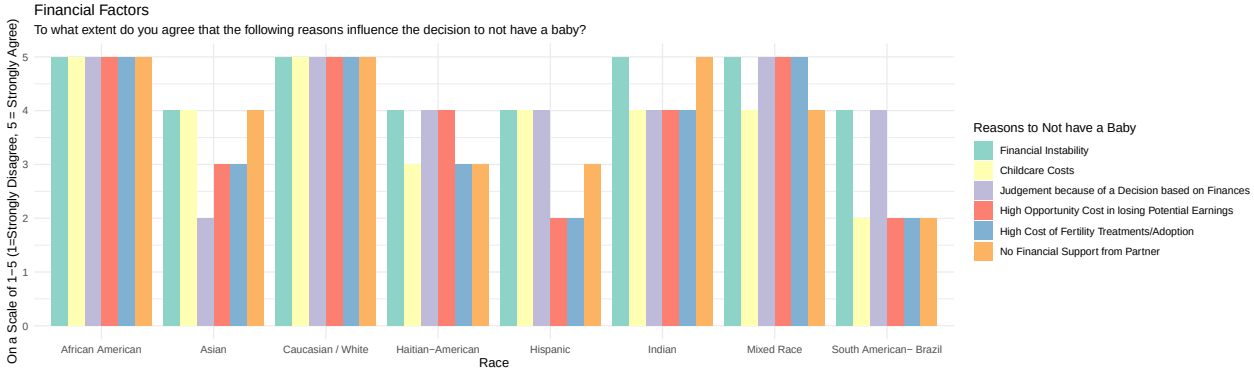
Both plots show how lower quality healthcare and limited access to it is related to both factors influencing birth outcomes (% skilled attendants) as well as the outcomes themselves (maternal mortality).

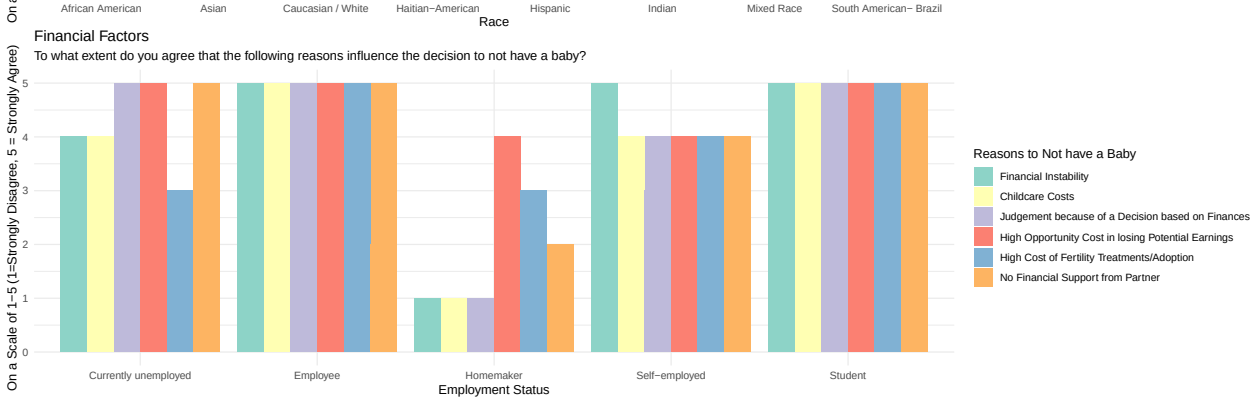
These factors and outcomes are oftentimes geographically linked. The following barplots show how countries from similar regions, like Western Africa (Chad, Gambia, Nigeria, Senegal), are affected by a low number of births attended by skilled personnel as well as high mortality rates.

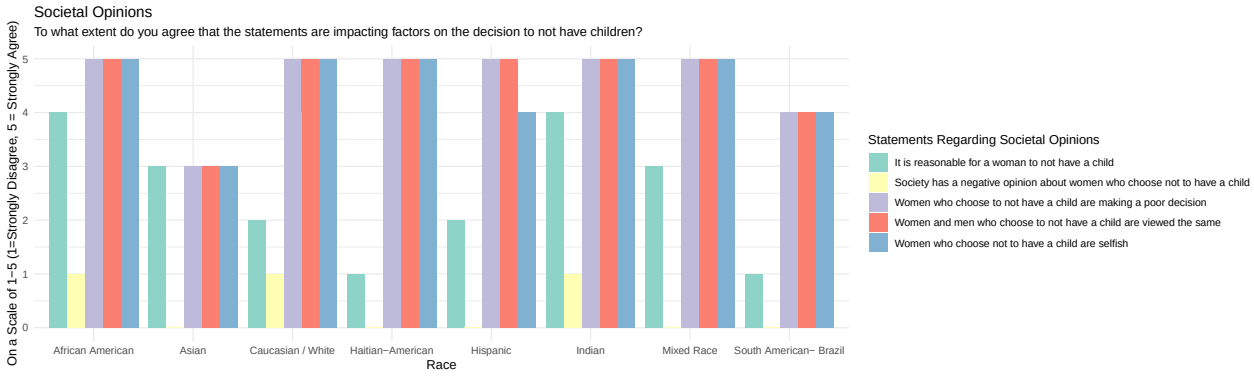
Social Attitudes Towards not Having Children

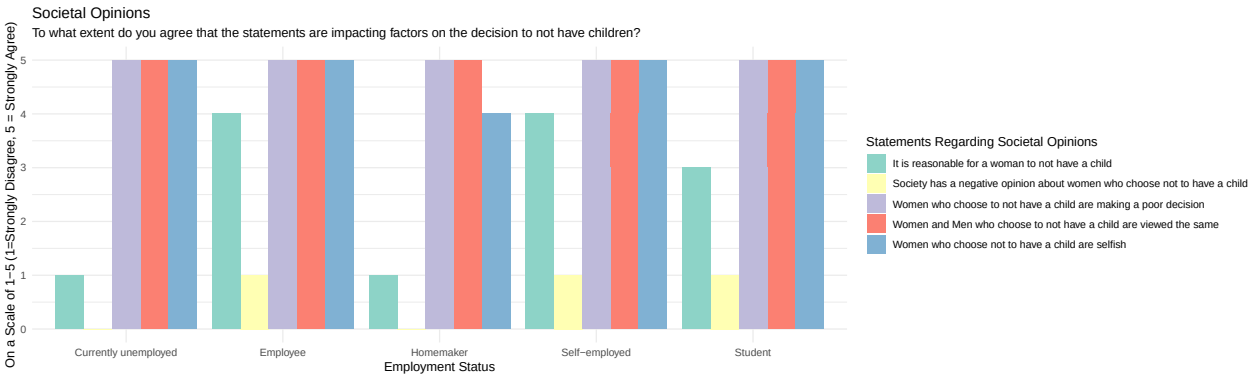
The Survey Data

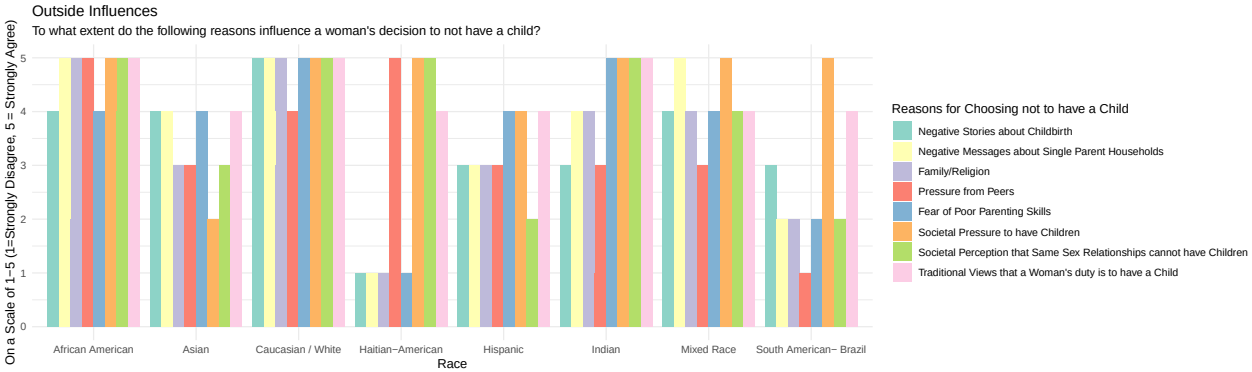
The following graphs visualize data from surveys to track societal attitudes towards having children. The survey data included the extent to which they agreed to various statements regarding societal attitudes towards having children.

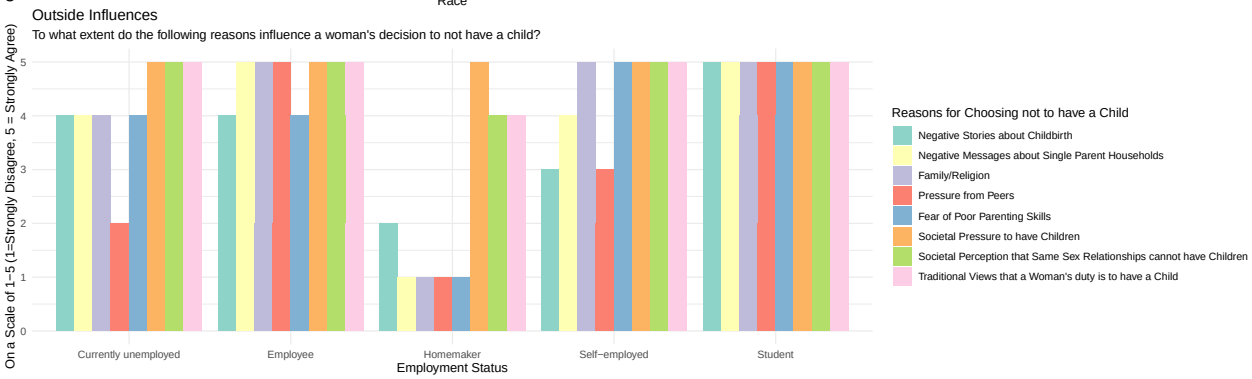







Societal Opinions
To what extent do you agree that the statements are impacting factors on the decision to not have children?
On a Scale of 1−5 (1=Strongly Disagree, 5 = Strongly Agree)
0
1
2
3
4
5
Currently unemployed
Employee
Homemaker
Self−employed
Student
Employment Status
Statements Regarding Societal Opinions
It is reasonable for a woman to not have a child
Society has a negative opinion about women who choose not to have a child
Women who choose to not have a child are making a poor decision
Women and Men who choose to not have a child are viewed the same
Women who choose not to have a child are selfish


Outside Influences
To what extent do the following reasons influence a woman's decision to not have a child?
On a Scale of 1−5 (1=Strongly Disagree, 5 = Strongly Agree)
0
1
2
3
4
5
African American
Asian
Caucasian / White
Haitian−American
Hispanic
Indian
Mixed Race
South American− Brazil
Race
Reasons for Choosing not to have a Child
Negative Stories about Childbirth
Negative Messages about Single Parent Households
Family/Religion
Pressure from Peers
Fear of Poor Parenting Skills
Societal Pressure to have Children
Societal Perception that Same Sex Relationships cannot have Children
Traditional Views that a Woman's duty is to have a Child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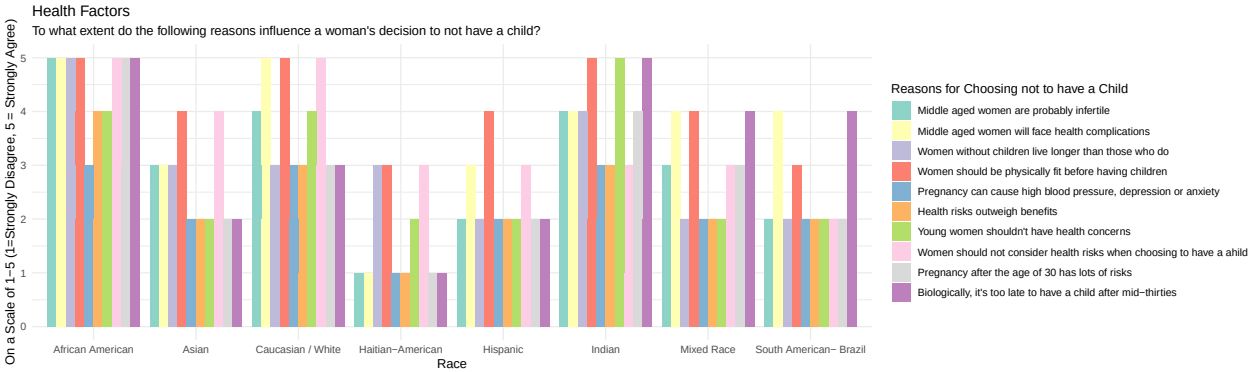
Health Factors
To what extent do the following reasons influence a woman's decision to not have a child?
On a Scale of 1−5 (1=Strongly Disagree, 5 = Strongly Agree)
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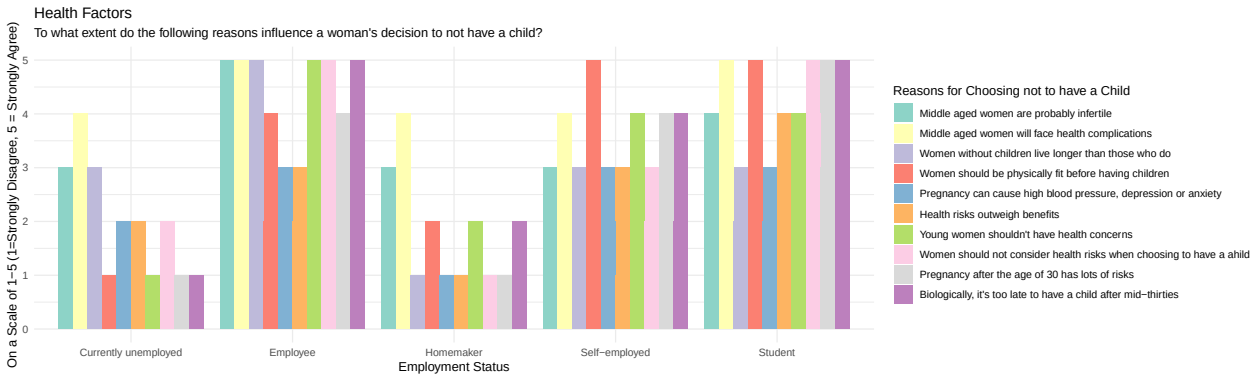
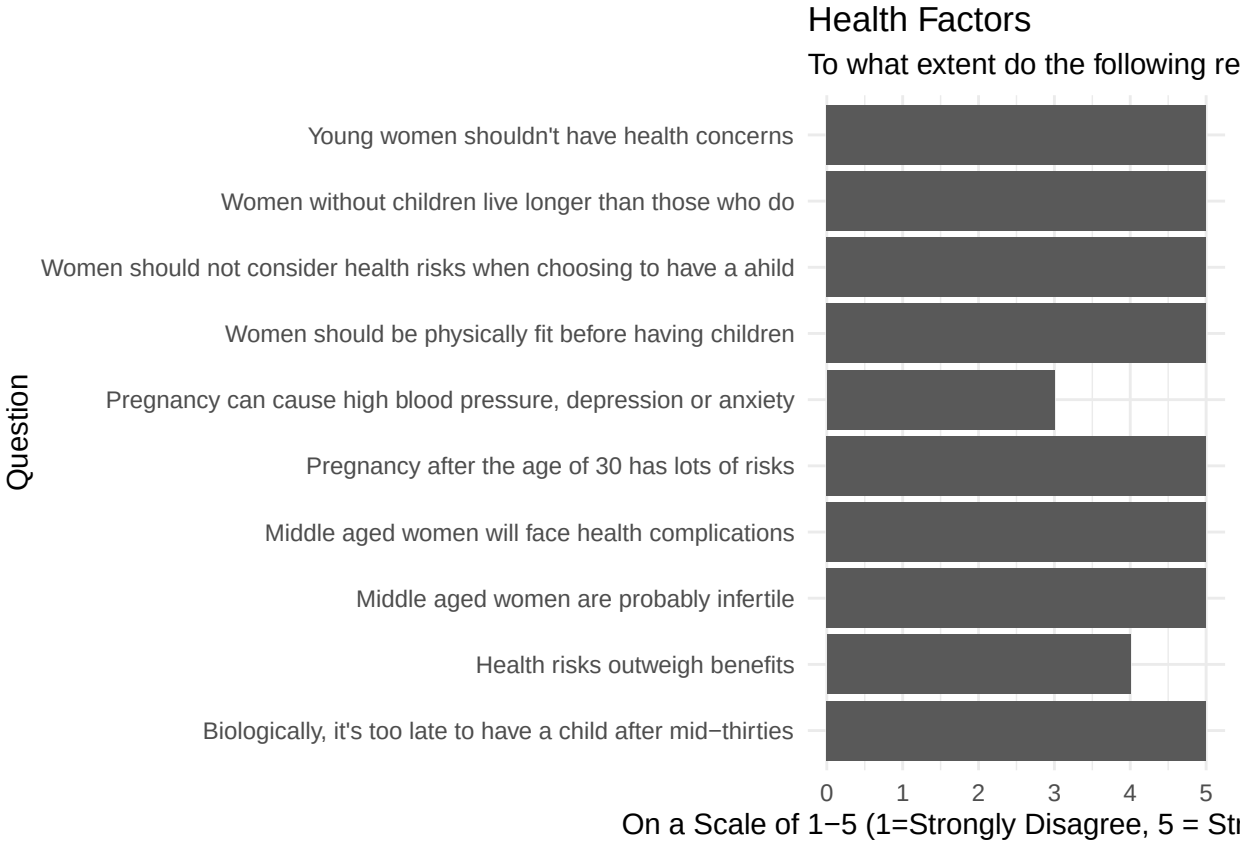
1
2
3
4
5
African American
Asian
Caucasian / White
Haitian−American
Hispanic
Indian
Mixed Race
South American− Brazil
Race
Reasons for Choosing not to have a Child
Middle aged women are probably infertile
Middle aged women will face health complications
Women without children live longer than those who do
Women should be physically fit before having children
Pregnancy can cause high blood pressure, depression or anxiety
Health risks outweigh benefits
Young women shouldn't have health concerns
Women should not consider health risks when choosing to have a ahild
Pregnancy after the age of 30 has lots of risks
Biologically, it's too late to have a child after mid−thirties





There are a few notable observations about factors that influence an individual's decision to not have a child. The first is that African Americans and Caucasian/White populations as well as students and those who are employed believe that financial factors have a large influence. This makes sense since these populations make a large part of the US population. Students who need to pay for school and people employed making an average salary also need to consider finances. Moreover, all groups felt that societal opinions have a large influence. When looking at outside influences, Indians believe factors like societal pressure and traditions are significant, a group that typically follows tradition. Furthermore, students also believed that these outside influences play a large role. This is an indication of the generational difference in caring what others think. Finally, with health risks, students and those who are employed felt that health risks are a large influence. This makes sense since students are young and care about living a long, healthy life and those who are employed must focus on health insurance from employers. Moreover, African Americans most strongly believe that health risks have a large influence. This is expected given the medical history of African Americans being discriminated against in hospitals.

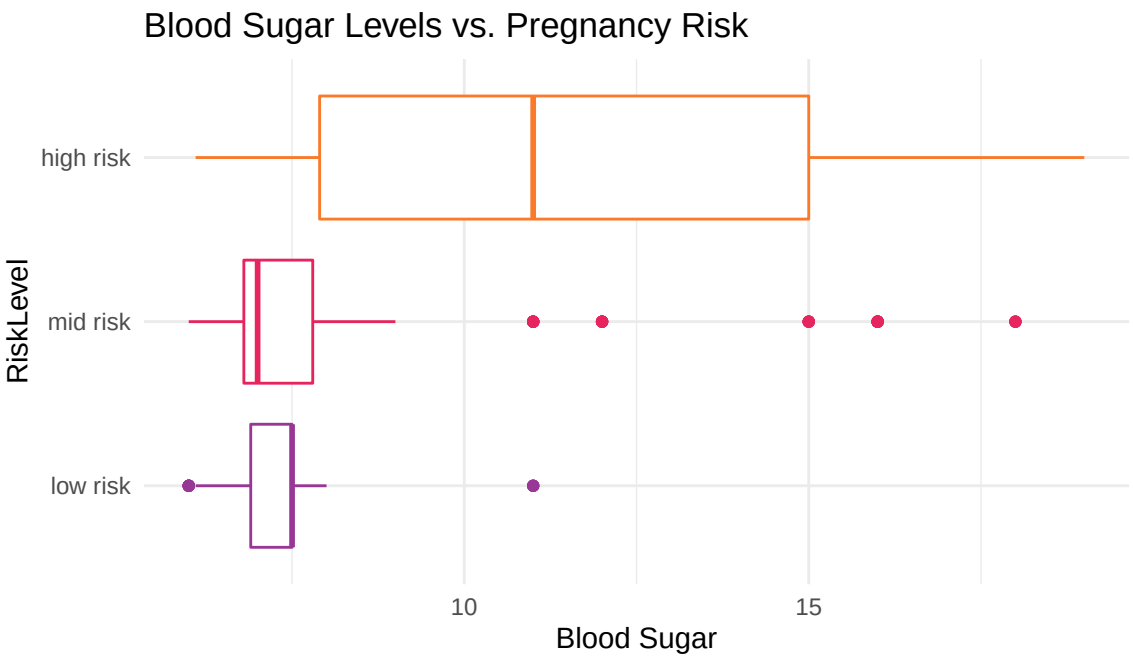
Health Risks Associated with Pregnancy

We examine how each factor is correlated in the matrix below.

```
##                     Age  SystolicBP DiastolicBP         BS    BodyTemp
## Age          1.00000000  0.41729214   0.3982341  0.4732994 -0.25663966
## SystolicBP   0.41729214  1.00000000   0.7871984  0.4254390 -0.28636626
## DiastolicBP  0.39823412  0.78719835   1.0000000  0.4238029 -0.25770201
## BS           0.47329943  0.42543897   0.4238029  1.0000000 -0.10376457
## BodyTemp    -0.25663966 -0.28636626  -0.2577020 -0.1037646  1.00000000
## HeartRate    0.06772672 -0.01832823  -0.0515417  0.1493514  0.09774947
## RiskLevel    0.26561788  0.39776788   0.3468261  0.5700965  0.16317726
##                HeartRate RiskLevel
## Age          0.06772672 0.2656179
## SystolicBP  -0.01832823 0.3977679
## DiastolicBP -0.05154170 0.3468261
## BS           0.14935140 0.5700965
## BodyTemp     0.09774947 0.1631773
## HeartRate    1.00000000 0.1903341
## RiskLevel    0.19033410 1.0000000
```

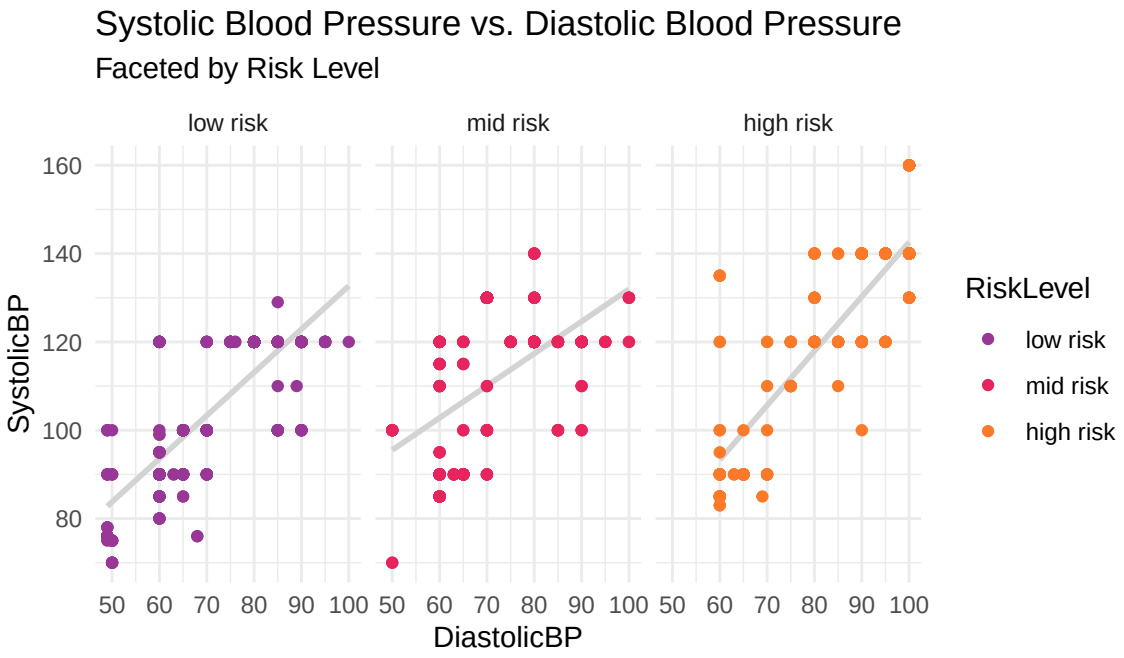
Since we are exploring what may influence maternal risk levels, we choose the three factors with the strongest relationships with risk as indicated by the correlation matrix: blood sugar, systolic and diastolic blood pressure, and age. We explore each of these relationships below.

To examine blood sugar values associated with the three levels of risk, we create a box plot.



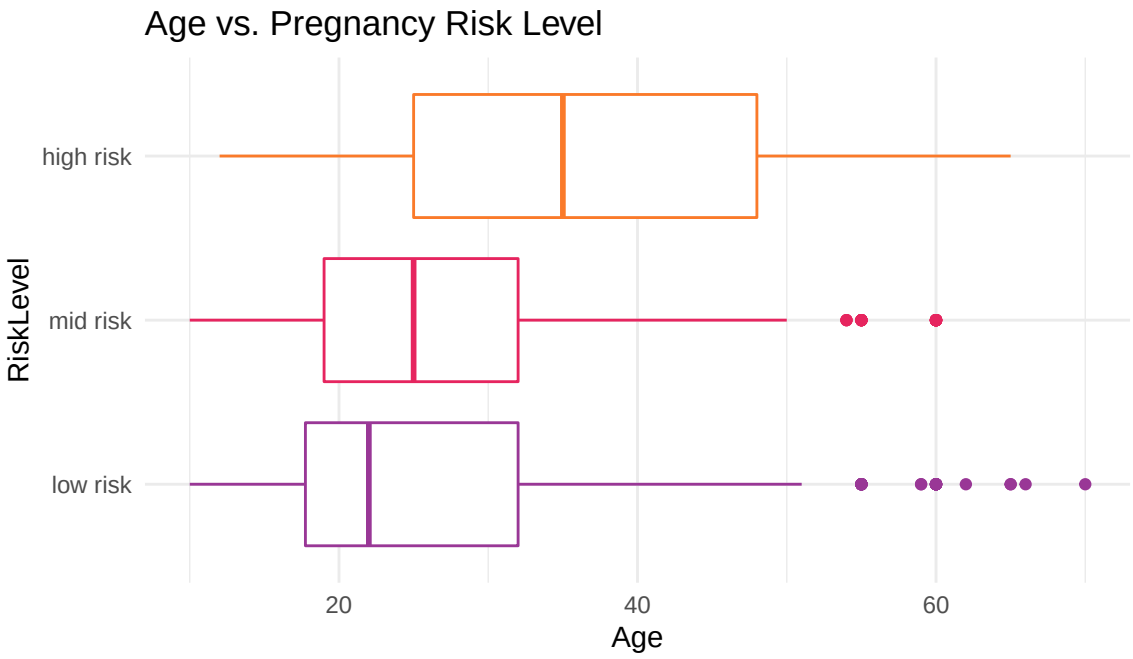
It is clear that higher blood sugar levels are correlated with higher pregnancy risk levels, as the high risk box plot has a much larger average and variance. This does not necessarily indicate cause, but does confirm the relatively large correlation value between blood sugar and risk level (0.47329943) seen in the correlation matrix.

Next, we examine blood pressure (both Systolic and Diastolic) and risk.



It is again clear that high values of these indicators correlates with increased pregnancy risk, though this correlation appears to be slightly weaker than blood sugar. This also confirms the direct relationship between Systolic and Diastolic blood pressure levels predicted in the correlation matrix, as indicated by the trend lines.

Finally, we examine age.



Age appears to be directly correlated with risk level. This is expected, as it is commonly assumed that older mothers are likely to have riskier pregnancies. There are some major outliers, however, that indicate that age is not the sole cause of increased risk. For example, there are several mothers over the age of 60 who are still classified as low risk.

It is important to consider how age might correlate with the other factors recorded in this data set, as it likely influences the other factors. In the above correlation matrix, age is positively correlated with every factor except body temperature, which we previously found to be of little influence on risk. Thus, age on its own may not be a cause of higher-risk pregnancies, but rather an older age is often linked with high values of other factors (blood sugar, blood pressure, etc.) that do increase maternal risk.

Improvements and Feedback

Some improvements that we plan on making for our final draft would be to make our whole report more cohesive and adding more to our analysis. While we tried to make our graphs related via similar color themes, we feel that we could do a little more to make them connect better, which helps with the overall theme of the report as well as making the visualizations more aesthetically pleasing. We also want to improve our analysis and work on connecting the three main sections a bit more.

The specific feedback that we would like for our project is ways in which to improve the cohesiveness of our paper and thoughts on how our overall question/topic is being addressed. We would appreciate any overall thoughts as well on how to improve our project, whether they be specific to the visualizations or about our topic as a whole.

References

Mock, Thomas. (2018). Global Mortality. Retrieved March 13, 2022 from https://github.com/rfordatascience/tidytuesday/tree/master/data/2018/2018-04-16.

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