CS108

RACE & MATERNAL MORTALITY

REGHAN LANNING

DATASET

- Created by the Centers for Disease Control and Prevention (CDC)
- Contains data from different states in the US
- Years and State have been modified so the data is de-identified
- Mat_Race listed as 3 (other) dropped from DataFrame (N=15)
- Categorical data grouped into relevant codes, created new columns in new DataFrame and data was appedned there
- New frame was grouped into White and Black mothers

DICTIONARY

Variable Name	Description (Coding)
Mat_Hispanic	Hispanic ethnicity (0=non-Hispanic, 1=Hispanic)
Preg_Related_Death	Did the maternal mortality review committee (MMRC) determine death was pregnancy related? (0=no, 1=yes)
Days_Delivery_to_Death	Days between delivery and death
Mat_Educ	Maternal education (1=less than high school, 2=high school graduate, 3=some college, 4=bachelor's degree, 5=post bachelors)
Married	Marital Status (0=not married, 1=married)
Manner_Death	What was the manner of death? (1=accident, 2=natural causes, 3=homicide, 4=suicide, 5=other)
Mat_Race	Mother's race (1=white, 2=black, 3=other)
Poor_Prev_Birth_Outc	Previous poor birth outcome (0=no, 1=yes)
Mat_Age	Mother's age, years
Prior_Abort	Prior abortion (0=no, 1=yes)
Prepreg_Subst_Use	Record of pre-pregnancy substance use? (0=no, 1=yes)
Pay_Source	Delivery Payer Source (1=self-pay, 2=private, 3=Medicaid)
WIC_Dur_Preg	Was mother in WIC program during pregnancy? (0=no, 1=yes)
Height	Height, inches
Prepreg_Wt	Pre-pregnancy weight, kg
Prepreg_BMI	Pre-pregnancy BMI, obese = 1, non-obese = 0
Num_Prev_Live_Birth	Number of previous live births
Year_Death	Year of death
Gest_Wt_Gain	Gestational weight gain, pounds
Delivery_Method	Method of delivery (1=spontaneous vaginal, 2=cesarean, 3=other)
Preterm_Del	Was it a preterm delivery? (0=no, 1=yes)

GOAL

Examine the effect of risk factors experienced by White and Black moms on likelihood of maternal morality (MM).

TASKS

1. Identify demographic information.
2. Analysis on risk factors of MM.
    - Education level
    - Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) while pregnant
    - Body Mass Index (BMI)
    - Maternal Age

HYPOTHESIS

Null: there is no relationship between risk factors (BMI, WIC, age, education) and mortality outcomes for White mothers and for Black mothers.

Research: there is a relationship between risk factors and mortality outcomes for White mothers and for Black mothers.

DEMOGRAPHICS

```
Table 1: Summary of Subject Characteristics
(N=375).
Race
White    279
Black     96
Name: count, dtype: int64
Maternal Mortality
No     251
Yes    124
Name: count, dtype: int64
Hispanic
No     335
Yes     40
Name: count, dtype: int64
Education
Low     227
High    148
Name: count, dtype: int64
BMI
Average    239
Obese      136
Name: count, dtype: int64
WIC
Yes    206
No     169
Name: count, dtype: int64
Age
Average Age                315
Advanced Age/ Geriatric     60
Name: count, dtype: int64
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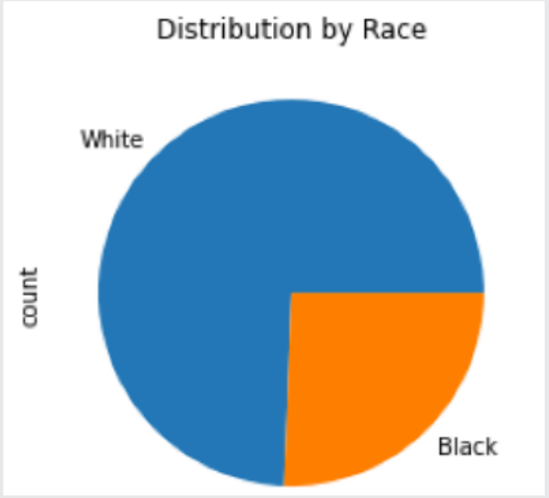
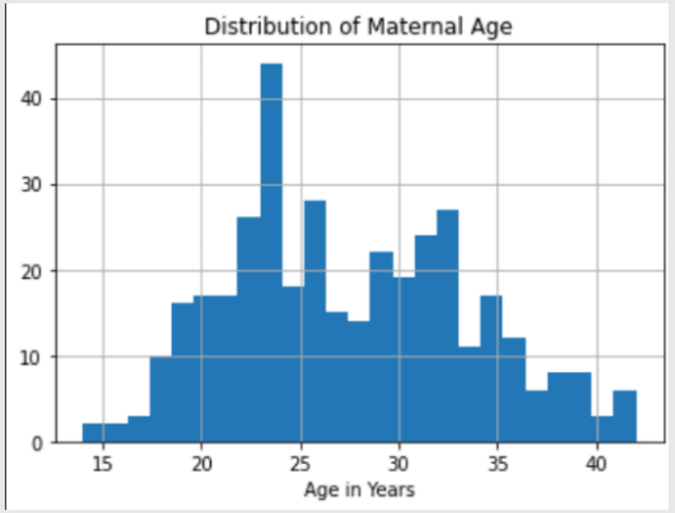
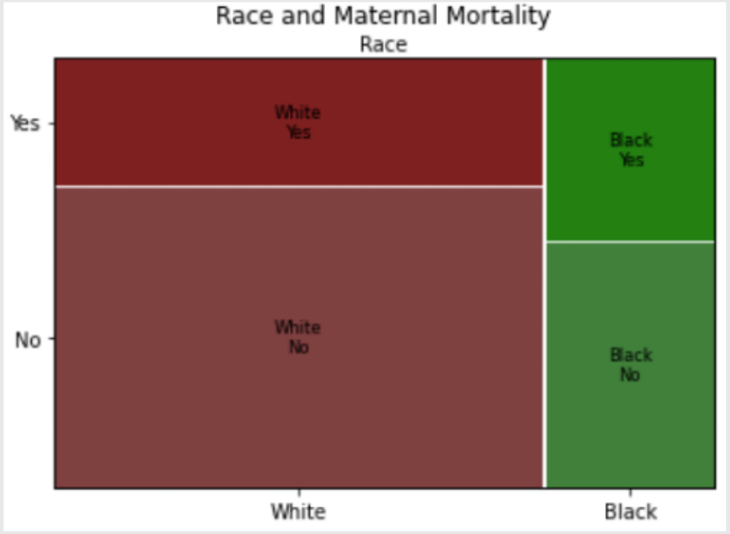


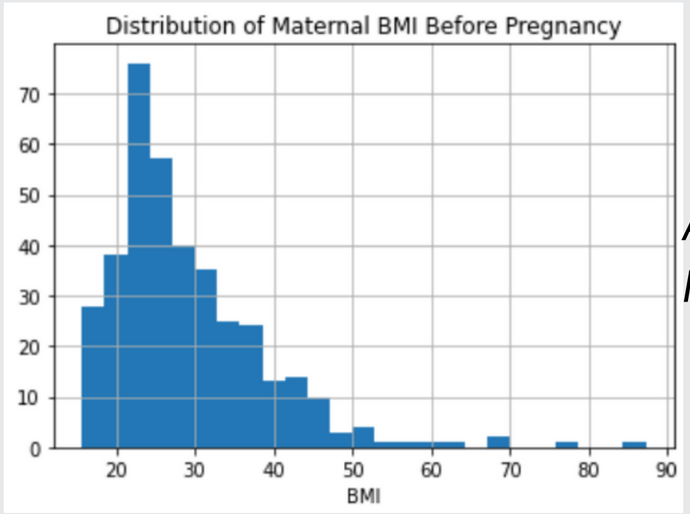
71.54% *of the mothers are White. 24.62% of the mothers are Black*



Average age of **27**
Min: **14**, *Max*: **42**



Proportion of Deaths from a pregnancy-related cause, by race:
White: **29.75%** (N=83)
Black: **42.71%** (N=41)



Average BMI of **29**
Min: **16**, *Max*: **87**

RESULTS

CHI-SQUARED TESTS FOR INDEPENDENCE

Chi-Squared Test of Independence for White Moms:

Maternal Mortality	No	Yes	All
Education			
High	25.09	14.34	39.43
Low	45.16	15.41	60.57
All	70.25	29.75	100.00

	Chi-square test	results
0	Pearson Chi-square (1.0) =	3.8017
1	p-value =	0.0512
2	Cramer's phi =	0.1167

Significant Association for White moms:

Education and WMM (*V=0.1167, p=0.0512)*, **Moderate**.

Maternal Mortality

Maternal Mortality	No	Yes	All
BMI			
Average	31.25	14.58	45.83
Obese	26.04	28.12	54.17
All	57.29	42.71	100.00

	Chi-square test	results
0	Pearson Chi-square (1.0) =	3.9372
1	p-value =	0.0472
2	Cramer's phi =	0.2025

Maternal Mortality

Maternal Mortality	No	Yes	All
Age			
Advanced Age/ Geriatric	6.25	13.54	19.79
Average Age	51.04	29.17	80.21
All	57.29	42.71	100.00

	Chi-square test	results
0	Pearson Chi-square (1.0) =	6.4007
1	p-value =	0.0114
2	Cramer's phi =	0.2582

Significant Association for Black moms:

BMI and BMM *(V=0.2025, p=0.0472<0.05)*, **Strong**

Age and BMM *(V=0.2582, p=0.0114<0.05)*, **Very Strong**

OLS REGRESSIONS

Regression plots serve as poor indicators of correlation for categorical variables, but r-squared value can add additional insights to data

Education and WMM

R^2 = 0.288

Approximately 28.8% of variability observed in White maternal mortality can be attributed to the education levels.

BMI and BMM

R^2 = 0.264

Approximately 26.4% of the variability observed in Black maternal mortality can be attributed to BMI before pregnancy.

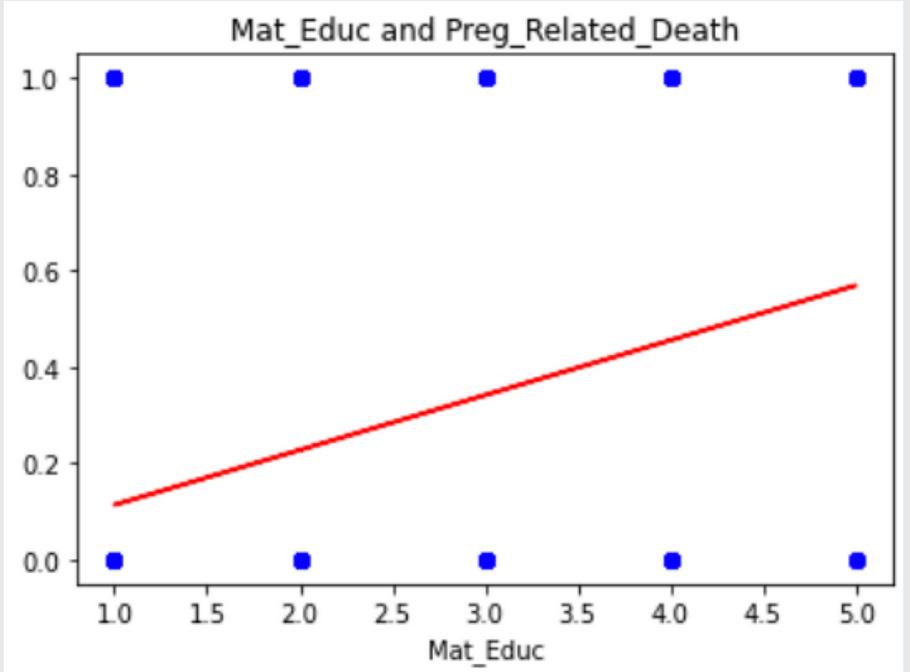
Age and BMM

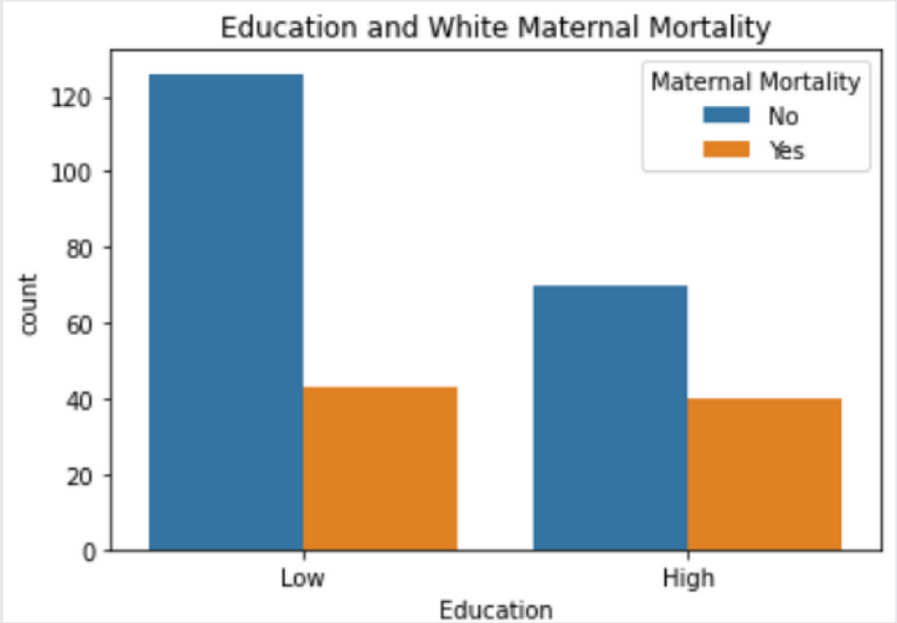
R^2 = 0.301

Approximately 30.1% of the variability observed in Black maternal mortality can be attributed to maternal age.

WHITE MOTHERS: EDUCATION AND MORTALITY

- *Smallest proportion of White moms: high education levels experiencing maternal death, with N = 40*
- *Largest proportion of White moms: low education levels not experiencing maternal mortality, with N=123*

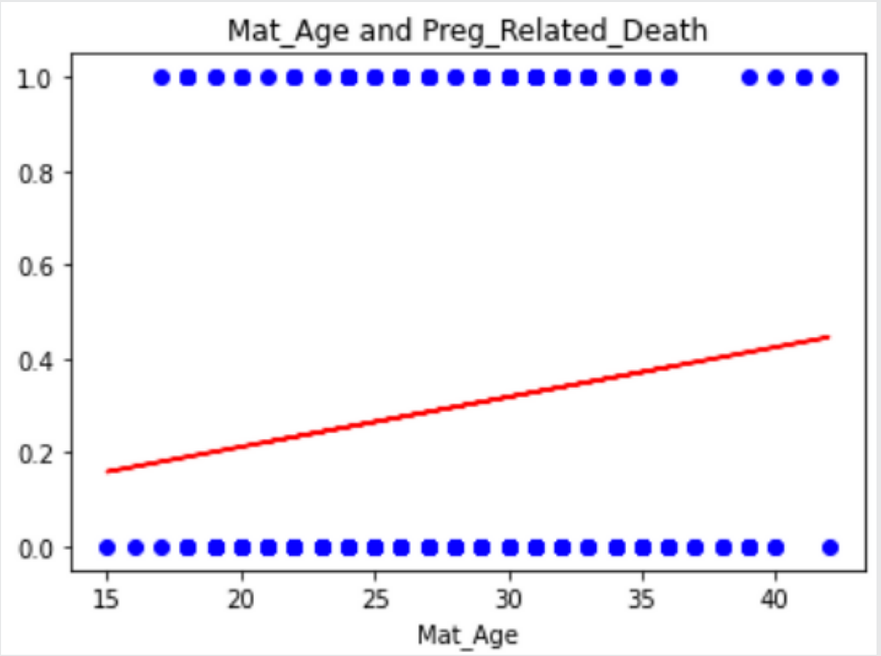


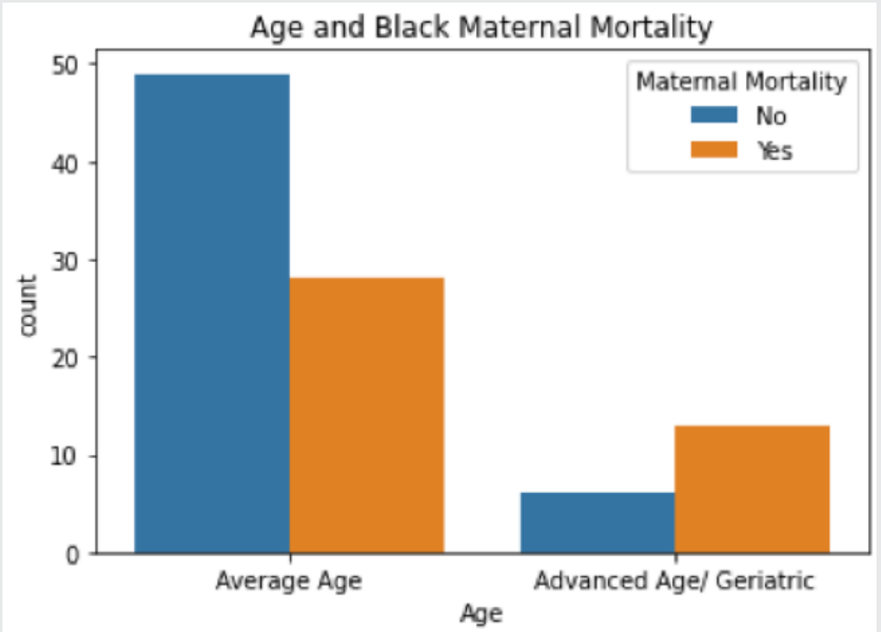


RESULTS

BLACK MOTHERS: AGE AND MORTALITY

- *Smallest proportion of Black moms: advanced age not experiencing maternal death, with N=5*
- *Largest proportion of Black moms: average age not experiencing maternal mortality, with N=48*

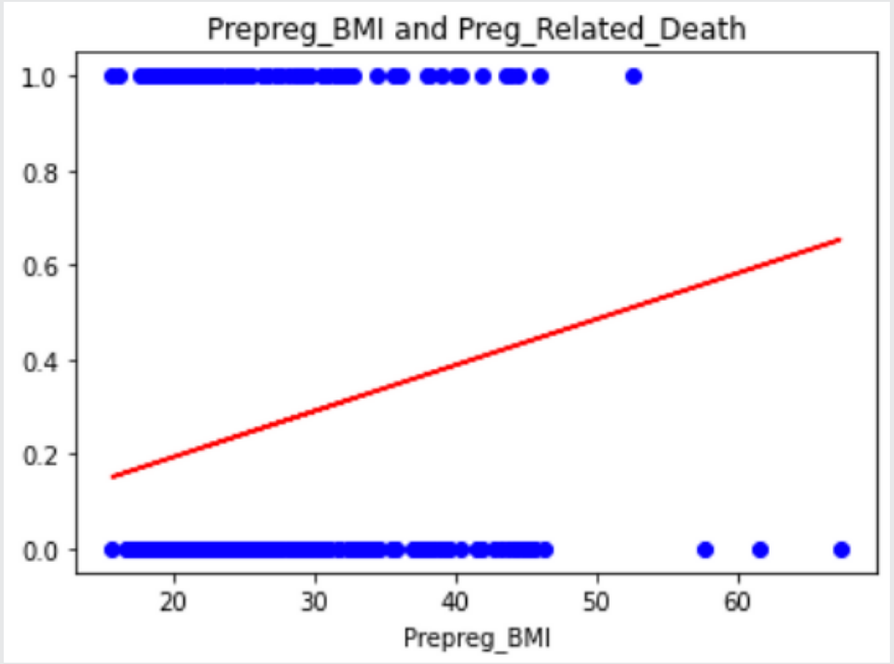


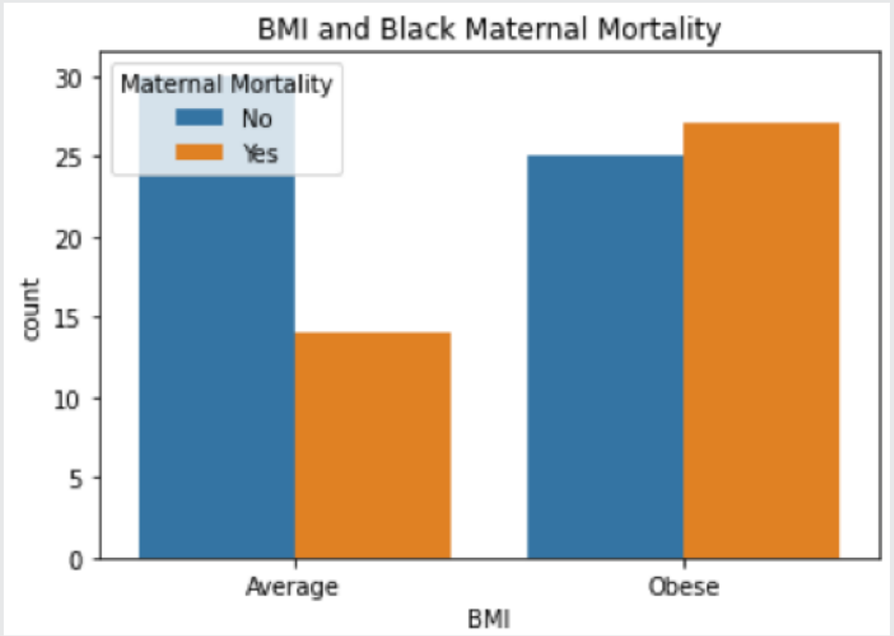


RESULTS

BLACK MOTHERS: BMI AND MORTALITY

- *Smallest proportion of Black moms: average BMI experiencing maternal death with N=14.*
- *Largest proportion of Black moms: average BMI not experiencing maternal death with N=30*





CONCLUSIONS

We reject the null hypothesis for the observation of education level on maternal mortality in White mothers (p=0.05).

We reject the null hypothesis for the observations of BMI and age on maternal mortality in Black mothers (p=0.0472<0.05, p=0.0114<0.05).

There is statistically significant evidence at p=0.05 that BMI and Black MM, age and Black MM, and education and White MM are not independent of one another.

REFERENCES

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