What Are the Barriers that Prevent Women from Getting Cervical Cancer Screening in the U.S.?

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Background:

Cervical cancer is a major public health issue for women in the United States. Early detection through regular screening is vital for prevention and improved treatment outcomes. However, not all women undergo routine screening due to various barriers. This study aims to analyze the 2021 BRFSS data to identify and address these barriers to enhance cervical cancer screening rates and ultimately improve women's health outcomes.

Hypothesis:

I hypothesize that factors such as age, race, income, employment status, healthcare plan, marital status, affordability of seeing a doctor, housing situation, and education level may be associated with women's cervical cancer screening rates. In addition,
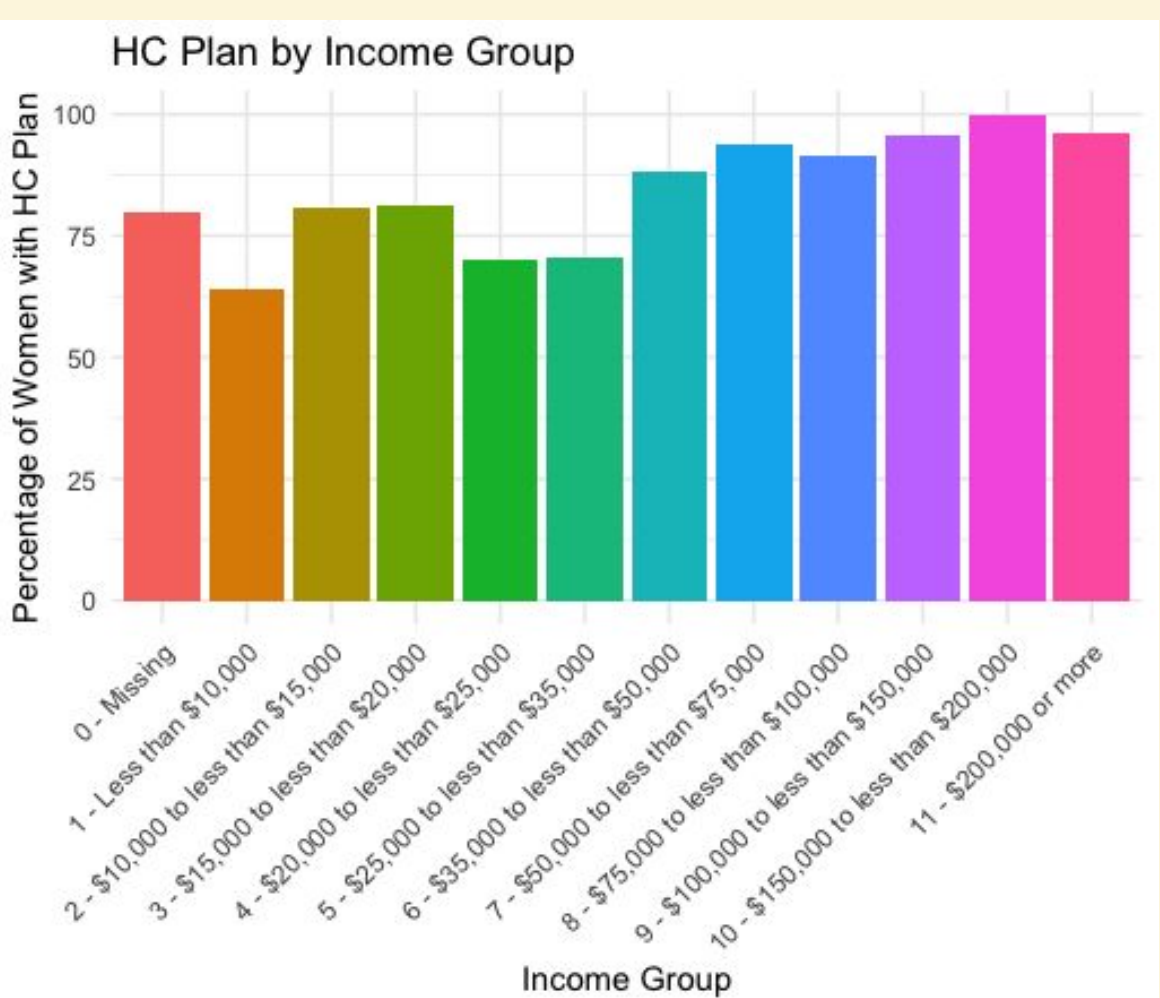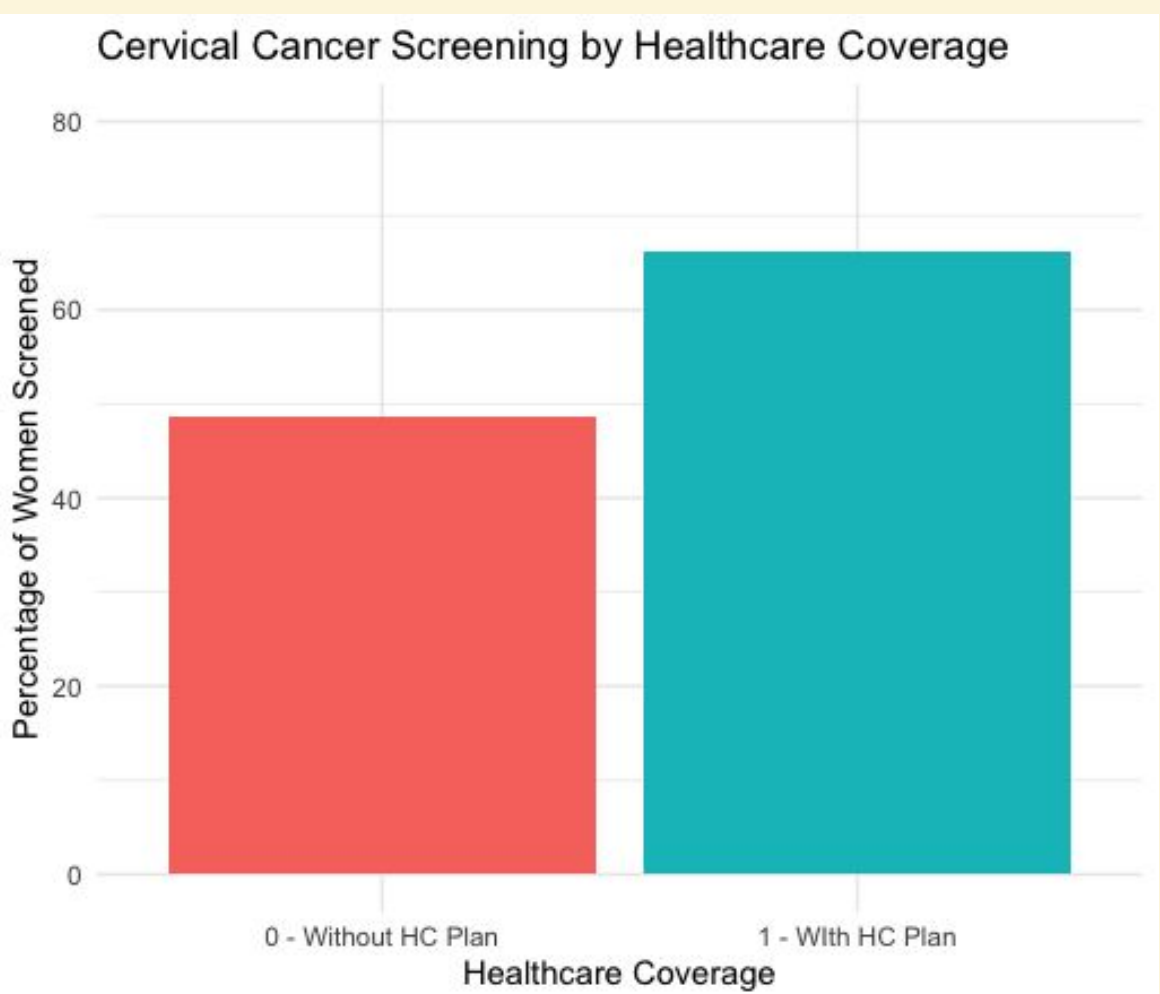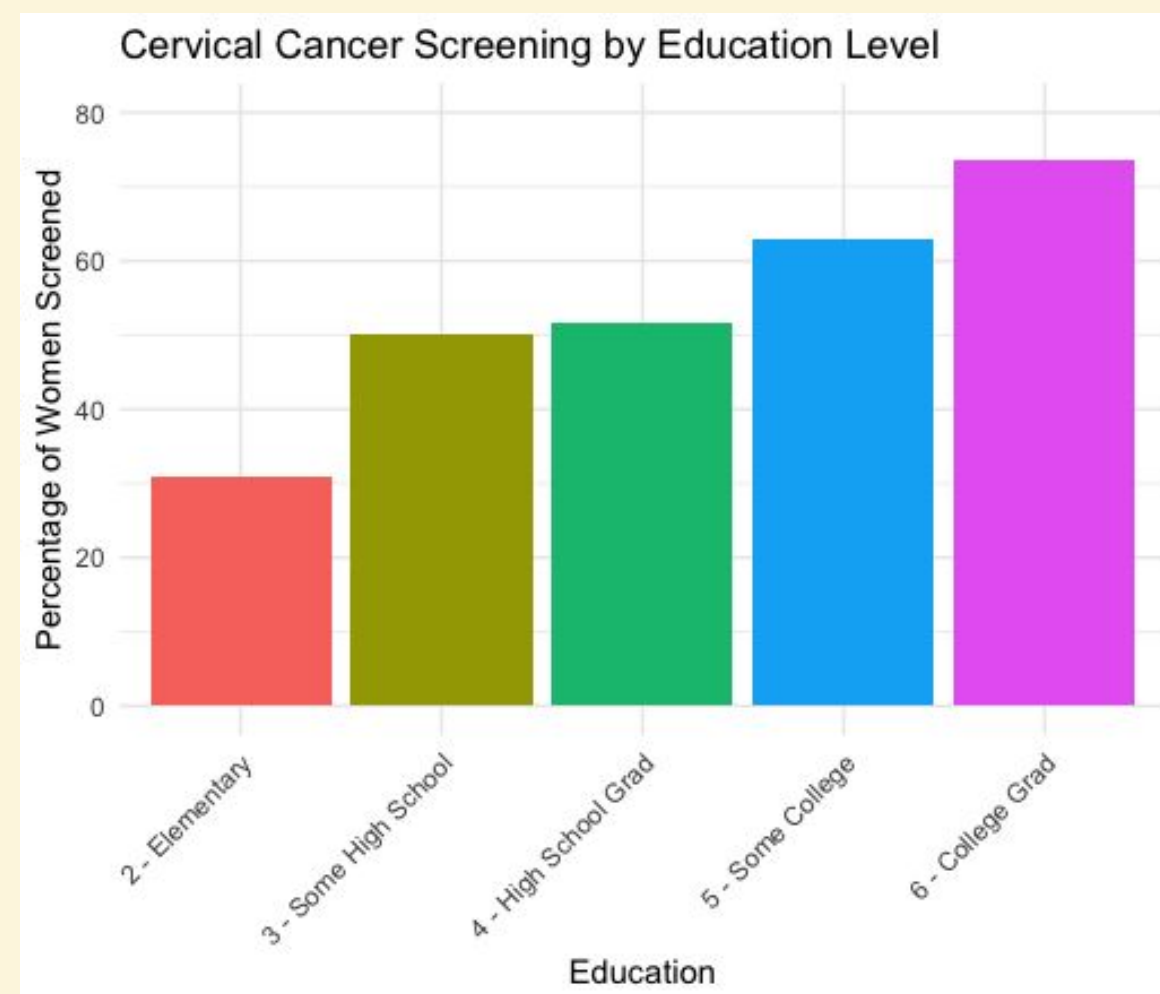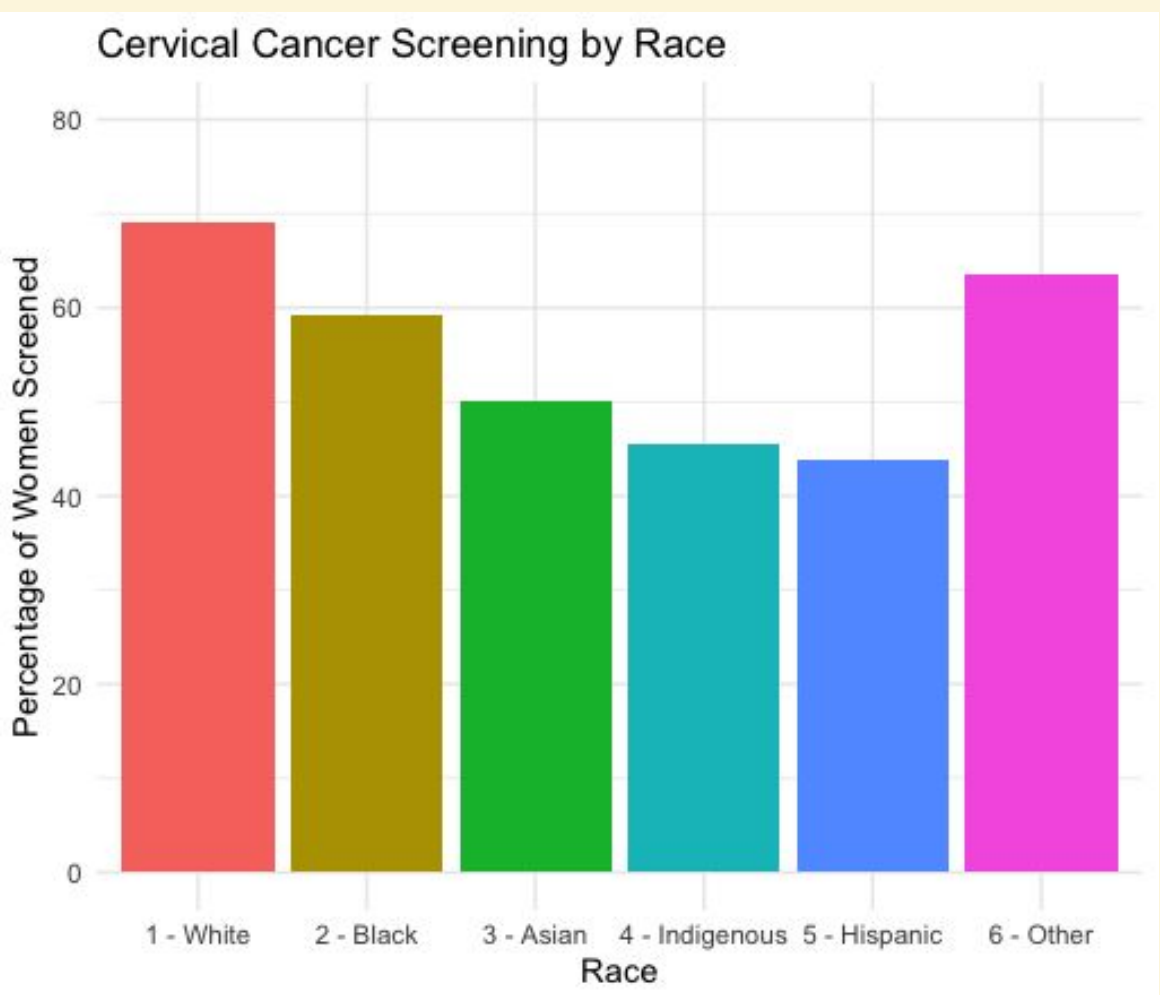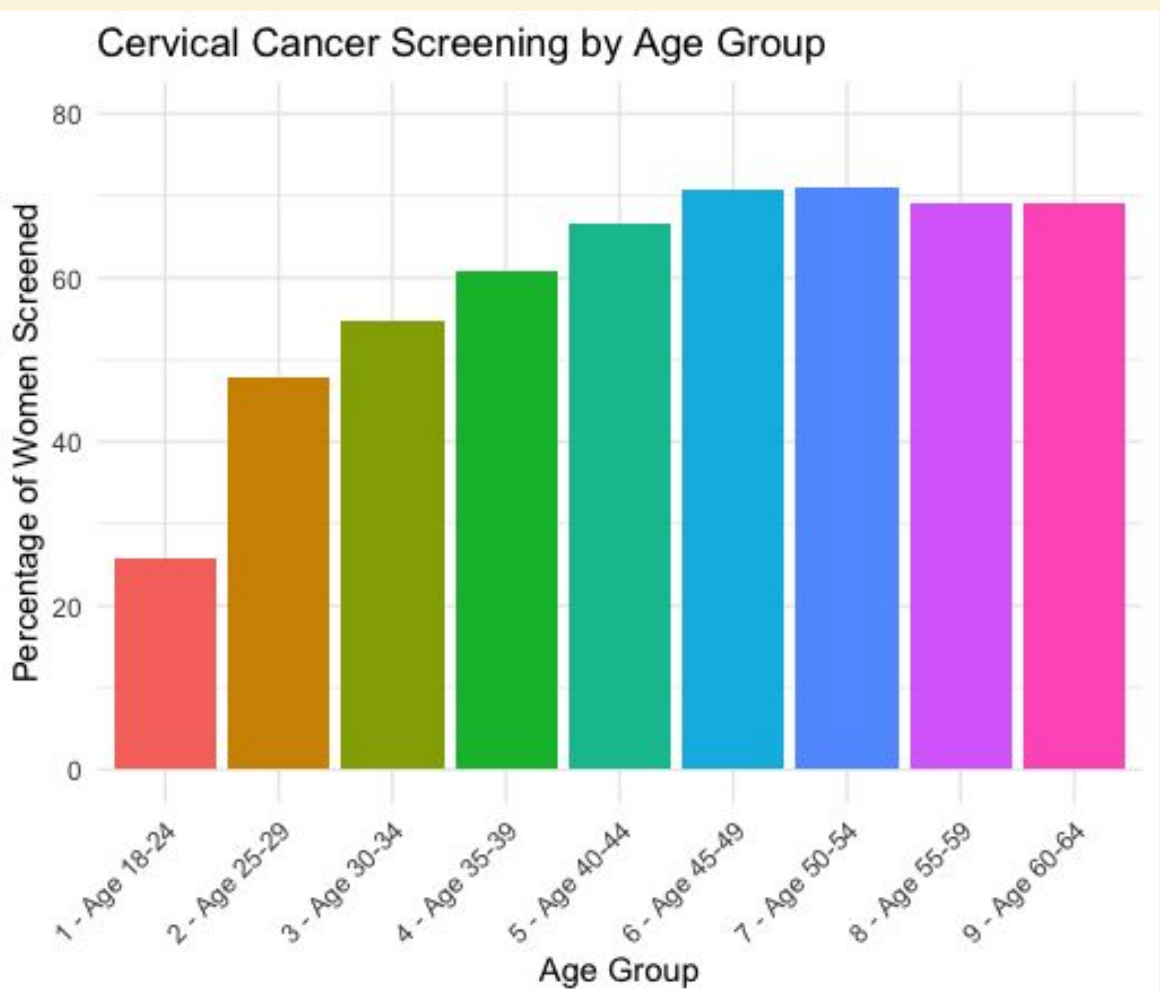
Methodology:

1. Data Preparation: identify missing data and ensure that categorical variables are appropriately converted into factors:
   a. If missing values accounted for less than 1% of the entire dataset, I deleted them, as their omission would likely have minimal impact on the overall results, and it simplifies the analysis and without compromising the validity of the findings.
   b. If missing values comprised more than 1% of the entire dataset, I treated them as a separate factor level.
2. Logistic Regression: Develop a full model to analyze relationships between variables and cervical cancer screening.
3. Model Selection: Use AIC to compare and select the most appropriate model.
4. Model Comparison: Analyze and compare different models to determine the best fit for this study.

Limitation::

- **Missing data**: Despite addressing missing values in the data preparation stage, the deletion of some data points or conversion of missing values into separate factor levels might have introduced bias or affected the generalizability of the results.
- **Categorical variables:** The use of categorical variables in the analysis might have limited the ability to detect more nuanced relationships between variables.
- **Cross-sectional data**: The analysis relies on cross-sectional data from the BRFSS, which limits the ability to draw conclusions about causality or long-term trends.

Data Collected:

Cervical Cancer Screening by Age Group

Cervical Cancer Screening by Race

Cervical Cancer Screening by Education Level

Cervical Cancer Screening by Healthcare Coverage

HC Plan by Income Group

		Full Model	Revised Model
AIC value		2157.399	2140.267
Variables	Age	✓	✓
	Race	✓	✓
	Education	✓	✓
	Income	✓	
	Employment	✓	
	Marital	✓	
	Rent or Own	✓	
	HC plan	✓	✓
	Affording HC	✓	
	HC plan * Income	✓	
	Race * Age	✓	
	Race * Education	✓	
	Race * HC plan	✓	

Excluding interaction: The interaction terms were not included in the final model because their p-values were all greater than 0.05.

Interpretation and Variables Associated with Barriers:

- **Age**: As the age group increases, the likelihood of receiving cervical cancer screening increases. This is indicated by the positive coefficient estimates for all age levels compared to the base group (18-24 years old). All age groups have statistically significant effects (p < 0.05).
- **Race**: Compared to the base group (white women), Hispanic women are less likely to receive cervical cancer screening, as indicated by the negative coefficients for Hispanic. Both of these effects are statistically significant (p < 0.05). The other race categories (Black, Asian, Indigenous, and Other) do not have statistically significant effects on the likelihood of receiving cervical cancer screening. However, this could be due to a smaller number of observations in these race categories, making it harder to detect statistically significant differences.
- **Education**: Women with some college education and college graduates are more likely to receive cervical cancer screening compared to the base group (elementary school education), as indicated by the positive coefficients. Both of these effects are statistically significant (p < 0.05). The other education categories (some high school and high school graduate) do not have statistically significant effects on the likelihood of receiving cervical cancer screening.
- **Healthcare plan**: Women with a healthcare plan are more likely to receive cervical cancer screening compared to those without a healthcare plan. This effect is statistically significant (p < 0.01).