

Inequalities in oral health: understanding the determinants of untreated caries among children in the U.S.

INTRODUCTION

- Despite a substantial overall reduction in the prevalence of dental caries in the United States, the discrepancy in dental caries cases between socially advantaged and disadvantaged children still remains.
- Discrepancies in income is an important factor, however, it is vital to understand all the disparities in order to effectively respond to this problem.
- This study aims to use data representative of the U.S. population to determine if untreated caries in children is due to biological and sociodemographic factors.
 - Race, HH income (house-hold income based on federal poverty level, FPL), recent dental visits, HH parental marital status, and HH education level were all taken into account

MATERIALS & METHODS

Data Description

- Oral health data from the National Health and Nutrition Examination Survey (NHANES) is used Years: 2011-2014
- Data compiles information from a demographic survey, oral health questionnaire, and oral health dentition examination
- Sample study consists of children 0 to 19 years of age, $n = 7008$ and the corresponding household reference person (HH) > 18 years of age, $n = 19931$
- Data is arranged based on race

Model Description

- A two-proportion z-test is run to compare the proportion of untreated caries between races; the result of the test conveys whether or not the difference between the proportions of the two groups is significant.
- Different approach taken for HH income, recent dental visits, HH parental marital status, and HH education level
 - For these variables, a simple linear regression using proportions was run via StatCrunch. The following regression model was used:

$$y = \beta_0 + \beta_1(\text{gender}) + \beta_2(\text{HHincome}) + \beta_3(\text{recentvisit}) + \beta_4(\text{maritalstatus}) + \beta_5(\text{HHeducation})$$

RESULTS

- The education level of the person of reference does not affect the impact on *untreated caries*
- Children from unmarried households have the greatest chance of having *untreated caries*
- Income > 100% FPL decreases the likelihood of having *untreated caries*, and income < 100% FPL increases the likelihood
- It is credible to say that race does play a statistically significant role when it comes to comparing *untreated caries* in children

Table 1: Two-proportion z-test results; null hypothesis is rejected for all but the last row

| Group 1 | Group 2 | Hypothesis Test | p-value |
|----------------|--------------------|--------------------------------------|------------------------|
| Mex. American | Other Hispanic | $H_0: p_1 = p_2$ $H_1: p_1 < p_2$ | 0 |
| Non-His. White | Other Hispanic | $H_0: p_1 = p_2$ $H_1: p_1 < p_2$ | 0 |
| Non-His. White | All Hispanics | $H_0: p_1 = p_2$ $H_1: p_1 < p_2$ | 4.45×10^{-6} |
| All Hispanics | Non-His. Black | $H_0: p_1 = p_2$ $H_1: p_1 < p_2$ | 0.002 |
| Non-His. White | Non-His. Black | $H_0: p_1 = p_2$ $H_1: p_1 < p_2$ | 2.95×10^{-11} |
| Non-His. White | All Non-His. White | $H_0: p_1 = p_2$ $H_1: p_1 < p_2$ | 1.04×10^{-9} |
| Non-His. White | Mex. American | $H_0: p_1 = p_2$ $H_1: p_1 > p_2$ | 0.282 |

Figure 1: Relative frequency of untreated caries by race

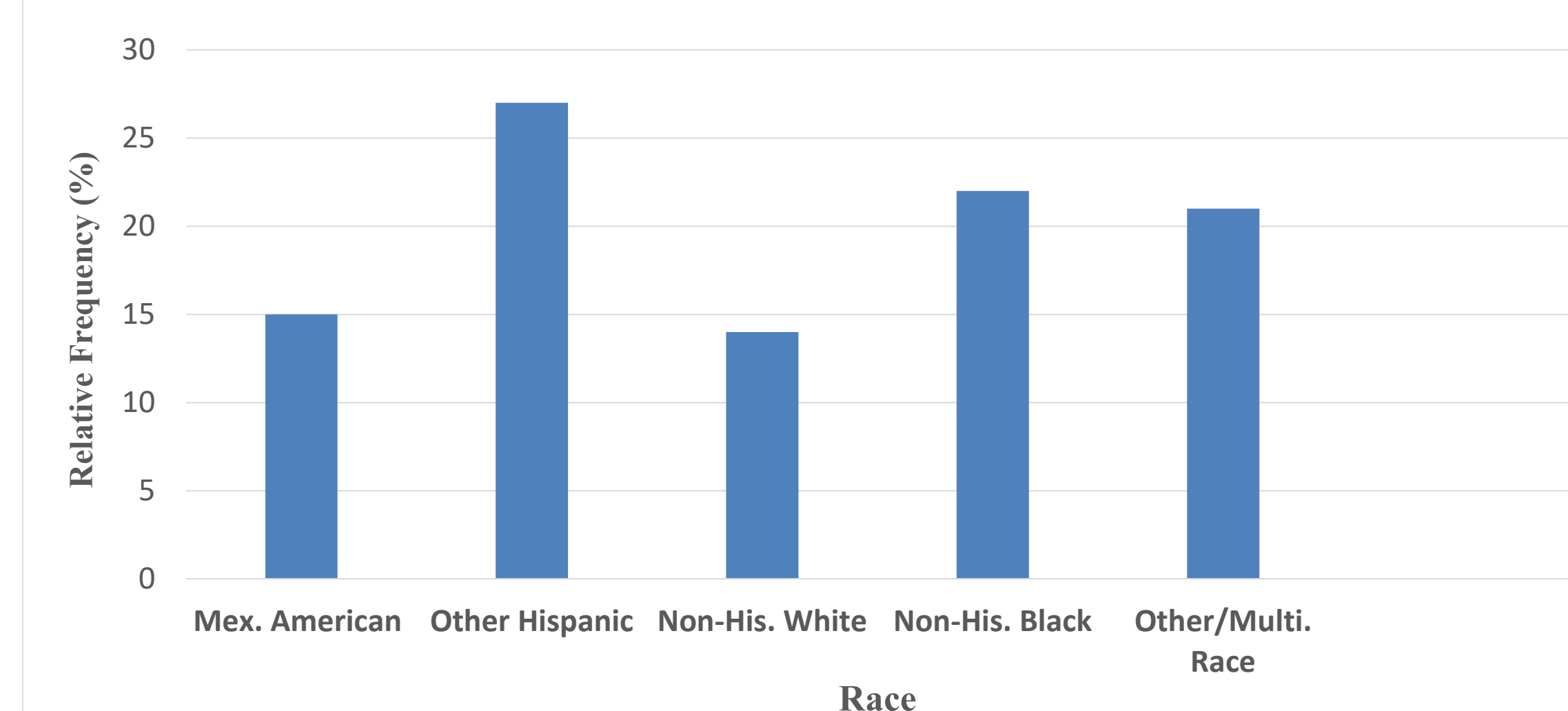


Table 2: The simple linear regression results for the dependent variable (untreated caries) and each independent variable (education level, income level, and marital status)

| Dependent Variable | Independent Variable | R |
|--------------------|---------------------------|---------|
| Untreated Caries | Uneducated | 0.0525 |
| Untreated Caries | Some Education | 0.0940 |
| Untreated Caries | Educated | -0.0867 |
| Untreated Caries | < 100% FPL | 0.3631 |
| Untreated Caries | > 100% FPL | -0.3631 |
| Untreated Caries | Married/with Partner | -0.4145 |
| Untreated Caries | Widow/Divorce/Separated | 0.2185 |
| Untreated Caries | Never Married | 0.6080 |
| Untreated Caries | Dental Visits < 12 months | -0.5164 |
| Untreated Caries | Dental Visits > 12 months | 0.5164 |

*Variables *Uneducated* consists of 9th and 9-11th combined, *Some Education* consists of High School/GED and Some College, and *Educated* is College Graduate +

DISCUSSION & CONCLUSION

- The results of this study imply that the parental education level (HH education) has no influence on the amount of untreated dental caries in children.
- The factors that proved to be determinants of untreated dental caries in children are race, HH family income level, and HH marital status. The most notable determinant is that of race.
 - *Race plays a statistically significant role in the prevalence of dental caries in children.*
- When policymakers look at these results they should be aware that cultural beliefs, values, and practices differ amongst racial minorities and these factors may influence the perception of oral health. School programs with the intention of promoting oral health education should be implemented in areas with a large racial minority population.

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