Vitamin D and Dental Caries

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Background

- Vitamin D is vital for absorption of calcium and phosphorus, which help build bone. A deficiency in vitamin D will lead to hypocalcification, increased inflammation, and bone resorption.
- National Health and Nutrition Examination Survey (NHANES) collects a nationally representative sample of the non-institutionalized population of the United States.
- Nearly 10,000 people are interviewed at home on health factors and examined in a mobile examination center (MEC) by licensed dentists.

Objective:

- This study examined the data from NHANES to further explore the relationship between dental caries and vitamin D.

Methods

Measures

- Dental caries were diagnosed by licensed dentists.
- Two dental caries measures were obtained: Dental caries experience, which included decayed, missing, and filled teeth (DMFT) and untreated dental caries.

Independent Variable

- Parameters for vitamin D deficiency (VDD) were set with the use of previous studies as serum 25(OH)D levels of: Severe VDD <25 nmol/L, moderate VDD 25-50 nmol/L, insufficiency 50-75 nmol/L, and sufficient >75 nmol/L.

Covariates

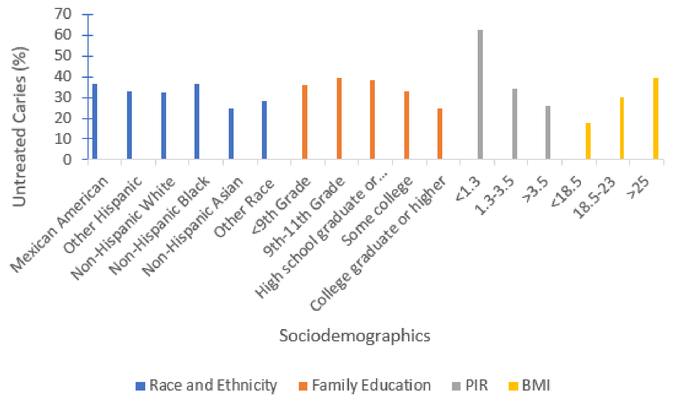
- Potential confounding variables between vitamin D and dental caries included demographics, body mass index, sugar intake, and socioeconomic status (SES).

Statistical analyses

- Untreated dental caries was compared to sociodemographic through Chi-square analysis. DMFT were compared to sociodemographic with the use of Mann-Whitney U test. Vitamin D levels were compared to sociodemographic with Chi-square test.
- Logistic regression analysis was performed to examine the relationship between vitamin D and untreated caries.
- Models were fitted to test the association between vitamin D and dental caries experience.

Results

Figure 1: Prevalence of untreated caries by sociodemographic factors from NHANES (2011-2016)



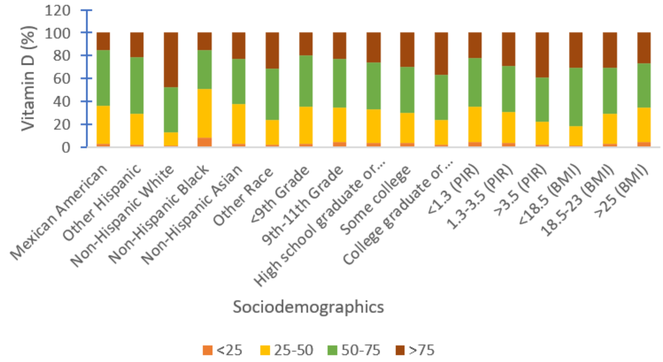
There was a higher prevalence of untreated caries among males. Groups with significant trends of higher untreated caries were Mexican Americans and Non-Hispanic blacks, parents with lower education, individuals living in lower socioeconomic status, and higher BMI.

Table 1: Prevalence of DMFT by sociodemographic factors from NHANES (2011-2016)

	DMFT	
	Mean (SD)	P-value
Sex		
Female	7.54 (8.25)	<0.001[a]
Male	7.19 (8.37)	
Race and Ethnicity		
Mexican American	5.31 (6.61)	<0.001[b]
Other Hispanic	7.24 (8.25)	
Non-Hispanic White	9.01 (9.06)	
Non-Hispanic Black	7.32 (8.31)	
Non-Hispanic Asian	5.74 (6.87)	
Other Race	5.51 (7.76)	
Poverty Income Ratio		
<1.3	7.61 (8.69)	0.139[b]
1.3-3.5	7.36 (8.40)	
>3.5	7.03 (7.58)	
Family Education		
<9th Grade	8.14 (9.14)	<0.001[b]
9th-11th Grade	8.73 (9.07)	
High school graduate or GED	8.06 (8.60)	
Some college	7.06 (8.12)	
College graduate or higher	6.10 (7.28)	
Body Mass Index		
<18.5	2.18 (4.28)	<0.001[b]
18.5-25	6.46 (7.84)	
>25	9.52 (8.71)	

DMFT scores were higher on average in females compared to males. Non-Hispanic Whites, low family education, and those with highest BMI had higher DMFT scores.

Figure 2: Prevalence of vitamin D by sociodemographic in NHANES cycles (2011-2016)



- Non-Hispanic whites had the lowest amount severe and moderate VDD serum levels. While non-Hispanic blacks had the highest levels.
- Severe, moderate, and insufficient VDD was highest in those with low income and lowest in those with high income.
- Parents with college graduate and higher education had the highest proportion of sufficient vitamin D levels, and had the lowest proportion of levels below the sufficient threshold.
- Those with BMI<18.5 had lowest proportion of severe and moderate VDD serum levels and individuals with BMI>25 had highest proportion.

Individuals with severe VDD had 2.219 times higher untreated dental caries than those with sufficient levels of vitamin D. With taking demographic factors into account the association was stronger with This continued to be significant after taking both added sugars and BMI into account. Vitamin D was found to be associated with dental caries experience.

Conclusion

- Significant relationship was found between vitamin D and dental caries.
- Individuals with lower vitamin D levels were at a higher risk for dental caries.

Acknowledgement

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