

Native Language Spoken as a Risk Marker for Tooth Decay

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Objective: The purpose of this study was to assess dmft, the number of decayed, missing (due to caries), and/or filled primary teeth, of English-speaking and non-English speaking patients of a hospital based pediatric dental clinic under the age of 72 months to determine if native language is a risk marker for tooth decay. **Study Design:** Records from an outpatient dental clinic which met the inclusion criteria were reviewed. Patient demographics and dmft score were recorded, and the patients were separated into three groups by the native language spoken by their parents: English, Spanish and all other languages. **Results:** A total of 419 charts were assessed: 253 English-speaking, 126 Spanish-speaking, and 40 other native languages. After accounting for patient characteristics, dmft was significantly higher for the other language group than for the English-speaking ($p < 0.001$) and Spanish-speaking groups ($p < 0.05$), however the English-speaking and Spanish-speaking groups were not different from each other ($p > 0.05$). **Conclusions:** Those patients under 72 months of age whose parents' native language is not English or Spanish, have the highest risk for increased dmft when compared to English and Spanish speaking patients. Providers should consider taking additional time to educate patients and their parents, in their native language, on the importance of routine dental care and oral hygiene.

Key words: communication, language barrier, immigration, caries.

INTRODUCTION

Dental caries is a significant disease process, which continues to affect children. The most recent NHANES data, released in 2007 by the Centers for Disease Control and Prevention (CDC), indicates a small but statistically significant increase in dental caries in primary teeth. This is a reversal in downward trends from the early 1970s to mid 1990s detected by previous CDC data¹. While adults, 35-44 years of age, are said to have an improvement in

oral health status, caries experience in 2 to 4 year olds is increasing². Additionally, caries is beginning to show increased trends in populations, which were previously believed to be low risk³. Caries, which occurs in the primary dentition before age 6, is classified as Early Childhood Caries (ECC)⁴. The American Academy of Pediatric Dentistry defines a sub-set of ECC, Severe Early Childhood Caries (S-ECC), as any sign of smooth-surface caries in a child younger than 3 years of age⁴.

Among additional risk factors identified for developing dental caries is status as a recent immigrant to the United States. Cote *et al* reported that refugees that immigrated to United States had caries experience similar to that of U.S. children (49.3%), but that U.S. children had significantly lower risk of untreated decay (22.8%). Caries incidence varied among the refugees based on geographic origin with those from Africa experiencing a lower caries rate than U.S. children at 38% and eastern European immigrants having a significantly higher caries rate at 79.7%. The authors concluded that White refugee children, primarily from Eastern Europe, were 2.8 times as likely to have caries experience and 9.4 times the risk of untreated decay when compared with white U.S. children. In contrast, African refugee children were only half as likely to have caries experience compared with white U.S. children and African American children; yet, similar to African American children in risk of untreated decay⁵. A study by Chung *et al* demonstrated that Asian and Hispanic Children in certain areas of San Francisco have a higher incidence of caries, despite signs of improvement in the public health sector overall. Nonetheless, the study's finding also suggested that racial/ethnic disparities exist in the prevalence of dental caries and treatment needs, but no conclusion was drawn

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on spoken language⁶. There are many studies that have examined the caries rate of different ethnic populations. The majority of these studies did not examine the impact of language on caries rates in children.

Medical literature has investigated the affect of language as a risk marker for a variety of ailments. Bayer *et al* found that if a child's native language at home was not English, then the child was at risk for internalizing mental health symptoms. This was a statistically significant predictor⁷. Similarly, Schweigman *et al.* found that speaking one's own native language, other than English, is associated with increased risk of being unaware that cigarette smoking and family history contribute to increased risk of acquiring heart disease⁸. Currently, there are no studies in the dental literature that assess native language spoken as a risk marker for dental disease.

MATERIALS AND METHOD

This retrospective study was conducted at Riley Hospital for Children, part of Indiana University Health (IUH), and was approved by the Institutional Review Board of the Indiana University School of Dentistry as Study # 1211010030. Riley Hospital for Children is located in downtown Indianapolis and serves children of a variety of ethnic backgrounds.

Patient records were required to meet the following criteria: a full comprehensive exam at the patient's initial visit to the facility, be under the age of 72 months at their initial visit, the parent's required the use of the hospital's Language Services Department (for non-English speaking patients), and had an unremarkable health history. Using a filter report from the practice management software used in the facility (Dentech, SoftTech), 419 patient records that met the inclusion criteria were selected to review.

Selected charts were assigned a sequential number. The following information was collected:

Patient's age in months, gender, self reported ethnicity, language or interpreter type, insurance type, date of initial exam (month, year), if this was the child's first dental visit (yes/no), behavior at initial exam, using the Frankl Scale evaluation for Behavior⁹, date of their recall hygiene examination (month, year), and the presence or lack of decay at their recall hygiene exam.

Statistical analysis

The English-speaking, Spanish-speaking, and other language groups were compared for differences in patient demographics using chi-square tests and ANOVA. A zero-inflated negative binomial model was used to compare the groups for differences in dmft with age, gender, behavior at initial exam, and whether it was the child's first dental visit included in the model as covariates. Ethnicity and insurance were not included as covariates because these effects were unable to be separated from the effects of language. Zero-inflated negative binomial models are used with count data, such as dmft, where there are a larger proportion of zeros than would be expected from a standard negative binomial model. The analysis involves two models, where the first part is a logistic model for the probability of having dmft > 0 and the second part is a negative binomial model for the dmft count.

RESULTS

Of the 419 charts reviewed: 253 were English-speaking, 126 were Spanish-speaking, and 40 were other languages. Eighty-seven percent of the patients assessed had Medicaid as their primary method of payment for their dental procedures. The English-speaking group had a significantly lower proportion of patients using Medicaid as their primary insurance compared to the Spanish-speaking ($p < 0.0001$) and other language group ($p = 0.0025$), but there was no difference between the Spanish-speaking and other language groups ($p = 0.33$). Behavior ratings were more positive for the English-speaking group than for the other language group ($p = 0.0016$), however the Spanish-speaking group was not different from the English-speaking group ($p = 0.06$) or the other language group ($p = 0.13$). The three language groups were not significantly different for age ($p = 0.33$), gender ($p = 0.86$), or whether it was the child's first dental visit ($p = 0.24$). After accounting for patient characteristics, dmft was significantly higher for the other language group than for the English-speaking ($p < 0.001$) and Spanish-speaking groups ($p < 0.05$), however the English-speaking and Spanish-speaking groups were not different from each other ($p > 0.05$).

DISCUSSION

As previous studies in medical literature noted, native language other than English is being researched, and has been found as a risk marker in various ailments. This study found that dmft was lowest in the English-speaking group (2.1) and highest in the "other languages" group (7.3). While significant differences in dmft were found between other languages and English/Spanish speaking, no significant difference was found between English and Spanish speaking patients in dmft score. One may want to consider alternative methods of providing patient education to families whose native language is not English, particularly as caries rates are rising¹.

Further research needs to focus on the relationship that exists between language and culture on the caries process. As it was noted in Kämpfi's study in Finland, "differences in oral health and associated factors among language groups" are the subject of future studies¹⁰. While it is critical to provide a preventive oral health plan that is understood by the patient in their native language, it is also paramount that we learn the culture and customs of their country of origin. What is perceived as a compliance issue may actually go beyond language. Therefore the first step is to identify language differences and the second is then culture and the role they both play in oral health care.

This study's strength was the diversity of the patient population in an urban hospital-based pediatric dentistry clinic. The state of Indiana census data reported that 6.2% of the population is of Hispanic descent and 1.7% of Asian descent in 2010¹¹. However, the patient population of this study gave a better representation of the demographics of the United States, as it had high ethnic populations of African Americans, Hispanics, and Asian when compared to what current census data indicate¹². Limitations in the study included there being a limited number of Spanish-speaking and all other native languages patients who met the inclusion criteria. In addition, there were multiple practitioners recording patient clinical data and patient characteristics. The practitioners collecting the data were pediatric dental residents that were trained in the Frankl Behavior scale and recording dmft, but because this was a retrospective study, they were not calibrated.

Figure 1. Average dmft

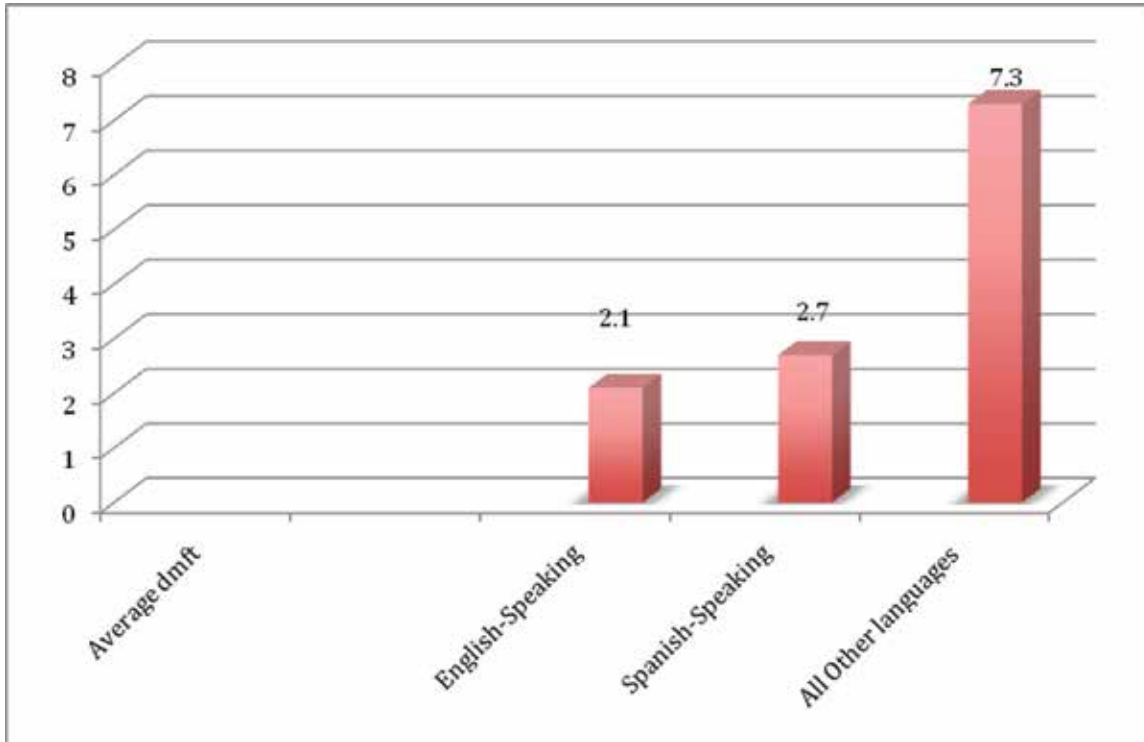


Figure 2. Percentage of subjects with dmft=0

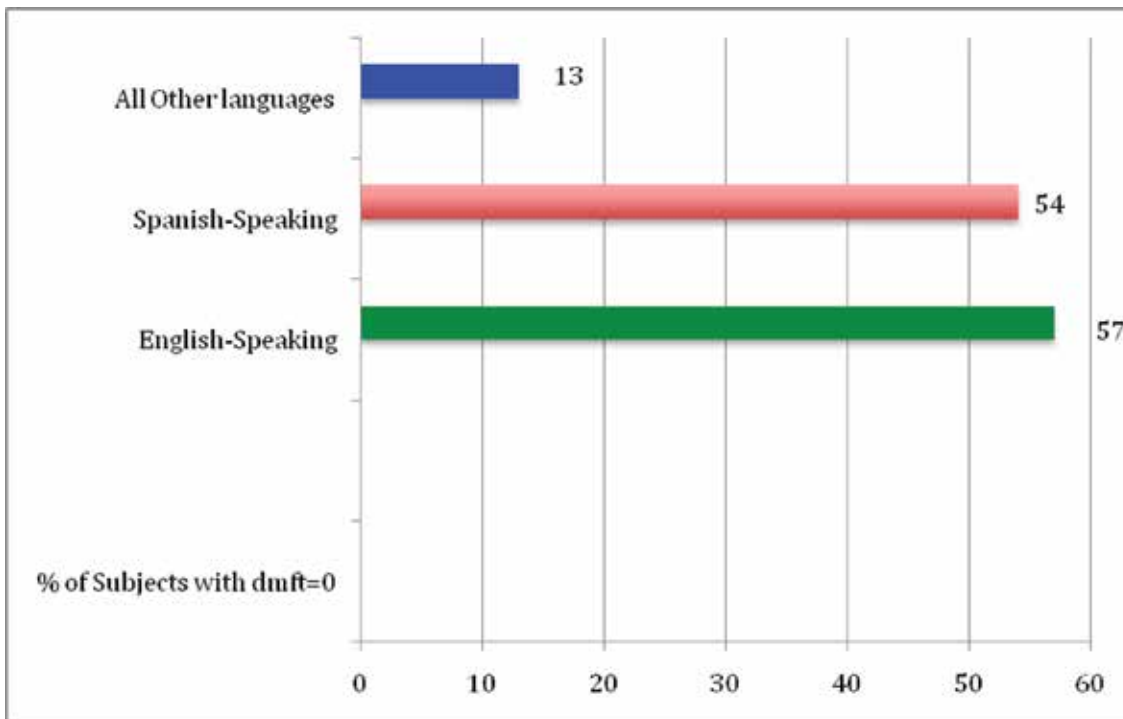
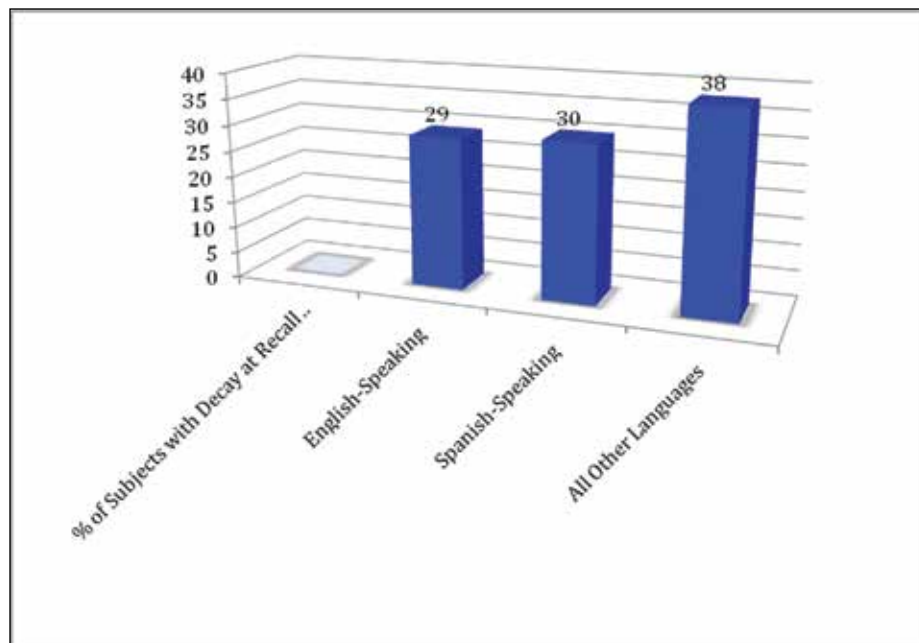


Figure 3. Percentage of Subjects with Decay at Recall Exam



CONCLUSION

Based on the study’s results, the following conclusion can be made:

Children under the age of 72 months whose parents do not speak English or Spanish are at the highest risk for an increased dmft.

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