

# IMPACT OF PROMOTORA MODEL ON CARIES INCIDENCE

after a comprehensive  
dental treatment

*Impacto del modelo promotora sobre la incidencia de caries dental  
después de un tratamiento dental completo*

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## Abstract

This study evaluated the impact of visiting the *Promotora de Salud* (PdS) before comprehensive oral rehabilitation under general anesthesia (GA) on return for post-GA recall and incidence of caries. A retrospective study was conducted by reviewing dental records for patients aged 12–66 months who had dental treatment completed under GA at University of Florida–Naples Children and Education Foundation (NCEF) Pediatric Dental Center. Primary outcomes were return to the clinic within 15 months after treatment and new caries lesions. Data were abstracted from electronic dental records and recorded on electronic spreadsheets, imported into SAS for descriptive analysis, chi-square tests, and multiple logistic regression modeling. Three hundred children met the inclusion criteria (137 females, 163 males; median age 50 months; 131 Hispanic, 156 non-Hispanic white, 13 other race/ethnicity). Of the patients who visited the PdS, 79% returned for recall compared with 46% who did not visit the PdS ( $P < .0001$ ). Those who did not visit the PdS were more likely to have caries or pathology at recall (69% vs 35%,  $RR = 2.08$ ,  $P < .0001$ ), even after adjustment for race/ethnicity ( $RR = 2.16$ ; 95% confidence limits: 1.47–3.19). In logistic regression modeling that included race/ethnicity, sex, and age, PdS status (Visit/ No visit) was the only statistically significant predictor of caries ( $P < .0001$ ). Patients who saw the PdS before dental treatment under GA were more likely than those who did not see the PdS to return for at least one post-GA recall visit and significantly less likely to experience new caries lesions.

**KEY WORDS (MeSH):** oral health, health promotion, health education, healthy people programs, incidence, dental caries.

## Resumen

Este estudio evaluó el impacto de visitar la Promotora de Salud (PdS) antes de la rehabilitación oral integral bajo anestesia general (AG), regreso al control e incidencia de caries. Se realizó un estudio retrospectivo mediante revisión de historias clínicas de pacientes entre 12–66 meses de edad que recibieron tratamiento dental bajo AG en *Naples Children and Education Foundation, Pediatric Dental Center*. Los resultados iniciales fueron al regresar entre los 15 meses posteriores al tratamiento y nuevas lesiones cariosas. Los datos recabados de registros dentales electrónicos se registraron en hojas de cálculo electrónicas, importándose a SAS para el análisis descriptivo, prueba de chi-cuadrado y regresión logística múltiple. Trescientos niños cumplieron con criterios de inclusión (137 niñas, 163 niños con mediana de 50 meses de edad; 131 hispanos, 156 blancos no hispanos y 13 otra raza/etnia). Los hispanos estuvieron más dispuestos (56%) que los blancos no hispanos (34%) u otros (31%) a visitar a la PdS. 79% que visitaron PdS regresó para evaluación en comparación con 46% que no visitó PdS ( $p < 0,0001$ ). Aquellos que no visitaron PdS tuvieron mayor riesgo de tener caries dental u otra patología dental durante la siguiente visita (69% vs 35%,  $RR = 2.08$ ,  $P < .0001$ ), incluso después del ajuste por raza / etnia ( $RR = 2.16$ ; 95% límites de confianza 1.47-3.19). El modelo de regresión logística que incluía raza / origen étnico, sexo y edad, estatus (Visitar/No visitar) de PdS fue el único predictor estadísticamente significativo de caries ( $p < 0,0001$ ). Aquellos que visitaron la PdS antes del tratamiento dental bajo AG tuvieron mayor probabilidad de regresar al menos a una visita de evaluación posterior a AG y menor probabilidad estadísticamente significativa de experimentar nuevas caries dental, que los que no visitaron a PdS.

**PALABRAS CLAVE (DeCS):** salud bucal, promoción de la salud, educación en salud, programas gente sana, incidencia, caries dental.

## Introduction

Dental caries is one of the most prevalent chronic diseases among children younger than 5 years old. This preventable condition continues to be a public health problem around the world <sup>1,2</sup>.

The American Academy of Pediatric Dentistry defines Early Childhood Caries (ECC) as a “disease that affects teeth in children aged between birth and 71 months. ECC is characterized by the presence of 1 or more decayed, missing, or filled tooth surfaces in any primary tooth” <sup>3</sup>. ECC is caused by biofilms containing acidogenic bacteria, which can be transmitted from the parent/caregiver to the child <sup>4,5,6</sup>.

In the United States, ECC affects approximately 12% of children ages 2-5 years. Children from low socioeconomic status households are considered at increased risk for developing ECC. Particular racial and ethnic groups in the United States are at elevated risk for ECC: Hispanic children have a higher prevalence of ECC (57.1%) than non-Hispanic Black (48.1%) or non-Hispanic White children (40.4%) <sup>7</sup>. Additionally, Hispanic (19.4%) and non-Hispanic Black children (19.3%) had a higher prevalence of untreated dental caries in primary teeth compared with non-Hispanic White (9.5%) children.

Numerous factors contribute to ECC etiology, such as diet, oral hygiene, and bacterial virulence, and ECC may be preventable by managing those factors <sup>8,9</sup>. Although oral health education is not the only step in dental caries prevention, it is an important factor among vulnerable populations that experience limited access to oral health care.

“Promotora de Salud (PdS)” —the Spanish term used for Community Health Worker (CHW), Community Health Liaison, Lay Health Advocates, and Outreach Educator, among others— is a community member who provides basic health education in the community in which they live. The PdS provides guidance in accessing community resources associated with health and interprets health terminology and concepts into language that the community better understands (10). The PdS model is a promising approach for improving oral health-related knowledge and behavior among underserved and underinsured minority communities, with the ultimate goal of reducing the incidence of ECC <sup>11,12</sup>.

The purpose of this study was to evaluate the impact of visiting the PdS before comprehensive oral rehabilitation under general anesthesia (GA) on the rate of return for post-treatment dental visits and the incidence of dental caries.

## Materials and methods

The study was conducted at the University of Florida – Naples Children and Educational Foundation (NCEF) Pediatric Dental Center in Naples, Florida. It was approved by the University of Florida Health Science Center Institutional Review Board (protocol IRB201700861).

A retrospective chart review of patients age 12 to 66 months who had dental treatment completed under general anesthesia (GA), during January 2012 to July 2016.

The study population included 300 children who completed dental treatment under general anesthesia or IV sedation and whose parents either had seen the PdS in the education room for educational activities during the selected period (n=137) or had not (n=163). After 15 months following completion of dental treatment under GA, the presence or absence of new carious lesions was recorded from the patients' records. Caries data were available for 179 children in the study population.

The data were abstracted from electronic patient dental records and recorded on electronic spreadsheets and imported into SAS statistical software package version 9.4 (SAS Institute, Cary, NC) for univariate and bivariate analyses and multiple logistic regression modeling. Stratified analysis was conducted to examine the association between use of the PdS and each of the two outcomes, while controlling for potential confounders. Multiple logistic regression modeling was conducted to measure the degree of association between visiting the PdS and the development of new carious lesions, while simultaneously adjusting for potential confounders.

## Results

Most of the children in the study population were male, which did not differ significantly between those who saw the PdS before dental treatment (53.1%) and those who did not (55.3%) (TABLE 1). Most children were age 48-72 months at the time of treatment. Saw Promotora 53.1%; and did not see Promotora 56.5%, respectively. The majority of the children were Hispanic/Latino origin ( $p=.0007$ ).

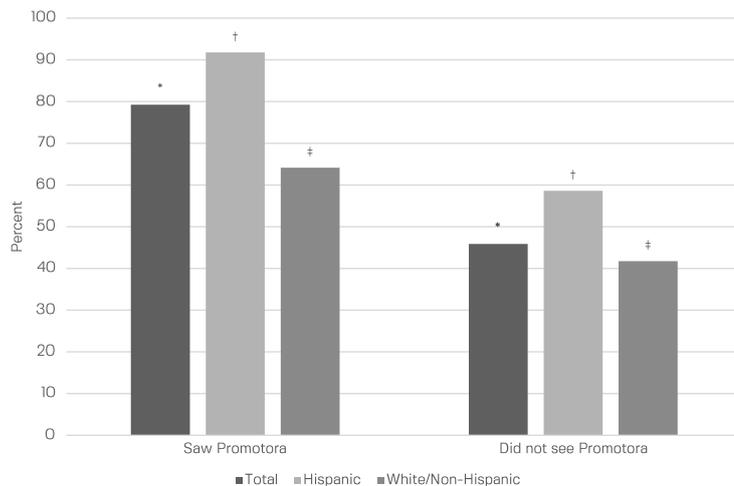
Children who saw the Promotora before dental treatment under GA were significantly more likely than those who did not see the Promotora to return for at least one post-GA recall visit, overall and when stratified by race/ethnicity (FIGURE 1). The association between seeing the Promotora before treatment and the rate of recall visits remained statistically significant in bivariate analysis that was stratified by race/ethnicity: adjusted rate ratio = 1.58; 95% CI: 1.31, 1.90;  $p < .001$ ).

Controlling for race/ethnicity, children who saw the Promotora were significantly less likely than those who did not to have new caries lesions (adjusted rate ratio=0.51, 95% CI: 0.38, 0.69;  $p < .001$ ) (FIGURE 2) In logistic regression

**TABLE 1.**

Selected demographic characteristics of the study population, by Promotora status (n=300).

Characteristic	Saw the Promotora		Did not see the Promotora	
	Number	Percent	Number	Percent
<b>Sex</b>				
Female	61	46.9	76	44.7
Male	69	53.1	94	55.3
<b>Age at treatment under general anesthesia</b>				
23-35 months	18	13.9	17	10.0
36-47 months	43	33.1	57	33.5
48-72 months	69	53.1	96	56.5
<b>Race/Ethnicity*</b>				
White, non-Hispanic	53	40.8	103	60.1
Hispanic/Latino	73	56.2	58	34.1
Other or not reported	4	3.1	9	5.3
<b>Total</b>	<b>137</b>	<b>100.0</b>	<b>163</b>	<b>100.0</b>



**FIGURE 1.**

Prevalence of Post-Operative Recall Visits, by Race/Ethnicity (n=300).

Adjusted Rate Ratio = 1.58 (95% CI: 1.31, 1.90)

\* p < .001

† p = .008

‡ p < .001

**FIGURE 2.**

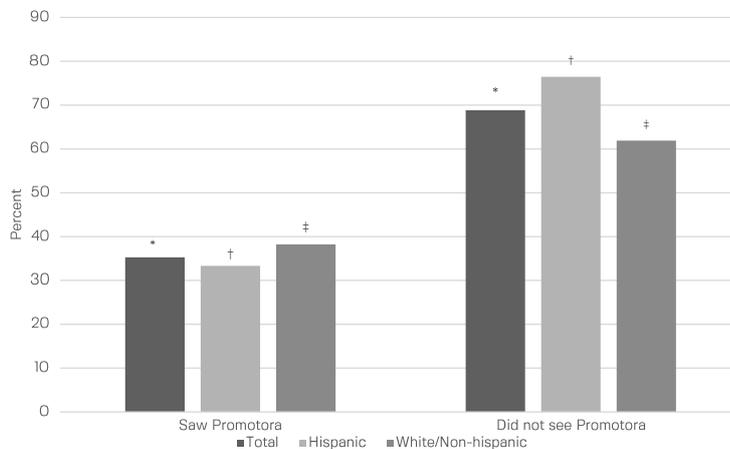
Cumulative incidence of Recurrent Caries at Post-Operative Recall, by Race/Ethnicity (n=179).

Adjusted Rate Ratio = 0.51 (95% CI: 0.38, 0.69)

\* p < .001

† p = .04

‡ p < .001



modeling that included race/ethnicity, sex and age, Promotora status was the only statistical significant predictor of new caries lesions.

## **Discussion**

Prior studies have shown the impact of the PdS in the reduction of chronic diseases <sup>15,16</sup>. The present study suggests that visiting a PdS before undergoing dental treatment under general anesthesia was associated with a reduction in caries incidence. At least one prior study reported similar findings <sup>14</sup>.

Previous studies indicate that higher levels of education of parents/caregivers, race/ethnicity, age, number of children, and literacy may be associated with the oral health status of a child <sup>7,8,13</sup>. On the contrary, our study did not find an association between race/ethnicity and the incidence of new caries lesions after oral rehabilitation of young children. The main predictor for caries found in this study was whether or not the parents visited the PdS before comprehensive dental treatment under GA.

In our study, those parents who attended the PdS were more likely than those who did not to return for the recommended recall visit of their children. Those children also were less likely to have new caries lesions develop after treatment under GA.

These results suggest that visiting the PdS helps to deliver effective information to parents/caregivers of young children, which may lead to better adherence to recommended post-operative visits and adoption of behaviors that reduce the risk for recurrent disease. Our findings are similar those from other studies <sup>13,15,16</sup>.

Employing the Promotora Model may help to deliver effective information to parents/caregivers of young children. The adaptation of this model holds great promise in increasing the oral health-related knowledge and skills of underserved communities, which could lead to improved children's oral health status.

Finally, as the authors have stated before <sup>11</sup>, the findings suggest that incorporating a PdS within a clinical dental setting is a favorable individualized educational strategy for Hispanic/Latino populations to increase recall visits post-GA treatment and to reduce the incidence of new caries lesions and their sequelae. Furthermore, the use of a bilingual dental public health specialist helped parents understand the importance of the oral health of their children.

## **Conclusions**

Patients who saw the Promotora before dental treatment under GA were significantly more likely than those who did not see the Promotora to return for at least one post-GA recall visit. Moreover, those who saw the Promotora were

significantly less likely to experience new caries lesions compared to those who did not see the Promotora. After controlling for race/ethnicity, sex, and age, Promotora status remains the only statistically significant correlate of caries in this study. We can conclude that incorporating the Promotora model for minorities and high-risk patients has the potential to improve oral health care and outcomes of treatment.

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