Self-efficacy and oral health in low-income African American children and their mothers in Detroit

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Abstract (updated)

**Background:** The Detroit Dental Health Project (DDHP; NIDCR grant U-54 DE 14261-01) collected survey and dental exam data from 1,021 lower-income African American families on their oral health practices, health and parenting beliefs, social and environmental health determinants, and dental outcomes (from self-reported perceptions and clinical evaluations) in a study of intra-group oral health disparities. Supplemental focus group data further investigated caregiver-identified barriers to taking care of their young (age 0-5) children’s teeth and caregivers’ feelings of efficacy (confidence in ability to clean children’s teeth despite barriers). The present study includes 750 mothers of children 1-5 from the sample.

**Objective:** To measure the magnitude and strength of mothers’ efficacy beliefs, identify barriers to cleaning children’s teeth, and examine the relationship between efficacy beliefs, toothbrushing patterns, and oral health status.

**Methods:** Descriptive and regression analyses of DDHP survey data were conducted to quantify the relationships between (overall and extreme) efficacy scores with children’s dental outcomes. Two focus group sessions were held to discuss barriers to cleaning children’s teeth and aspects of efficacy beliefs.

**Results:** Children’s toothbrushing at bedtime was significantly positively correlated with maternal efficacy scores (r=0.18, p<0.0001). Efficacy scores predicted regular toothbrushing at bedtime. Caregivers reported not being confident about cleaning children’s teeth when they were tired (11.7%) and too busy (11%). These top two barriers were also most frequently cited in the focus groups.

**Conclusion:** Maternal efficacy and other beliefs appear to be important predictors of young children’s oral health outcomes and practices.

**Learning Objectives:**
1) Describe the prevalence and correlates of dental caries in early childhood
2) Describe current research findings linking maternal self-efficacy and African American children's oral health
3) Discuss intervention strategies aimed at maternal efficacy to reduce the public health burden of oral health disparities.

**Keywords:** Oral Health, Child Health Promotion
Introduction and Background

Dental caries (also called tooth decay or cavities) is the most common chronic disease affecting children.

Socially disadvantaged individuals experience higher levels of dental caries and poorer oral health than their counterparts.

Despite the overall decline in caries in the last thirty years, disparities exist and it remains prevalent among lower-income African-Americans (Eklund et al 1997; Mueller et al 1998; Vargas et al 1998; Brown et al 2000).

These disparities are most striking among preschool children.
- the proportion of 2-4 year olds with dental caries is 18%, and among African Americans aged 2-4 is 24% (Healthy People 2010 estimates)
Objective

The field of maternal and child health has identified the need for research to assess oral health knowledge, attitudes, beliefs, and practices of mothers and children (Frazier and Horowitz 1990).

However, such research is sparse, and the processes by which social location translates into poor oral health starting in earliest childhood have yet to be explicated.

This study seeks to understand part of this process and the relationship between psychosocial factors and health outcomes by exploring how African-American mothers’ self-efficacy (perceptions of one’s capability to overcome barriers and perform a particular behavior) is associated with the oral health status and brushing practices of their young children.
Population Studied

• Data are from the Detroit Center for Research on Oral Health Disparities (Detroit Center, a.k.a. the Detroit Dental Health Project or DDHP), a population-based study examining intra-group disparities in 1,021 African-American children under age 6 and their main caregivers living in the poorest 39 Census Tracts in the City of Detroit.

• Survey and dental exam for children aged 1-5 and their mothers were used for this study (N=750). Supplemental focus group data was also collected.
METHODS - 1

- Descriptive, bivariate, and nested regression analyses were conducted to examine how mothers’ efficacy scores, other oral health beliefs, and psychosocial characteristics related to her young children’s dental outcomes and brushing practices.

- Analyses were driven by Social Cognitive Theory, an approach to understanding human behavior, motivation, affect, and thought processes (Bandura 1986).
METHODS - 2

• **Independent variables** include family socio-demographics, child’s past dental care and insurance status, and the mothers’ dental beliefs and measures of psychosocial characteristics.

• **Dependent variables** in the multivariate models:
  * **Brushing rate** = Reported total number of times the child’s teeth were brushed in the last week (by the child or other).
  * **Mother’s perception of her child’s oral health status**: Excellent, Very Good, Good, Fair/Poor.
METHODS - 3

Two supplemental focus group sessions of comparable caregivers (9-10 each) were held to discuss:

• barriers to cleaning their children's teeth,
• methods for overcoming those barriers,
• factors that affected their feelings of efficacy,
• how to care for children’s teeth,
• how caregivers can make a difference in their children’s oral health.
Self-efficacy variable

Every parent experiences moments (times) when it is difficult to get their children’s teeth brushed. For each situation or feeling that I read please indicate how confident you are that you can get your child’s teeth brushed when it is not automatically done at bed time. When you are ______, how confident are you that you can have your child’s teeth brushed before bedtime? 1=not at all confident to 4=Very confident.

E1. under a lot of stress
E2. depressed
E3. anxious
E4. feeling like you do not have the time (too busy)
E5. tired
E6. worried about other things in your life
E7. bothered by your child crying
E8. bothered because your child doesn’t stay still when you want him or her to brush
E9. told by your child that he/she does not feel like brushing right now

Negative Affect subscale

Excuses subscale

Resistance subscale

– Alpha reliabilities were all above 0.88 for the individual items.
– Extreme efficacy scores were considered those in the first (low, 9-20) and fifth (high, 34-36) quintile of summed responses.
– Responses from the 9 items were averaged to generate a single efficacy score.
– Adapted from the Cancer Research Prevention Center Exercise Efficacy Scale, from web: www.uri.edu/research/crpc/measures/exercise04.htm
Distribution of responses to efficacy item statements, by mothers of children aged 1-5 (N=749)

- Stressed
- Depressed
- Anxious
- Too busy
- Tired
- Worried
- Bothered by crying
- Bothered by moving
- Child refusal

Efficacy item statement

Disribution of responses to efficacy item statements, by mothers of children aged 1-5 (N=749)
RESULTS – Brushing

• Being busy and tired were the top two barriers in the survey and most frequently cited by the focus groups.

• Focus group participants also expressed that they would feel more confident if there were fewer barriers to daily brushing. They suggested making a chart for the child to remind the caregiver and child to brush, having older siblings help watch younger ones, and building brushing into the daily routine early.
RESULTS- Brushing

• Maternal self-efficacy was positively associated with children’s weekly brushing frequency ($r=0.18$, $p< 0.0001$).

• Average frequency per week: $9.01 \pm 0.23$

Extreme efficacy scores also reflect this trend:
• Low efficacy / average weekly brushing rate $7.48 \pm 0.41$, $p=0.0001$

• High efficacy / average weekly brushing rate $10.46 \pm 0.37$, $p=0.0001$
• Insert multivariate table for 1-3 year olds brushing
• Insert multivariate table for 4-5 year olds brushing
Prevalence of early childhood caries* (ECC) by child’s age

<table>
<thead>
<tr>
<th>Child age</th>
<th>N</th>
<th>No caries</th>
<th>Precavitated enamel lesions</th>
<th>Cavitated enamel / dentin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>146</td>
<td>132 (91.4%)</td>
<td>3 (1.8%)</td>
<td>11 (6.9%)</td>
</tr>
<tr>
<td>2</td>
<td>160</td>
<td>104 (65.0%)</td>
<td>23 (14.3%)</td>
<td>33 (20.7%)</td>
</tr>
<tr>
<td>3</td>
<td>150</td>
<td>57 (43.3%)</td>
<td>43 (27.3%)</td>
<td>50 (29.4%)</td>
</tr>
<tr>
<td>4</td>
<td>148</td>
<td>33 (24.0%)</td>
<td>39 (26.9%)</td>
<td>75 (49.1%)</td>
</tr>
<tr>
<td>5</td>
<td>143</td>
<td>18 (10.6%)</td>
<td>48 (34.4%)</td>
<td>77 (55.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>747</td>
<td>344</td>
<td>156</td>
<td>246</td>
</tr>
</tbody>
</table>

*International Caries Detection and Assessment System criteria for caries detection
Association between child’s prevalence of ECC (No cavities, precavities, cavities) and perception of oral health (n, wt %)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair/Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cavities (n=334)</td>
<td>135 (68.23%)</td>
<td>99 (51.30%)</td>
<td>81 (39.23%)</td>
<td>29 (17.69%)</td>
</tr>
<tr>
<td>Precavities (n=156)</td>
<td>47 (23.75%)</td>
<td>38 (22.68%)</td>
<td>49 (24.01%)</td>
<td>22 (13.62%)</td>
</tr>
<tr>
<td>Cavities (n=246)</td>
<td>19 (8.02%)</td>
<td>45 (26.02%)</td>
<td>69 (36.76%)</td>
<td>113 (68.68%)</td>
</tr>
<tr>
<td>N</td>
<td>201</td>
<td>182</td>
<td>199</td>
<td>164</td>
</tr>
</tbody>
</table>

Note: p-value=0.0000 from chi-square test.

-Mothers’ perceptions of her young child’s oral health were associated with the child’s dental status, based on a clinical examination.
• Insert multivariate table for 1-3 year olds oral health status perception
• Insert multivariate table for 4-5 year olds oral health status perception
CONCLUSION

These preliminary findings suggest that some specific Social Cognitive Theory and psychosocial constructs are associated with children’s brushing frequency and mothers’ perception of her child’s oral health status.

BRUSHING

1-3 year old children’s weekly brushing frequency is expected to be higher if their mothers had higher levels of efficacy, less fatalistic beliefs, more knowledge of dental disease, fewer barriers to brushing, and mothers who brushed (modeled behavior) and took them for a dental checkup. Support with transportation was also helpful.

4-5 year old children’s weekly brushing frequency is expected to be higher if their mothers brushed (modeled behavior), had an annual household income above $10,000, and if the child had insurance.

ORAL HEALTH STATUS

Mothers with less knowledge of appropriate bottle use were more likely to rate their young child’s (1-3 year olds) oral health as fair/poor.

Mothers with more fatalistic oral health beliefs were more likely to rate their young child’s (4-5 year olds) oral health as fair/poor. Insured children were also less likely to have fair/poor rating.
Contributions

– Intra-group disparities and the complex links between social factors, dental behaviors, and caries prevalence can be examined.

– Implications for intervention in this high risk population – easy to assess and potentially modify these social cognitive and psychosocial factors.