

Reducing caries in South Asian children

Reducing Oral Health Risks in South Asian Immigrant Children: A Pilot Study¹

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IMPRESSIONS

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Abstract

South Asian immigrants are one of the fastest growing immigrant groups in the United States. Children in low income South Asian families are at high risk for early childhood caries, a common disease with implications for child development and health in adult life. Culturally sensitive, user friendly intervention models are needed to engage Asian immigrant families regarding oral health risk. We conducted a pilot/feasibility study of SAPNA (“South Asian Parents and Navigators Action”) for Child Oral Health, a home visit based intervention designed to reduce childhood caries risk in low income families in NYC. Sixty one South Asian families were recruited from pediatric practices and randomized into intervention and control groups. Seventy-five percent of participants were retained in the study; 100% of intervention participants received the full dose of the intervention. Though the study was not designed to detect group differences, a broad pattern of such differences was found; with positive changes in feeding, oral hygiene, and preventive dental care greater in the intervention group. Findings suggest that the SAPNA model is acceptable, feasible, and potentially efficacious.

Key Words: oral health, health disparities, South Asians, immigrant health, child health, childhood caries

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Early childhood caries (ECC) is the most prevalent chronic disease of childhood, affecting 23% of 2-5 year olds. Poor and immigrant children bear a disproportionate burden of disease (Council on Clinical Affairs, 2013) (Dye BA, 2015). Left untreated, caries can lead to pain (Levine, Pitts, & Nugent, 2002), infection (Pine, Harris, Burnside, & Merrett, 2006), and missed school time (Edelstein, Vargas, Candelaria, & Vemuri, 2006). Early caries experience impacts adult oral health (Broadbent, Foster Page, Thomson, & Poulton, 2013) (Li & Wang, 2002).

The development of ECC is closely linked to feeding practices, oral hygiene, and early preventive dental care. Feeding practices that increase caries risk include: drinking from bottles beyond the advised weaning age of 12-15 months (American Academy of Pediatric Dentistry) (Behrendt, Sziegoleit, Muler-Lessmann, Ipek-Ozdemir, & Wetzel, 2001; Robke, 2008), adding solids and sweeteners to bottles, (Hyden & Bonuck, 2014) nighttime feeding, and sweetened beverages/snacks. (Evans, Hayes, Palmer, Bermudez, Cohen, et al., 2013; Evans, Hayes, Palmer, Bermudez, Naumova, et al., 2013) Oral hygiene behaviors in the first year of life, e.g., tooth-brushing, also affect the development of ECC. (Wigen & Wang, 2015)

Regarding preventive dental care, the American Academies of Pediatrics (AAP) and of Pediatric Dentistry (AAPD) recommend establishing a dental home for young children around the time the first tooth erupts and a first visit to the dentist before 12 months of age. (Dentistry, 2013; Ramos-Gomez, Crystal, Ng, Tinanoff, & Featherstone, 2010; Section on Pediatric & Oral, 2008). Yet, just 1% of US children visit a dentist by one year of age (Section on Pediatric & Oral, 2008). Lack of health insurance is one barrier (Institute of & National Research, 2011) but even children with Medicaid or CHIP have low rates of dental visits utilization (Hakim, Babish, & Davis, 2012). And despite frequent pediatric well-child visits for birth to age two, oral health counseling and dental visit referrals from pediatric health care providers remains low (Lewis, Grossman, Domoto, & Deyo, 2000; "Maintaining and improving the oral health of young children," 2014) (de la Cruz, Rozier, & Slade, 2004; Long et al., 2012) ,

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South Asians are one of the fastest growing immigrant groups in the United States. South Asian (SA) immigrant communities are at high risk for ECC, even controlling for socio-economic status (Gray, Morris, & Davies, 2000). Cariogenic feeding practices--delayed weaning and frequent consumption of sweets and sweet drinks—are common in SA communities (Faruque et al., 2008; Godson & Williams, 1996) . Young children consume diets heavy in milk, sweets, and pureed starches. SA mothers tend to be anxious about child feeding and often sweeten milk to encourage greater consumption (Karasz et al., 2014). In one study, 75% of 15-month olds were still using a bottle and 30% regularly drank sweetened milk (Watt, 2000; Williams, Ahmed, & Hussain, 1991a, 1991b; Williams & Hargreaves, 1990).

Preventive oral health behaviors are undervalued in SA communities. Families may seek dental care only when there is pain or visible decay; baby teeth may be seen as dispensable (Karasz, Patel, Ranasinghe, Chaudhuri, & McKee, 2014). Our prior qualitative study revealed that despite knowledge of cariogenic feeding behaviors, mothers felt disempowered to change these behaviors, viewed oral hygiene as unnecessary for their 6-18 month olds, and did not believe that care of primary teeth would impact the health of their children's permanent teeth (Karasz et al., 2014). Furthermore, in traditional SA societies, young mothers occupy a low status within the family. Senior family members often control decision-making(Williams & Hargreaves, 1990), thus reducing mothers' ability to change cariogenic feeding and hygiene practices.

To address ECC risk factors in this high risk group, we developed a home visit intervention, conducted by community health workers (CHWs). SAPNA (“South Asian Parents and Navigators Action”) for Child Oral Health targeted three key oral health prevention behaviors: feeding practices, oral hygiene, and dental care utilization.

. The first visit provided education and helped mothers set goals for change. A second visit engaged senior family members to support mothers' behavioral change plans. The goals of this pilot study were to: a) obtain baseline data on cariogenic feeding practices of low-income SA families in the US, and 2) pilot the acceptability and feasibility of the intervention.

Methods

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Setting and participants. Sixty-one participants were recruited from two pediatric practices in SAPPHERE (“South Asian Practice Partnership for Health Improvement and Research”), a practice-based research network in the Bronx, New York City. CHWs approached mothers in the waiting room to explain the study and screen for eligibility. Eligibility criteria included: a) mother is a Bangladeshi immigrant; b) mother speaks English or Bengali, c) child’s age is 6-18 months. After obtaining informed consent, CHWs conducted the baseline (T1) interview and then randomized participants at an approximately 2:1 ratio to Intervention (n=38) or Control (n=21) groups. The study was approved by the Albert Einstein College of Medicine Institutional Review Board.

Controls were scheduled to receive a pediatrician-delivered Enhanced Usual Care (EUC) condition consisting of: a) a pamphlet about oral health for young children, tailored for this study, based on one developed by the National Institute for Dental and Cranial Research; b) a brief 5 minute oral health counseling module (see Figure 1); and c) a referral list of available local dentists. The referral list was created based on preliminary pilot work. A researcher with our team posed as the parent of a young child, calling providers near the study practices to request an appointment. To be included on the list, the dentist/dental practice had to: accept the public and private insurance plans most used by the pediatric clinic patients, be willing to see a 12 month-old child, and be able to offer a visit within 2 weeks.

In addition to the EUC, the Intervention group was scheduled to receive the experimental intervention, delivered by CHWs. This consisted of home visits (n=2), follow up phone calls (n=3), and navigational support toward making an oral health visit within the 12 month project period. Intervention activities were based on a Motivational Interviewing model. One home visit was conducted with the mother-child dyad; the second included the husband or another family elder.

Home visit intervention. The following components were included in the initial visit with the mother:

Step 1 elicited the mother’s knowledge, attitude and practices regarding child oral health.

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Step 2 provided education as requested by the mother, using a culturally appropriate flipchart and other materials developed for the study. Educational messages are provided in Table 1.

Step 3 set goals for change. Mothers were asked to set goals for: 1) bottle-feeding; 2) oral hygiene; and 3) making a dental health visit with a provider on the Pre-Screened Provider Referral list.

Step 4 developed a written action plan, with goal worksheets, by target area. Potential barriers to achieving goals (e.g., child refuses unsweetened milk bottle, family objects to change) and strategies (enlist family member to distract child, gradually reduce sweetener) were discussed.

Family home visit. The family visit followed the same format as the initial visit. In addition, the CHW engaged family members (e.g., husband, mother-in-law) in support of maternal decision-making. Goals were to: 1) assess barriers to behavior change from the perspective of family elders; and 2) gain their 'buy in' for the mother's oral health prevention goals.

Follow up telephone support. The CHW followed up with the mother at 3, 6, and 9 months from the initial home visit. At each call, she asked about the family's goals for change, gauged progress, and assisted with trouble shooting. Additional phone support and follow up was provided as needed.

Patient navigation support. Depending on readiness, the CHW offered navigation support in making the dentist visit. Support was available in making the appointment, accompanying the mother to the visit, and providing translation if needed.

Strategies to increase fidelity

Control condition. Physicians participated in a training visit with the third author (KM). Study staff collected completed physician counseling checklists on a regular basis to determine whether the counseling session was provided. **Intervention condition.** CHWs completed six days of training in: oral health, empowerment theory, counseling skills, and motivational interviewing (MI). To promote fidelity, a SA clinical supervisor held weekly supervisory meetings and conducted periodic observations of CHW visits in the home. Detailed data on home visits were collected and reviewed at these meetings.

Data Collection and Analysis

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Data were obtained at baseline (T1) and 12-month follow-up (T2). CHWs conducted the baseline interview at the primary care practice. Research assistants, blinded to treatment group, obtained follow-up data during the final home visit.

Measures

A *demographics questionnaire* was administered at baseline. *Bottle-feeding and dietary data* - were obtained via a food feeding questionnaire (FFQ), adapted for a SA study population from a national study (Fein et al., 2008). The FFQ queried mothers about how many times, in the past 7 days, their child was fed a variety of foods and beverages, including sugar sweetened beverages (SSBs). In addition, the measure was adapted to assess the frequency of bottle feeding and bottle additives (Bonuck, Avraham, Lo, Kahn, & Hyden, 2014). *Oral hygiene*- was assessed using a questionnaire adapted from a measure widely used by the Centers for Disease Control, which includes items on tooth-brushing, use of toothpaste, and bottle-feeding at nap or bedtime. *Dental care utilization*- was assessed by asking whether the child had completed a visit to an oral health provider during the study period.

Demographics are described by mean (SD) or nominal data. Chi-square and t-test statistics were used to analyze treatment group differences for categorical and continuous variables, respectively. Descriptive statistics are presented for continuous and dichotomous outcomes. Feeding and oral health practices are shown as continuous variables (mean [SD]) by treatment group at baseline and follow-up. Though the pilot study was not powered to detect group differences, we analyzed treatment group differences in continuous variables related to feeding and oral health (e.g., frequency of sweet intake) practices by Wilcoxon rank-sum test at both time-points. For dichotomized feeding and oral health variables (any/none)), we employed a Generalized Estimating Equation (GEE) logistic regression that included time-point, treatment group, and their interaction term to assess the intervention effects. The odds ratios and 95% confidence intervals (OR, 95% CI) comparing 12-month follow-up versus baseline for each treatment group are reported.

Results

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The study enrolled 61 dyads, of whom 39 were assigned to the Intervention group. At 12 month follow-up, 85% were retained- 31 from the Intervention group and 21 from the control group. A description of the baseline sample is shown in Table 2. Most mothers were housewives, and about half were comfortable speaking English. About half had less than 12 years of education. The average length of residence in the US was 5.6 years.

We assessed implementation of the EUC condition (both groups) and the Intervention. For the EUC, physicians were requested to complete a checklist after each visit with a participant, indicating delivery of the counseling session, dental referral, and pamphlet. However, fewer than half of visits were associated with a completed checklist, suggesting that the EUC was not delivered consistently. By contrast, 100% of the Intervention group received the full-dose of intervention (2 visits + 3 phone calls).

Baseline data indicates high rates of bottle use, use of sweetened beverages, and low rates of tooth brushing. Only 14 children reported having a dental visit at baseline. There were no significant differences in bottle, dietary or oral health practices between groups, except for dental visit (Table 3).

At 12-month follow-up, the Intervention group consumed significantly fewer total and nap/nighttime bottles compared to Controls. They also consumed fewer bottles with additives, SSBs, and sweets, though these differences were not significant. While toothbrush and toothpaste use remained comparable between groups, the Intervention group was more likely to have seen a dentist at follow-up.

We also compared the odds of any improved feeding and oral hygiene practices at follow-up vs. baseline between two treatment groups (Table 4). Overall, the Intervention group improved its cariogenic risk behavior profile more than Controls (except for any night time bottle use), though differences were not statistically significant. For example, the odds of bottle use among controls increased by 2.5-fold (150%) from baseline to follow-up, but decreased by 36% in the Intervention group. Changes in the odds of adding solids/sweeteners to bottles (0.36 vs. 0.75) and consuming SSBs (5.66 vs. 10.45) differed sharply across the two groups. While both groups markedly increased their initiation of toothbrush and toothpaste use, the increase of odds for having done so at follow-up compared to baseline was far greater in the Intervention group.

Conclusion

Cariogenic feeding practices and poor oral hygiene are the primary contributors to ECC, the most common disease of early childhood. Despite known links between early-life feeding practices and ECC, fewer than 1 in 20 studies have involved interventions or extended follow-up. (Chaffee & Cheng, 2014) We conducted a pilot study of a home visit intervention, designed to improve the cariogenic risk profile of a high risk SA immigrant population. Baseline data for feeding and oral health behaviors affirms the need for interventions to promote guideline concordant behavior. The high follow-up rate at 12 months (75%), and intervention dose received (100%) affirm our team's ability to implement the study and families' receptivity to it. Though the study was not powered to detect treatment group differences, the intervention was associated with marked improvement in cariogenic risk behaviors. Unfortunately, our brief physician intervention, designed to be administered by pediatricians during the office visit, was poorly implemented. This reflects other research suggesting low rates of oral health counseling and referral in primary practices (Lewis et al., 2009), and underscores the barriers to changing physician behaviors in the busy, real world practices.

Our findings align with results from other home visit interventions for ECC, all conducted outside the US, several of which have shown benefits (Feldens, Vitolo, & Drachler Mde, 2007; Plonka et al., 2013) Overall, successful interventions are characterized by a more intensive schedule of home visits than that provided in our intervention; one home intervention with fewer visits was less effective (Whittle, Whitehead, & Bishop, 2008). Overall, as noted by the 2014 Early Childhood Caries Conference: "...there remains a surprising paucity of high-quality evidence to support the effectiveness of any specific clinical, behavioral, or community-based interventions targeting children younger than 6 years old."(Garcia et al., 2015)

This pilot study has several strengths. CHW home visits represent a user-friendly and cost-effective delivery approach (Kowash, Toumba, & Curzon, 2006). Interventions that are bi-lingual and culturally sensitive are most effective in immigrant Asian communities in the US (Chi, Ko, & Kim, 2014) . Our incorporation of family decision-makers respected participants' traditions, and likely reinforced the intervention's impact. Weaknesses include the limited scope of this pilot study and poor implementation of an

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enhanced usual care physician intervention. A future scale up of this intervention will replace the physician counseling session with an office based community health worker intervention.

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Table 1: Educational Messages

Messages	Content
Risk Behaviors	<i>Lack of brushing, sharing saliva, lack of preventive care, feeding practices</i>
Impact	<i>Pain, appearance, school absenteeism and performance, self confidence</i>
Strategies	
Feeding Practices	<i>Milk or breast milk only in the bottle, water only when napping, limit sweets and processed food snacks to meal times, wean by 12 months</i>
Oral Hygiene	<i>Brush with smear/pea sized lump tooth paste, do not share saliva with baby</i>
Oral health care	<i>Complete an oral health appointment by 1 year (or as soon as possible thereafter)</i>

Table 2: Sample Demographics

	Control (N=22)	Intervention (N=39)
Children, ≥ 2	12 (57%)	28 (72%)
Comfortable in English	10 (48%)	14 (37%)
Child Age in Months, mean (sd)*	1.0 (0.24)	1.17 (0.26)
Mother's Age in Years, mean (sd)	30.4 (4.5)	30.4 (5.3)
Education, highest degree		
≥ 12 th grade	9 (47%)	10 (32%)
Employed, Currently	5 (25%)	2 (6%)
Years in US, mean (sd)	5.6 (5.0)	5.0 (4.1)

* indicates significant ($p < .05$) difference between two treatment groups.

Table 3. Frequency of Cariogenic-Related Practices

Mean (sd)/week		Baseline		Follow-Up*	
		Control	Intervention	Control	Intervention
Bottles					
	Total	25.4 (23.5)	21.4 (21.9)	22.3 (16.2)	11.7 (16.1)
	At Nap/Bedtime	9.9 (11.6)	5.9 (9.1)	12.9 (11.7)	6.1 (2.7)
	With Additions	6.5 (13.3)	5.5 (10.0)	6.0 (13.5)	4.2 (12.9)
Dietary (servings)					
	SSB	4.9 (5.4)	3.5 (4.9)	7.9 (8.1)	5.5 (6.8)
	Sweets (Solids)	0.4 (1.6)	0.4 (1.3)	2.6 (3.7)	1.4 (2.0)
Oral Health					
	Brush Teeth	6.0 (6.5)	2.5 (4.9)	9.3 (4.6)	9.6 (4.1)
	Toothpaste Use	3.2 (5.8)	2.3 (4.8)	8.0 (6.0)	9.0 (4.6)
	Dental Visit, ever	0 (0%)	1 (3.0%)	3 (14.3%)	22 (75.9%)

* Bold indicates significant ($p < .05$) difference between two treatment groups.

Table 4: Odds of Cariogenic-Related Practices: Follow-Up vs. Baseline

	Control, OR (95% CI)	Intervention, OR (95% CI)
Bottles (Any)		
All Bottles	2.50 (0.33- 18.81)	0.64 (0.37- 1.12)
At Nap/Bedtime	2.01 (0.67- 6.05)	2.29 (0.93- 5.60)
With Additions	0.75 (0.29- 1.96)	0.36 (0.15- 0.83)
Dietary (Any)		
SSB	4.50 (0.95- 21.23)	1.57 (0.63- 3.93)
Solid sweets	10.45 (1.91- 57.28)	5.66 (2.12- 15.08)
Oral Health (Any)		
Toothbrush Use	9.93 (2.17- 45.42)	86.56 (11.81- 634.27)
Toothpaste Use	7.59 (2.41- 23.95)	33.65 (7.29- 155.28)

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Figure 1: Enhanced Usual Care Pediatrician Protocol

Physician Talking Points Checklist

Please have a 3-5 minute conversation with this family regarding oral hygiene and caries prevention for their 11-15 month old child.

If possible, communicate the following points. Check off each point that you cover. This checklist will be collected by our study staff within the next couple of weeks.

- Wean your child off the bottle starting now
- Milk or water only in the bottle
- Avoid sweets and sweeteners
- Don't feed your child while lying down or asleep
- Start brushing when your child has one tooth
- Use a smear of fluoride toothpaste
- Make an appointment with a dentist now

Provide Mom with

- Educational pamphlet in language of her choice
- Referral list of local dentists