Benefits of Oral Health Education at Women, Infant, and Children (WIC) Clinic Visits: Assessments of Parent's Oral Health Beliefs, Behaviors and Dental Access in O'ahu, Hawai'i

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Abstract

Improving oral health outcomes in Hawai'i for children and families remains a high priority. Children in the state are leading the nation with the highest caries rates, while women before, during, and after pregnancy are failing to receive regular and necessary dental care resulting in poor health outcomes. To answer for this need, an educational intervention was conducted among families enrolled in the Kapi'olani Medical Center for Women and Children's Women, Infant, and Children program (WIC) in O'ahu. The project included the following activities: (1) identification the oral health beliefs and behaviors of families, (2) providing oral health education to families, and (3) reassessing beliefs and behaviors in 3-6 months to document the impact of the education session. Participants consisted of 81 families resulting in the data on 176 children and 4 pregnant women. Of the 81 families, 40 representing 84 children completed the follow-up oral health questionnaire. Results of the assessment and education demonstrated a positive impact on the family's oral health behaviors. Parents were 6.61 times as likely to report using fluoride toothpaste in the follow-up visit compared to their initial visit (95% confidence interval [CI]=3.12-14.00). Additionally, statistically significant changes were noted in the frequency of children's daily tooth brushing (odds ratio [OR]=2.15, 95% CI=1.33-3.46), as well as in the incidence of children receiving fluoride varnish application over time (OR=2.66, 95% CI=1.50-4.73). These results provide further evidence that initiating a simple educational intervention can have a positive impact on oral health behaviors in groups that are at highest risk for developing dental disease in Hawai'i.

Keywords

Children, Hawai'i, Oral health, Pregnant women, WIC Clinic

Abbreviations

CI = Confidence interval
KMCWC = Kapi'olani Medical Center for Women and Children
OR = Odds ratio
Q = Question
WIC = Women, Infant and Children program

Introduction

The State of Hawai'i faces oral health challenges due to its geographical location, cultural diversity, high cost of living, lack of a dental schools, limited dental benefits for adults with MedQuest (Medicaid) insurance and no current statewide fluoridation system, except on military bases.[1] These challenges have led to negative outcomes: 1) less than acceptable rates of women accessing recommended dental care prior to, during, and after their pregnancy and 2) caries rates for children that are more than double those documented in children residing in the contiguous United States (US),[3] resulting in a grade of "F" in consecutive oral health report cards published by The Pew Center on the States.[4,5]

The Hawai'i Oral Health: Key Finding Report (2015) indicated that there are substantial dental health disparities in Hawai'i, with low income populations having higher rates of dental problems while having less frequent dental visits.[1] The 2016 Hawai'i Smiles report, based on oral health surveillance of third graders, revealed that more than 7 out of 10 third graders (71%) experienced tooth decay, and oral health disparities for children were noted based on income, race/ethnicity and geography.[3]

Maintaining and improving oral health is particularly important during pregnancy because of the potential perinatal complications (eg, prematurity, low birth weight infants, pre-eclampsia) associated with dental disease in pregnant women,[6,7] and the possible transmission of cariogenic bacteria to their infants.[8] Despite documentation of the importance of dental visits before and during pregnancy, and the safety and efficacy of dental care at all stages of pregnancy, most pregnant women in Hawai'i do not see a dentist.[2] During 2009-2011, only 41% of pregnant women in Hawai'i reported seeing a dentist during their pregnancy.[2]

Increasing preventive oral health services by non-dental health care providers is one of the strategies suggested by the Hawai'i State Department of Health's Family Health Services Division. The implementation of preventive oral health programs in primary care practices in other states has been documented to be an effective way to change parents' oral health beliefs and behaviors and provide preventive treatments for children (eg, application of fluoride varnish).[9-10]

Despite the numerous articles acknowledging the benefits of water fluoridation for the prevention of caries, fluoride remains a topic of controversy in Hawai'i. However, to date, there has been limited information investigating the public's current knowledge about fluoride and family's acceptance of fluoridation if they knew it could benefit their child's oral and systemic health. The introduction of oral health education as part of WIC clinic services is not a new idea and has been implemented in WIC clinics throughout the US.[11-14] Positive outcomes that have been associated with oral health education including changes in clients' oral health beliefs and behaviors, increased rates of accessing preventive dental services, and a reduction of early childhood caries.[11-14]

The proposal for the oral health initiative for the Kapi‘olani Medical Center for Women and Children (KMCWC) WIC Clinic was based upon the best practices documented in the literature.[11-15] In addition, results from a recent oral health pilot project conducted at the Kona WIC Clinic on Hawai‘i island revealed that providing information to parents about current recommendations for caries prevention was welcomed by clients.[15] The analysis of the data collected at the Kona WIC Clinic resulted in several key findings about the oral health practices of families and health care providers in the region. Parental knowledge about fluoride was limited, with almost half stating they had no knowledge. In addition, despite the state's lack of community fluoridation for the majority of the population, there was a low percentage of infants and children >6 months of age, receiving fluoride prescriptions (40%) and equally low percent who had received fluoride varnish (42%).[15]

As the result of the Kona WIC project findings, the KMCWC WIC oral health project was proposed to further evaluate this simple intervention. The Kona WIC pilot project involved a single questionnaire and educational session without any subsequent encounters with the clients to determine retention of knowledge about oral health and clients' successes and challenges accessing dental care. To obtain this information, the KMCWC WIC Clinic Project added a 3-6–month follow-up visit so that clients participating in the project could complete a follow-up questionnaire to assess whether there were any behavior changes and access to dental services following the initial oral health education.

Methodology

The oral health project at KMCWC WIC Clinic, consistent with the Kona WIC project, was developed to be a simple and sustainable solution to address the prevention of dental disease in pregnant women and young children (ie, children 5 years of age and younger). WIC Clinic are an excellent environment for providing oral health messaging for several reasons: 1) pregnant women and mothers with children under age 5 years have regular WIC visits; 2) maternal and child nutrition, which can affect oral health outcomes, is discussed at each WIC visit; and 3) WIC Clinic staff are known and trusted by the families as a valuable source of information about available services in their community. The KMCWC WIC Clinic is located in Honolulu on the island of O‘ahu.

Study criteria for participation included being a KMCWC WIC-enrolled families (ie, parent/guardian of a child or pregnant woman), residing in O‘ahu, and English-speaking. Families were excluded if they could not speak English or were returning to their residence, not located on O‘ahu, within the next 6 months. Oral health questionnaires were used to determine parent's oral health beliefs and behaviors and included questions pertaining to their current oral hygiene habits, nutrition intake, knowledge and use of fluoridation, and dental access. The questionnaires were developed based on previously published studies, including the Kona WIC study as well as feedback from state and national dental experts.[15]

There were 2 time points during the project in which data was collected using the oral health questionnaires. The initial visit consisted of parental consent, completion of the initial questionnaire, oral health education and provision of dental supplies (ie, toothbrush, toothpaste, dental floss) to the family. The oral health education included information on nutrition to reduce caries (ie, limit sugar, juices, eliminate bottle use by 14 months), proper dental hygiene (ie, brushing twice a day, floss daily), description of fluoride and proper use (ie, toothpaste, prescription, varnish), and the importance of preventive dental visits every 6 months. Educational brochures were provided to support this short 5-7–minute oral health education session. The follow-up visit took place 3-6 months after the initial visit and consisted of completion of the follow-up questionnaire, additional oral health education based on the participant survey responses, and provision of dental supplies to the family, which reinforces the importance of changing one's toothbrush every 3 months.

Prior to implementation, the University of Hawai‘i Committee on Human Studies and the Western Institutional Review Board reviewed and accepted the project proposal, satisfying KMCWC requirements for the protection of human subjects for quality improvement or research projects conducted at the Medical Center.

Recruitment

Program recruitment and educational materials were developed based on a review of the literature documenting the best practices about the integration of oral health into WIC Clinics as well as the experiences and the recent results from the WIC Kona Pilot Project.

At the clinic's main desk, the receptionist invited clients checking in for appointments to participate in the project. Clients willing to participate in the project were provided the appropriate informed consent form (ie, non-pregnant women with children received the child informed consent document and pregnant women received the perinatal informed consent document). After signing the consent form, a member of the research team asked and recorded clients' responses to questions from the child and perinatal oral health questionnaires.

Once the questionnaires were completed, oral health education was provided for all of the children in a family based on the child's age and relevant history noted in the questionnaire. Following parent/guardian education, dental kits were distributed and a follow-up WIC appointment was made, allowing for the completion of the follow-up oral health questionnaire, further oral health education and distribution of additional dental kits, and endorsement of the practice of replacing toothbrushes every 3 months.

Statistical Analysis

Descriptive statistics were computed using frequencies, percentages, means, and standard deviations. Parent's response to oral health questionnaire was compared between the 2 time points using McNemar-Bowker's test (a generalized version of McNemar's test for variables with more than 2 categories). Significant questions were treated as binary (Yes vs. No/Other/Uncertain, More than once a day vs. ≤Once a day). For the variables, generalized estimating equations for repeated measures (ie, baseline vs. post-intervention) were performed using logit link and accounting for correlation within family as well as adjusting for the baseline variables of parent's age, marital status, and child's age that presented significant association with at least one of the questions. Odds ratio (OR) and 95% confidence interval (CI) were used to assess the effect of the intervention on the questions. A *P*-value less than .05 was considered statistically significant and all analyses were performed in SAS 9.4 (SAS Institute: Cary, NC).

Results

Initial Visit Analysis

Initial participants included in the study were 81 families that resulted in the collection of data on 176 children and 4 pregnant women. However, due to the small number of pregnant women, the analyses were restricted to the parents with children in this study. Table 1 presents the characteristics of WIC clients who completed the initial questionnaire. The majority of caregivers completing the survey were noted to be the mother of the children (98%) with an average age of 31 years (standard deviation [SD] = 6.4). A large percent (69%) of the children enrolled in the KMCWC WIC Clinic were cared for by parents with a high school or less than high school education. The ethnic and racial background of parents, mostly mothers, indicated that the majority of participants were non-Hispanic (93%) and identified as being more than one racial or cultural group. The largest

Table 1. Participant's Characteristics

Variable	Baseline (n=81)	Follow-up (n=40)	*P*-value[a]
Relationship with Child, n (%)			
Mother	79 (98%)	40 (100%)	1.0
Father	1 (1%)	0 (0%)	
Other	1 (1%)	0 (0%)	
Age, Mean ± SD (Range)	31.4 ± 6.4 (20-49)	29.8 ± 5.7 (20-44)	.022
Marital Status, n (%)			
Married/Cohabitated	60 (74%)	28 (70%)	.41
Other (Never Married/Separated)	21 (26%)	12 (30%)	
Ethnicity, n (%)			
Non-Hispanic or Latino	75 (93%)	36 (90%)	.43
Hispanic or Latino	6 (7%)	4 (10%)	
Race*, n (%)			
White	17 (21%)	11 (28%)	.155
Asian	42 (52%)	26 (28%)	.019
Chinese	18 (22%)	11 (28%)	.26
Japanese	14 (17%)	9 (23%)	.22
Filipino	17 (21%)	13 (33%)	.015
Other Asian	6 (7%)	2 (5%)	.68
Hawaiian or Other Pacific Islander	43 (53%)	20 (50%)	.58
Native Hawaiian	24 (30%)	16 (40%)	.044
Other Pacific Islander	21 (26%)	6 (15%)	.027
Other Race	4 (5%)	1 (3%)	.62
Highest Level of Education, n (%)			
Less than or Equal to High School	55 (69%)	26 (65%)	.47
Some College or Greater	25 (31%)	14 (35%)	
# of Children per Family, Mean ± SD (Range)	3.2 ± 2.1 (1-10)	4.3 ± 2.3 (2-10)	<.001

* Participants can choose multiple races.

[a] To compare participants who did not complete the follow-up questionnaire and who did, Fisher's exact test or Chi-square test for categorical variable and two sample t test for continuous variable was conducted.

percentage of participating mothers came from minority groups that included Native Hawaiian (30%), Other Pacific Islanders (26%), Filipino (21%), Chinese (22%), and Japanese (17%).

Table 2 shows the clients' responses of the oral health questionnaire for initial visit. When responding to the question about when they started cleaning their child's teeth about half (48.9%) responded they started cleaning their child's teeth when the first tooth came in. For the parents who started cleaning their child's teeth, the authors asked if they used fluoride toothpaste to brush their child's teeth (Question [Q] 6). Results indicated that only 57% of parents were using fluoride toothpaste for their children, while 19% reported being unsure if the toothpaste they were using for their child contained fluoride. Additionally, parents were asked to indicate whether their child's pediatrician prescribed fluoride drops or tablets (Q8). The results indicate among children old enough to receive fluoride supplements (ie, >6 months), over one-third were not given a fluoride prescription. Among parents given a prescription for their children, almost 70% gave it daily (Q9). Parents were asked if their child ever had fluoride varnish applied to their teeth (Q10). Results indicated that 50 of 151 (33%) of children >6 months old had not received any fluoride varnish application.

Dental access for children on O'ahu was also documented. Of those children who were at the recommended age of 1 year to receive preventive dental care (n=138), 64% were seen by a dentist during the past 3-6 months, 1% reported being seen 1-2 years previously, and 22% reported that their children had not been seen for a dental assessment (Q12). Dental care for mothers during and after pregnancy was also measured (Q15). Results from the initial questionnaire revealed that 66% of mothers did not see a dentist during pregnancy and when asked to recall when they last had a dental evaluation the majority of mothers (65%) did not have routine dental care based on the American Dental Association recommendations.

Table 2. Oral Health Questionnaire at Baseline and Post Intervention

Variable	Baseline (n=176)	Post Intervention (n=84)	*P*-value
Q1. What is your child's age in years and months?	3.9 ± 3.5	4.4 ± 3.9	<.001
Mean ± SD (Range) (in years.)	(0-16)	(0.2-17)	
<1	38 (22%)	11 (13%)	
1-4	68 (39%)	36 (43%)	
5-8	49 (28%)	23 (27%)	
>8	21 (12%)	14 (17%)	
Q2. Is your child currently drinking from a bottle or breastfeeding?			.39
No	107 (61%)	59 (70%)	
Yes	68 (39%)	25 (30%)	
Both	1 (1%)	0 (0%)	
Q3. What do you most often put in your child's cup or bottle during the daytime?			.85
Water	114 (65%)	58 (69%)	
Milk	22 (13%)	8 (10%)	
Formula	23 (13%)	8 (10)	
Juice	3 (2%)	1 (1%)	
Other	14 (8%)	9 (11%)	
Q4. Does your child sleep with a cup or bottle (other than water) at nap or bedtime?			.096
No	153 (87%)	78 (93%)	
Yes	23 (13%)	6 (7%)	
Q5. When did you first start cleaning your child's teeth?			.040
When their first tooth came in	86 (48.9%)	66 (79%)	
After one year	51 (29.0%)	8 (10%)	
After two years	8 (5%)	0 (0%)	
Teeth have not been cleaned (skip to Q8)	6 (4%)	2 (2%)	
My child does not have any teeth yet (skip to Q8)	25 (14%)	8 (10%)	

Table 2. Oral Health Questionnaire at Baseline and Post Intervention (Continued)			
Question (Q)	**Baseline (n=176)**	**Post Intervention (n=84)**	***P*-value**
Q5 (Restricted to children aged ≥1 year).			
When their first tooth came in	78 (57%)	57 (85%)	.35
After one year	50 (36%)	8 (12%)	
After two years	8 (6%)	0 (0%)	
Teeth have not been cleaned (skip to Q8)	1 (1%)	0 (0%)	
My child does not have any teeth yet (skip to Q8)	1 (1%)	2 (3%)	
Q6. Do you use fluoride toothpaste to brush your child's teeth?*			
Yes, I use fluoride toothpaste	83 (57%)	66 (89%)	<.001
No, I use toothpaste without fluoride	25 (17%)	7 (10%)	
No, I do not use toothpaste at all	9 (6%)	1 (1%)	
I am not certain if the toothpaste has fluoride in it	28 (19%)	0 (0%)	
Q7. How often are your child's teeth brushed?*			
Between 1-3 times a week	12 (8%)	0 (0%)	.040
Between 4-6 times a week	2 (1%)	0 (0%)	
Once a day	42 (29%)	15 (20%)	
More than once a day	88 (61%)	58 (78%)	
N/A	1 (1%)	1 (1%)	
Q8. Has your child's pediatrician prescribed fluoride drops or tablets for your child?			
No (skip to Q10)	59 (34%)	29 (35%)	.48
Yes	104 (59%)	51 (61%)	
Too young (<6 months) (skip to Q10)	13 (7%)	2 (2%)	
Unsure (skip to Q10)	0 (0%)	2 (2%)	
Q9. How often do you give your child fluoride drops or tablets?*			
Every day of the week	71 (68%)	30 (59%)	.63
4-6 days of the week	7 (7%)	3 (6%)	
1-3 days of the week	4 (4%)	2 (4%)	
I rarely give my child fluoride drops or tablets	17 (16%)	9 (18%)	
N/A	5 (5%)	7 (14%)	
Q10. Has your child ever had fluoride varnish applied to their teeth?			
No	57 (33%)	21 (25%)	.002
Yes	85 (49%)	57 (68%)	
Too young (<6 months)	33 (20%)	4 (5%)	
Other	0 (0%)	2 (2%)	
Q10 (Restricted to children aged >6 months).			
No	50 (33%)	16 (22%)	.016
Yes	84 (56%)	56 (76%)	
Too young (<6 months)	16 (11%)	1 (1%)	
Other	0 (0%)	1 (1%)	
Q11. How important are your child's primary teeth (baby teeth) compared to their permanent teeth (adult teeth)?			
Extremely important	170 (97%)	82 (98%)	.26
Moderately important	4 (2%)	2 (2%)	
Somewhat important	2 (1%)	0 (0%)	
Not important at all	0 (0%)	0 (0%)	

Table 2. Oral Health Questionnaire at Baseline and Post Intervention (Continued)			
Question (Q)	**Baseline (n=176)**	**Post Intervention (n=84)**	***P*-value**
Q12. When was the last time your child saw the dentist?			
Within the past 6-12 months	112 (64%)	61 (73%)	
Within the past 1-2 years	2 (1%)	0 (0%)	
Over 2 years ago	1 (1%)	0 (0%)	.34
My child has never been seen by a dentist (skip to Q14)	39 (22%)	12 (14%)	
Too young (<1 year old) (skip to Q14)	21 (12%)	11 (13%)	
Not answered (skip to Q14)	1 (1%)	0 (0%)	
Q13. What were the reasons your child was brought to the dentist?*			
Regular check-up and cleaning	100 (87%)	56 (93%)	
Tooth pain	0 (0%)	0 (0%)	
To have a cavity filled	11 (10%)	1 (2%)	.26
Other	3 (3%)	3 (5%)	
N/A	1 (1%)	0 (0%)	
Q14. While you were pregnant with your child how many times did you visit the dentist?			
3 or more times	1 (1%)	0 (0%)	
2 times	11 (6%)	13 (16%)	
1 time	46 (26%)	27 (32%)	.004
I never saw a dentist when I was pregnant (skip to Q16)	117 (67%)	44 (52%)	
Not applicable – I am not the child's mother? (skip to Q16)	1 (1%)	0 (0%)	
Q15. What were the reasons you went to see the dentist while you were pregnant?*			
Regular check-up and cleaning	44 (76%)	31 (78%)	
Tooth pain	6 (10%)	2 (2%)	
To have a cavity filled	1 (2%)	0 (0%)	.30
Other	3 (5%)	7 (18%)	
N/A	4 (7%)	0 (0%)	
Q16. When was the last time you saw a dentist?			
Within the past 6-12 months	62 (35%)	36 (43%)	
Within the past 1-2 years	48 (27%)	18 (21%)	.85
Over 2 years ago	66 (38%)	30 (36%)	

Generalized McNemar's test was conducted to compare significant changes between baseline and post-intervention. Unsure and N/A were treated as missing and zero values were replaced by 0.001 to make a meaningful result.

* The total is smaller than the total number of the subjects who completed the survey (n=176 for baseline; n=84 for post-intervention) because of the skipped pattern from a previous question.

Follow-up Visit Analysis

Table 2 also shows follow-up visits. Of the 81 parents/guardians completing the initial questionnaire and receiving oral health education, 40 parents/guardians representing 84 children completed the follow-up questionnaire. This represents a completion rate of 49% (40 of 81) among families and 48% (84 of 176) among children. Five questions showed significant improvement over time. Table 3 presents the results from generalized estimating equations for the 3 follow-up visit questions that demonstrated significant changes in families' oral health behaviors over time.

The intervention had a positive impact on the family's oral health behaviors. Parents were 6.61 times as likely to report using fluoride toothpaste in the follow-up visit compared to their initial visit (95% CI 3.12-14.00). There was also a statistically significant change in the frequency of children's daily tooth brushing (OR=2.15, 95% CI 1.33-3.46), as well as a significant change in the incidence of children receiving fluoride varnish application over time (OR=2.66, 95% CI 1.50-4.73).

Parents who returned for the follow-up visit at the WIC Clinic were also asked to respond to 2 additional questions related to their acceptance and willingness to provide fluoride oral supplements to their children and their support of the use of fluoridated water for their children. Overwhelmingly, 98% of parents stated they would give fluoride drops or tablets every day and 89% would support water fluoridation if they knew these actions would result in a reduction of caries for their children.

Table 3. Odds Ratios and 95% Confidence Intervals of Mixed Effects Logistic Regression			
Variable	**Question (Q)6. Do you use fluoride toothpaste to brush your child's teeth?[a] [Yes vs. No/Uncertain]**	**Q7. How often are your child's teeth brushed?[a] [More than once a day vs. ≤ Once a day]**	**Q10. Has your child ever had fluoride varnish applied to their teeth?[b] [Yes vs. No/Other]**
Time			
Post vs. Pre	6.61 (3.12-14.00)***	2.15 (1.33-3.46)**	2.66 (1.50-4.73)**
Child's Age			
5-8 yrs. vs. 1-4 yrs.	3.00 (1.41-6.38)**	1.87 (0.86-4.09)	6.61 (3.22-13.55)***
>9 yrs. vs. 1-4 yrs.	2.83 (1.03-7.75)*	0.93 (0.38-2.28)	7.56 (2.71-21.08)***
Parent's Marital Status			
Married or cohabitated vs. Other	2.16 (0.89-5.20)+	0.31 (0.11-0.85)*	1.07 (0.51-2.24)
Parent's Age (in yr)	1.00 (0.94-1.06)	1.02 (0.96-1.08)	1.07 (1.01-1.13)*

+*P*<.01. **P*<.05. ***P*<.01. ****P*<.001. [a] Restricted to children of age ≥ 1 year. [b] Restricted to children of age ≥ 6 months. Unsure and N/A were treated as missing.

Discussion

The results of the KMCWC WIC Clinic Project provide further evidence that initiating a simple educational intervention can have a positive impact on oral health behaviors in groups that are at highest risk for developing dental disease in Hawai'i. Significant changes in parents' approaches to oral health for their children were observed after the educational intervention during the initial visit with participants. This intervention consisted of a simple and short (ie, less than 10 minutes) discussion about preventive oral health measures for children and pregnant women. It resulted in a significant increase in the frequency that children's teeth were brushed, the use of fluoride toothpaste, and having fluoride varnish applied to children's teeth. Similar results have been reported in WIC Clinics in the US; however, this is a new approach to documenting oral health behavior change via an education initiative at WIC Clinics for the State of Hawai'i.

Information about the educational attainment of the participants in this project revealed that a majority had completed a high school education but only one-third had completed any course work at a college level. This is important to consider when developing and implementing interventions to increase knowledge about oral health or other health related issues, so that educational sessions and materials are organized and described at a literacy level that promotes understanding and integration of key messages. In addition, it is important to adapt and translate educational materials into the WIC Clinic client population's first languages as English may be a new language for clients receiving services at WIC Clinics.

Project Limitations and Barriers

There are several key findings that have been identified by this study; however, there are also limitations that need be noted. This project was conducted at the KMCWC WIC Clinic located in Honolulu on O'ahu. The data obtained and analyzed for this project reflects the characteristics of women and children receiving services at a tertiary care medical center located in the capital city for the State of Hawai'i. Therefore, the generalizability of the findings of the project cannot be extrapolated to the neighbor islands and rural areas of the state.

Almost half of the clients who participated in the initial visit for the project returned on the scheduled day initially agreed upon to complete follow-up questionnaires, thereby providing data for analysis regarding parental oral health behavior change for their children. However, the inability of the researchers to be notified of clinic appointment changes by the families in a timely manner increased the number of families that were not seen for a follow-up survey and education during the approved study period. This reflects a respectable follow-up visit rate; however, the responses of these clients cannot be interpreted to represent those of the clients who participated in the initial project visit but did not return for the follow-up visit.

All educational materials used as part of this project were written in English. Although clients participating in the project stated that they could read English, English was not the preferred language of all participants. Because interpreter services are not offered by WIC Clinics, some of the content of the oral and written education materials for the project may have been less effective in achieving parental behavior changes due to language barriers.

One of the goals of this project was to improve the oral health of pregnant women. However, only 4 pregnant women agreed to participate in the educational intervention of this project, thereby preventing any analysis or interpretation of findings about their experiences of accessing dental care. Pregnant women are an important group that needs to have more comprehensive information collected and analyzed about their dental care so that feasible interventions can be developed, implemented, and evaluated to improve their oral health.

The project did not include an assessment of client satisfaction with or feedback about the educational sessions and referrals to dental care. This is an important aspect of any project that attempts to improve health care access, including dental care.

Conclusion

The relationship between nutrition, oral health, and systemic health is well documented; therefore, the integration of oral health education into the content of WIC Clinic visit for families is an ideal opportunity to impact overall health. In addition, the frequency at which WIC Clinic visits occur lends itself to repeated messaging about the importance of oral health for families.

Based on the information obtained from the KMCWC WIC Clinic Project, future program strategies can be developed, implemented, and evaluated to assist in successfully educating residents of Hawai ʻi who are at risk for adverse health outcomes associated with dental decay and transitioning them to dental providers in the community who are both willing and able to care for these clients' specific dental needs.

Conflict of Interest

None of the authors identify a conflict of interest.

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