Assessing the Knowledge and Dissemination of Nutrition Information Related to Oral Health in WIC Counselors and Clients

Brianne M. Butler

A thesis

Submitted in partial fulfillment of the

Requirements for the degree of

Master of Science in Dentistry

University of Washington

2014

Committee:

Penelope Leggott

JoAnna Scott

Susan Coldwell

Erica Lamson

Program Authorized to Offer Degree:

School of Dentistry

University of Washington

Abstract

Assessing the Knowledge and Dissemination of Nutrition Information Related to Oral Health in WIC Counselors and Clients

Brianne M. Butler

Chair of the Supervisory Committee:
Professor Penelope Leggott BDS MS
Department of Pediatric Dentistry

Purpose: To determine whether providing WIC counselors with targeted nutrition education related to oral health increases the dissemination of that information to WIC clients.

Methods: WIC counselors at 17 clinics in three Washington State counties received an oral health nutrition assessment. Counselors were assigned to a control or intervention group, the intervention being a presentation on oral health nutrition. Counselors who received the presentation repeated the assessment to see if there was an immediate increase in oral health nutrition knowledge. Three months later, all counselors repeated the assessment. A convenience sample of WIC clients at all clinics also received an assessment to see if there was a difference in oral health knowledge in clients based on whether their counselors received the intervention.

Results: 69 WIC counselors and 94 WIC clients participated in the study. A comparison of the control group pre-assessment (mean=76.8) and three month follow-up assessment scores (74.9) showed little change. Comparison of the pre-, post-, and three month follow-up scores of the intervention group showed a significant difference between pre- and post-assessment scores ($p<0.001$). Three months later, the scores of the intervention group were still significantly higher than their pre-assessment scores ($p<0.001$). While there was no significant difference between the control (mean=76.2) and intervention group (mean=72.2) prior to the presentation ($p=0.17$), there was a significant difference in scores after the presentation ($p=0.020$). No significant difference was seen between WIC clients when comparing the control (mean=62.4) and intervention (mean= 63.9) assessment scores ($p=0.50$).

Discussion: In our study, providing WIC counselors with targeted nutrition information as it relates to oral health significantly increased their oral health knowledge and the information gained through the presentation was significantly retained after three months. Counselors who receive training in oral health will have more accurate knowledge and will be more equipped to educate their clients on their dietary habits. Inter-professional relationships and training can increase the health knowledge and promotion among personnel outside their own specialty, ultimately increasing the number of professionals who can provide appropriate oral health education. While there was an increase in WIC counselor oral health knowledge, no increase was seen in the assessment scores of the WIC clients. Future studies should examine how inter-professional approaches to oral health promotion can be most effective among high-risk populations.

TABLE OF CONTENTS

Page

Figures……ii

List of Tables……iii

Introduction……1

Purpose of Study……5

Methods……6

Results……9

Discussion……11

Bibliography……25

Appendix A: WIC Counselor Demographic Questionnaire ……28

Appendix B: WIC Client Demographic Questionnaire ……30

Appendix C: Oral Health Assessment ……32

LIST OF FIGURES

Figure Number Page

1. Study Design Flow Chart……8

2. Control Group Assessment Scores Pre-Intervention and 3 Month Follow-Up……21

3. Intervention Group Assessment Score Pre-Intervention, Post-Intervention and 3 Month Follow-Up……22

4. Comparison of Control and Intervention Counselor Assessment Scores Pre-Intervention and 3 Month Follow-Up……23

5. Comparison of Control and Intervention Client Assessment……24

LIST OF TABLES

Table Number Page

1. Demographics of WIC Counselors 14

2. Oral Health and Specialty Training Demographics of WIC Counselors 15

3. Demographics of WIC Clients 16

4. WIC Clients and Oral Health 17

5. Differences in Assessment Scores within WIC Counselor Groups 18

6. Differences in Assessment Scores between the Control and Intervention Groups 18

7. Differences in WIC Provider Scores Pre- and Post- Intervention by Demographic and Knowledge Variables 19

8. Differences in Client Assessment Scores according to Client Demographics.....20

ACKNOWLEDGEMENTS

I wish to express sincere appreciation to all of the members of my thesis committee: Drs. Penelope Leggott, Sue Coldwell, JoAnna Scott, and Erica Lamson. I could not have done this project without your support.

DEDICATION

To my fiancé, Ian, for all of his love and support and to Lola, for always being by my side

INTRODUCTION:

It is well established that dental caries is the most prevalent disease of childhood.[1] While dental caries is decreasing in the permanent dentition among youths and adolescents, National Health and Nutrition Examination Survey (NHANES) data show that caries in the primary dentition actually increased from the 1988-1994 NHANES survey to the 1999-2004 NHANES in children age 2-5 years old.[2] Over 80% of the disease is seen in only 20% of the population[2]. This population includes children of low-income families, children with no or limited dental care insurance coverage, and those of ethnic minority groups. Among person aged 5-19 years, untreated caries were at least twice as high for those living below the federal poverty level.[3] Unfortunately, these children, who are the most vulnerable and in need of dental services, are also only half as likely to visit a dentist.[4] In order to better fight this growing epidemic there must be a clear understanding by vulnerable families of what causes dental caries and preventative measures that should be used to prevent caries. There also must be provider efforts to recognize what populations are at risk and investigations into how to best educate, motivate, and serve those at high risk for caries.

The Caries Process

The dental caries process is multifactorial with the four necessary components to create a cavity being bacteria, substrate, teeth, and time. Bacteria in the oral cavity attach to teeth and to each other to create a biofilm. The bacteria utilize monosaccharaides and disaccharides from the host's diet in their glycolytic pathways to produce energy. A byproduct from this metabolism is acid, which can then begin the process of demineralizing the tooth structure to which the bacteria is adhered. With frequent and repeated acidic attacks, the demineralized tooth structure will result in a frank cavitation. While the type of bacteria present in each individual does affect their caries risk, the role of dietary intake in the progression of caries is unquestionable. [5]

Overall, there is only a weak correlation between total sugar intake and the incidence of dental caries.[6] The largest increases in caries activity are noted when sugar is consumed frequently between meals.[7] Children shape their eating behavior according to the culturally appropriate pattern provided to them by their parents and in the United States, snacking several times a day and at any time of the day is observed.[8] Many of children's favorite snack foods are highly cariogenic. This includes foods high in fructose[7]and sticky foods, such as candy, fruit snacks or dried fruit, and fermentable carbohydrates that break down into sugars in the oral cavity, such as crackers, chips, and cereals. Acidic and sugary beverages, such as soda and juice, also play an important role in the caries process.[9] Besides consuming sugar between meals, other dietary associations for early childhood caries include frequent night time bottle-feeding, breastfeeding more than 7 times daily after 12 months of age, at will bottle or breastfeeding after the introduction of other dietary carbohydrates,[10] and bottle use for sweetened liquids other than milk, such as formula or juice.[11] It should be noted that while there is an association between breastfeeding and early childhood caries after primary tooth eruption and the introduction of other dietary carbohydrates, human milk ensures the best possible health, developmental, and

psychosocial outcomes, including protecting against multiple acute and chronic diseases, thus breastfeeding should be highly encouraged throughout a child's infancy.[10] All of these factors and their associated risks and benefits need to be made known to parents early on as they can play a major role in the child's dental as well as general health.[5]

Risk Assessment and Motivation

Higher caries risk is seen in children of lower socio-economic status (SES).[2] One reason for this might be that processed foods high in calories but low in nutrients can be purchased at a lower cost than healthier alternatives,[12] making them more accessible for low-income parents. Another possible factor is parental influence on a growing and impressionable child. As role models, parents can encourage eating fruits and vegetables by regularly serving them at meals and eating them themselves. They can also encourage the opposite by consuming large amounts of sweetened beverages and snacks.[13] In order to decrease these high risk behaviors, parents need guidance and motivation to change their own food choices and feeding practices.[14] Another influence to consider is a general lack of knowledge about what foods are nutritious and which are high in sugar and calories. Parents with less formal education consume less fruits and vegetables compared to sugar-rich foods associated with caries production,[15] and a healthy diet in a child is positively associated with higher levels of education in the parent.[16] This data suggests a lack of knowledge by parents about what food is nutritious and what is high in carbohydrates and sugars and highlights the importance of providing dietary counseling to parents, including the role these foods play in caries risk.[13] Those of low income are also more likely to lack cooking skills and time for cooking, reducing the likelihood of cooking and consuming freshly cooked meals.[17] Nevertheless, parental compliance to recommended treatment protocols is essential for moderate to high caries risk children.[18] Motivational interviewing, or counseling that relies on two-way communication between the clinician and the patient or parent and establishes rapport and trust,[18] is able to be used by both counselors and professionals. It is shown to enhance preventative behavior in mothers of young children at high risk of developing caries.[19] This method has been shown to be more effective than traditional health education, where information is disseminated via pamphlets, posters or media campaigns.[20] This research suggests that family-centered approaches and individualized recommendations are more likely to engage parents to change their practices and behaviors[18] and that this methodology is needed to involve parents in preventative measures.[20]

Support Organizations

A number of organizations including the American Academy of Pediatric Dentistry (AAPD), the American Academy of Pediatrics (AAP), the Maternal and Child Health Bureau (MCHB) and Access to Baby and Child Dentistry (ABCD) are committed to promoting optimal oral health and oral health care for children. The AAPD and AAP encourage the first dental visit by 12 months of age in order to determine their oral health risk assessment and establish a dental home for the child.[21] In Washington State, the ABCD program was created in 1995 as a joint effort between the Department of Health, Washington state, the University of Washington Department of Pediatric Dentistry, and the Spokane Dental Society to provide primary dental care and anticipatory guidance to low-income children under the age of six.[22] The

Maternal and Child Health Bureau within the U.S. Department of Health and Human Services works to connect families with services and to promote inter-professional training and opportunities to emphasize family-centered, community-based systems of care. For oral health, this includes increasing oral health preventative services, integrating oral health into primary care practice, and identifying sustainable approaches to increasing knowledge about oral health.[23] This type of inter-professional care has been shown to enhance patient compliance and lead to greater patient satisfaction in their health care while reducing costs to the health care system.[24]

While such programs have helped by requiring or recommending dental utilization among young children,[25] these programs are not without their challenges. Having all children complete a dental exam by 12 months of age could result in low-risk children crowding out high-risk children if Medicaid capacity were limited at a dental office or if compensation is higher for those with private insurance.[26] Parents enrolled in the ABCD program have reported problems setting up appointments with providers to receive timely care for their children.[22] While these programs are doing their part to provide preventive services and education to low-income families, more help is needed outside of the dental profession to prevent caries.

Other programs have addressed dietary education and assistance for the infant, child, and adolescent population. The United States Department of Agriculture (USDA) Food and Nutrition Services has created school meal programs to improve access to healthy food and beverage options for children.[13] Programs such as Head Start and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) were designed to educate and improve access to healthy food and beverage options for low-income women, infants and children.[13] The mission of the WIC program is to safeguard the health of low-income women, infants, and children up to age 5 who are at nutritional risk.[27] The program was created in 1972 by USDA's Food and Nutrition Service and today almost half of all infants and one-quarter of all children 1-4 years of age in the United States now participate in the program. It is the nation's third-largest food and nutrition assistance program. In order to participate in the program, you must be either a pregnant woman, a non-breastfeeding woman with a child under 6 months of age, a breastfeeding woman with a child up to 1 year postpartum, or a child up to his/her fifth birthday. Participants must also have an income at or below 185% of the Poverty Income Guidelines or, in Washington State, participate in a complementary federal assistance program, such as Medicaid, Temporary Assistance to Needy Families (TANF), or Basic Food. These guidelines ensure WIC is focusing its services on those of lower SES, the same population most at risk for early childhood caries. The benefits to being a WIC participant include a monthly supplemental food coupon worth approximately $50, nutrition education, and referrals to health care providers.[27] Depending on the age of the child, WIC food coupons can include infant formula, fruit and vegetable based baby food, juice, cereal, milk, cheese, eggs, fresh fruits and vegetables, whole grain products, dried beans, peanut butter, and canned tuna or salmon for breastfeeding women.[28] In order to receive the food package, WIC clients meet with WIC counselors at least every three months for a nutritional education session where the educator can stress the relationship between proper nutrition and good health and assess the nutritional risk of both the mother and child. Positive effects of WIC on dental health have already been well established. WIC has been found to be the main source of parents' knowledge regarding oral health, even more than

hearing it from their physician.[29] Among Medicaid enrolled children, those participating in WIC were more likely to visit a dentist, participate in preventative and restorative visits, and less likely to use the emergency room.[30] WIC participation was also shown to be associated with decreased dental care under general anesthesia, demonstrating the potential to decrease dental related costs to the Medicaid program.[31]

PURPOSE OF STUDY:

While some positive relationships between WIC and dental health benefits have been established in research, few studies have been done to assess WIC counselors' knowledge of nutrition as it relates to oral health. Because the mission of WIC is related to healthy nutrition for mothers and children, it is reasonable to include oral health nutrition guidelines in WIC counseling sessions. While increasing the knowledge of the counselors is beneficial to the dental community, the end objective is to increase dissemination of oral health nutrition information to their clients. To date, little to no research has been done to determine if increasing the amount of oral health nutrition knowledge in WIC counselors results in increased knowledge of their clients.

The purpose of this study is to determine whether providing WIC counselors with targeted nutrition education related to oral health increases the dissemination of that information to WIC clients.

METHODS:

A group randomized design was selected for this study. A convenience sample of 20 WIC clinics was identified in Washington State in Snohomish, Skagit, and Whatcom Counties. The clinics were contacted by telephone and asked to participate in this study. Of the 20 clinics contacted, 17 clinics consisting of 69 counselors elected to participate in the study. WIC counselors participated in this study at their monthly staff meetings. Due to the infrastructure of WIC in these three counties, some clinics joined with others for their staff meetings. This resulted in the 17 clinics creating 8 groups to be assigned either as an intervention or control group. Prior to beginning the study, a block randomized allocation scheme was created using Excel© (Microsoft) to assign each participating group to either a control or intervention group. Groups were assigned based on the randomization scheme in the order of their meeting date. To be eligible to participate, the WIC counselor had to be a WIC certifier or dietitian who counseled clients on their nutritional choices, had to be employed with WIC for at least two weeks to ensure they were trained in WIC procedures, and had to speak English. Consent was obtained from each participant prior to the distribution of any study materials. The study materials given included an 11-question demographic questionnaire and a 10-question pre-assessment on nutrition as it relates to oral health. All counselors worked independently and no additional resources were given. Completed surveys were collected but no answers were reviewed at the time of initial contact. Control clinics had no more information presented at the time of initial contact, while intervention clinics were given a 30-minute PowerPoint © (Microsoft) presentation that addressed nutrition as it relates to oral health after taking the pre-assessment. The presentation included information about the caries process, the best and worst snack and beverage choices for your teeth, and the importance of limiting snacking and consumption of sugary beverages in between meals. The presentation addressed all of the assessment questions presented in the pre-test and time was allotted for questions following the presentation. The WIC counselors at intervention clinics were then asked to complete a post-assessment, the questions being identical to those on the pre-assessment.

After three months, the same 10-question assessment was given to all counselors in both the control and intervention groups. At this time, a convenience sample of WIC clients at each of the participating clinics was asked to participate in the study. To be eligible to participate, the client had to be a WIC participant, over 18 years of age, and English or Spanish speaking as these were the two languages in which the study materials were available. A total of 94 WIC clients elected to participate in this study. Consent was obtained from each participant prior to the distribution of any materials. The study materials for WIC clients included an 8-question demographic questionnaire and the same 10-question assessment on nutrition as it relates to oral health given to the WIC counselors. After all study materials were collected, the presentation was given to counselors in the control group and the answers to the assessment were reviewed and discussed with all WIC counselor participants. All study materials and the intervention presentation was approved by the Institutional Review Board (IRB) at the University of Washington.

Descriptive statistics (means, standard deviations, counts, and percentages) were calculated for all variables. Some demographic variables were recoded into binary variables due to small cell counts, to allow for association testing. Paired t-tests were used to compare the pre-, post-, and 3-month follow-up assessment scores of WIC counselors in the intervention clinics and pre- and 3-month follow-up assessment scores of the control clinics. Two sample t-tests were used to compare intervention and control assessment scores at the pre-assessment and 3-month post-assessment within WIC counselors and within WIC clients. Two sample t-tests were also used to determine associations between differences in pre- versus post-intervention assessment scores with demographic covariates of interest. The significance level was set to 0.05.

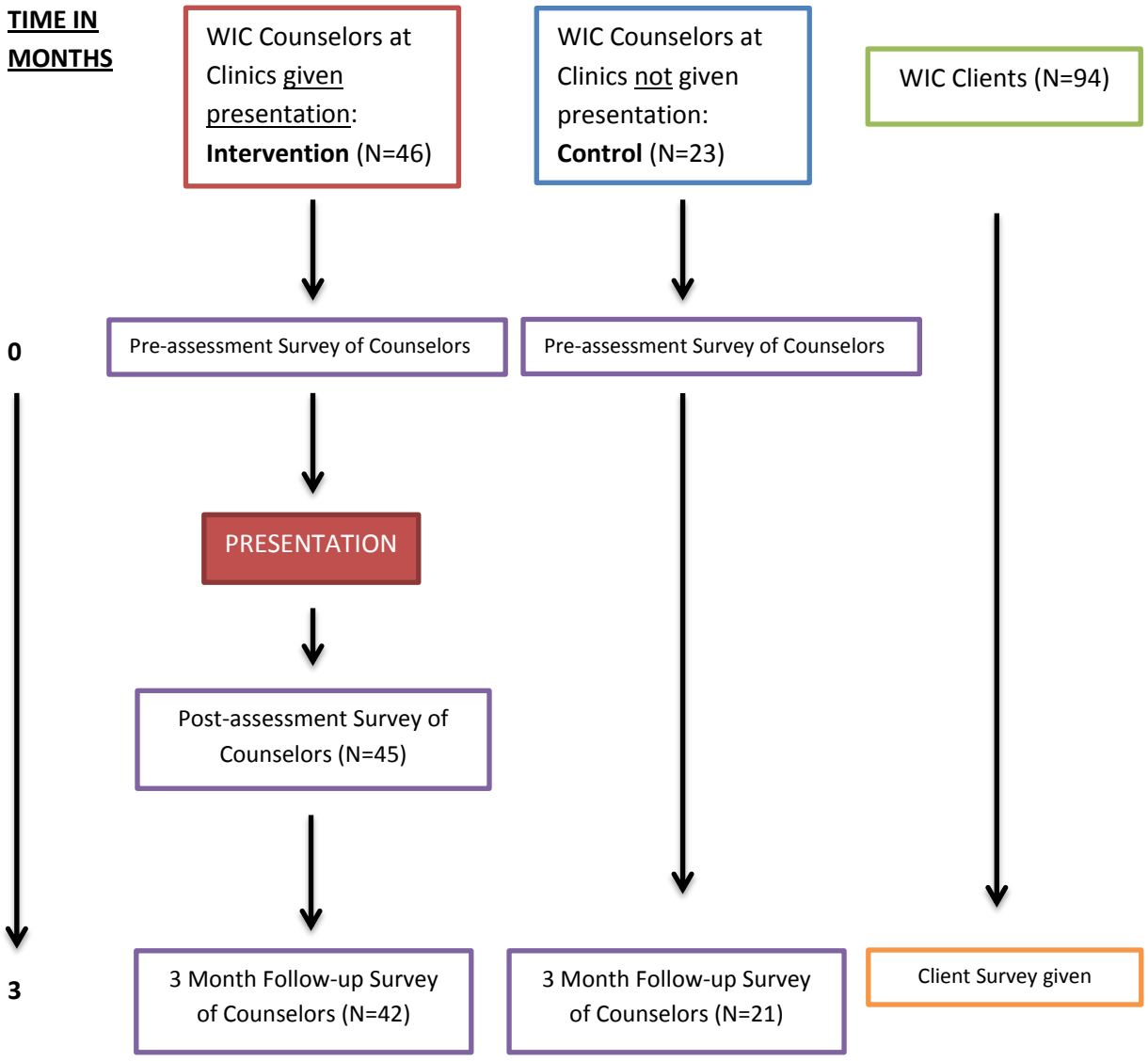


Figure 1: Study Design Flow Chart

RESULTS:

The study population initially consisted of 69 WIC counselors in Snohomish, Skagit, and Whatcom counties. The counselors were split into eight groups, with 46 counselors in the intervention group and 23 in the control. The imbalance in the groups was due to WIC infrastructure, resulting in staff meetings with uneven numbers of clients and thus an uneven split between the intervention and control group. After three months, six WIC counselors were lost to follow-up: two from the control group (N=21) and three from the intervention (N=42).

Tables 1 and 2 contain the demographic information of the WIC counselors, both by their assigned group and as a population. The counselors were all females with ages ranging from 23 to 70 years old. The majority were white (67%), had worked with WIC for more than two years (96%), and had at least some college or a degree (92%). Many have received training in oral health education (54%) and nutrition (65%) prior to the study and most reported talking to their clients about oral health sometimes, very often, or always (89%). The vast majority of the counselors report feeling somewhat or very knowledgeable discussing oral health with their clients (93%).

Tables 3 and 4 contain demographic information of the WIC clients who participated in the study. Ages of the WIC clients ranged from 18 to 42 years old. The majority of the clients were female (89%) and white (47%), however there was also a large number of Hispanic clients (37%). Almost half of the clients had at least some college education (47%). A majority of the clients had taken their child to a dentist (70%) and seen a dentist themselves (53%) within the past year with the main reason for their visit being a regular check-up/preventative visit (71%). While most of the WIC clients reported having had a dentist discuss oral health with them (84%), 60 percent report having their pediatrician/medical doctor discuss oral health with them as well and almost half report hearing about oral health from a WIC counselor (46%).

Table 5 compares the pre-assessment and three month follow-up assessment scores of the control group, showing that there was little change in the control group between the initial pre-assessment (mean=76.8) and three months later (mean=74.9). Table 5 also shows the pre-, post-, and 3-month follow-up assessment scores of the intervention group. Directly following the presentation, there was a statistically significant difference between pre-assessment and post-assessment scores ($p<0.001$). While scores did significantly drop between the post-assessment and the three month follow-up ($p=0.002$), it was shown that the scores were still significantly higher three months later compared to their initial pre-assessment scores ($p<0.001$). (Graphs 1 and 2)

Table 6 compares the control and intervention pre-assessment scores. The control group (mean=76.2) did not initially differ from the intervention group (mean=72.2) to a level of statistical significance ($p=0.184$). However, at the 3-month follow-up the intervention group scored significantly higher ($p=0.020$) than the control group, as shown in Table 6 (Graph 3). Table 6 also compares the assessment

scores of the clients in the control and intervention group at the three month follow-up. However, no significant difference in assessment scores was found (p=0.556) (Graph 4).

Associations between pre-assessment scores for all WIC counselors and post-assessment scores for counselors in the intervention group with demographic and knowledge variables are reported in Table 7. Dietitians scored significantly higher than certifiers in the pre-assessment (p<0.001). Counselors who reported special training in nutrition had significantly higher scores (76%) than those who did not (68%)(p<0.001). Counselors with 4 years of college or more also scored significantly higher than those with less than 4 years in the pre-assessment (p<0.001).

Associations between WIC client assessment scores and demographic and oral health variables are reported in Table 8. WIC clients who identified as being white scored an average of 66% while those who identified with a different race scored an average of 61% (p=0.014). Interestingly, clients who reported discussing oral health with a school teacher scored significantly lower than those who had not (p=0.043). No other WIC client demographic or oral health variables were found to have a significant association with assessment scores.

DISCUSSION:

The mission of WIC is to safeguard the health of low-income women, infants, and children who are at nutritional risk.[27] The goals of the American Academy of Pediatric Dentistry in preventing childhood caries include timely delivery of family education on caries etiology and appropriate dietary habits , including initiating the education process during pregnancy in high risk mothers.[32] The WIC client population is the same demographic shown to most likely develop childhood caries. Positive effects of WIC on dental health have already been established, including being a source of parents' knowledge regarding oral health.[29] WIC clients must receive nutritional education from a WIC counselor at least every three months, allowing clients to have more frequent visits and more established relationships with WIC counselors than with other healthcare providers, such as pediatricians or dentists. With targeted training and education, WIC providers can play an important role in educating low-income families about nutrition information as it relates to oral health and motivating them to practice preventative behaviors.

In our study, providing WIC counselors with targeted nutrition information as it relates to oral health significantly increased their amount of oral health knowledge. It should be noted that the information provided focused on dietary habits and nutrition instead of oral hygiene in order to better align with the mission of WIC. This indicates that receiving targeted information from another professional in their area of expertise leads to greater knowledge among professionals. A decrease in knowledge was observed from our post-assessment which was given directly after the presentation to the time of the three month follow-up (Table5). This is to be expected as the recall rate of information directly after being given a presentation is much higher than after a three month time lapse. However, our study also showed scores in the three month follow-up were still significantly higher than the pre-assessment scores in the intervention group (Table 5), indicating the information provided to the counselors was learned and retained. The scores of the intervention group were also significantly higher than their peers in the control group who did not receive the presentation and experienced no change in knowledge during the same three month time period (Table 6). These results indicate that counselors who received training in oral health have more accurate knowledge about nutrition as it relates to oral health and should thus be more equipped to educate their clients on how to prevent caries with their dietary habits. This study supports the importance of inter professional relationships and training that increase the health knowledge and promotion in personnel in other professionals, ultimately increasing the number of providers who promote oral health education.

It should be noted that three demographic factors that were significantly associated with higher assessment scores in WIC counselors before the intervention was given were the counselor's position at WIC, special training in nutrition, and their level of education (Table 7). Dietitians averaged a higher assessment score than certifiers. In their specific job descriptions, WIC dietitians provide more comprehensive and individualized nutrition services while certifiers provide more routine services to WIC clients. Because of this, it is possible that dietitians have received more focused training or information regarding oral health than certifiers, accounting for their initially higher assessment scores.

However, clients meet more frequently with certifiers than dietitians, allowing them more interactions and time to promote positive health behaviors in clients. Thus, giving certifiers clear education about healthy oral dietary habits is vital if they are to communicate prevention methods to their clients. Counselors with a four-year degree or graduate training also had higher scores than those with less education. These results suggest that their extra schooling might have allowed them to receive more focused training or information on oral health than those with less education. This same reasoning could explain why those who had special training in nutrition also scored higher on their pre-assessment.

While there was a significant increase in the oral health knowledge of the counselors, our study found no difference in assessment scores in the clients, whether they met with counselors at a control or at an intervention clinic. In addition, when the WIC clients were asked what professionals were sources of information on oral health, no significant difference was found between the control and intervention group in identifying WIC counselors as a possible source (Table 4). Since our study evaluated clients only at three months post-intervention, there was only one meeting between the WIC counselor and clients. Hence it is possible that as clients have more meetings with counselors there would be more time for intervention counselors to convey oral health information to the client and to reiterate this information. This could lead to higher assessment scores and proportions of clients reporting WIC counselors as a source of oral health information in the intervention group. Therefore, future research studies should consider evaluating client outcomes at more than one follow-up time period after any intervention. It is important to note that WIC clients scored lower than WIC counselors on their pre-assessment, suggesting they overall had less baseline oral health knowledge than their counselors and more oral health knowledge to gain from their WIC meetings (Table 5). However, our study shows over 70% of WIC counselors report talking about oral health “very often” or “always” (Table 2), suggesting that there is a possible ceiling on how much oral health knowledge can be successfully disseminated during WIC meetings that was reached prior to the start of this study. Nonetheless, the lack of difference between the control and intervention WIC client assessment scores suggests either that the information did not get disseminated to the WIC clients or that even with dissemination of this information to the clients, it did not increase their oral health knowledge. There are many possible reasons why we did not see an increase in the knowledge of the WIC clients. During a nutrition consultation with a WIC client, the discussion is client driven. Thus, even if the counselor possessed more knowledge about oral health, this might have not been a topic of discussion at the clients meeting and it might not have been disseminated to the client. There is also the possibility that the information was disseminated to the client but that it was poorly understood or received. Nevertheless, future research and practices should focus on how to send a clear, concise message to clients about oral health nutrition and how to best incorporate nutrition as it relates to oral health into the overall message of good nutrition to young mothers and their families.

The one demographic factor that was found to be significantly associated with assessment scores was race. WIC clients who identified as “white” scored significantly higher than those who did not. One hypothesis for this difference is that English may be a second language for many of the clients from non-white race categories. This hypothesis is further supported by the fact that when you separate

"Hispanic" as a race, the result is no longer significant since the assessment was also available in Spanish. However, this hypothesis would not account for the multiple ethnic populations that identify as white and still have English as a second language. Another hypothesis to account for this difference would be that the oral health information these populations are receiving might be in English and less understood due to language barriers. A client who has English as a primary language will most likely have better comprehension of the oral health message than a client for who English is a second language. Ethnic minority groups are considered to be at high risk for developing early childhood caries, and efforts should be made by all providers to ensure their understanding of practices on how to prevent this chronic disease.

The limitations of this study include the small sample population of both WIC counselors and clients, the length of follow-up time, and the use of a convenience sample of WIC clients. Follow-up studies should aim to look at the long-term effects of increasing the knowledge of professionals other than dentists on oral health nutrition, how to increase the dissemination of that knowledge to clients to ensure their comprehension, and to track how well the learned knowledge is being used as a preventative behavior.

Multiple studies have shown traditional health education alone does not increase preventative behavior in high risk populations. Compliance with preventative oral health behaviors will only be achieved with the help of other professionals in a multi-disciplinary approach to healthcare. Our study shows an inter-professional approach to healthcare successfully increases the knowledge of professionals outside of their scope of practice. While our study did not show an increase in knowledge in our target population, it does show the ability of professionals to increase knowledge by educating each other about key factors in their areas of specialty. Increasing awareness of eating habits and their effect on oral health to non-dental providers, such as WIC counselors, can enable the healthcare community to battle early childhood caries in vulnerable families and highlight the importance of oral health on total body health.

In conclusion, WIC providers are recognized to be an important source of oral health information for their clients, many of whom are at high risk of developing early childhood caries. Both general and pediatric dentists should reach out to their local WIC offices in order to facilitate inter-professional relationships and to better motivate the community to practice preventive oral health behaviors. All healthcare providers should focus on how to better communicate their message of prevention to vulnerable communities and ensure that the message is comprehended by their target population. Working with WIC can increase the counselor's knowledge of preventive oral health behaviors and can serve as an additional resource to clients during their quarterly meetings.

Table 1: Demographics of WIC Counselors

	Control Group N=23	Intervention Group N=47	All Counselors N=70
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Age (in years)	50.0 (12.4)	41.8 (11.8)	44.4 (12.5)
	N (%)	**N (%)**	**N (%)**
Gender			
Male	0 (0%)	0 (0%)	0 (0%)
Female	23 (100%)	47 (100%)	70 (100%)
Length of WIC Employment			
Less than 6 months	0 (0%)	1 (2.1%)	1 (1.4%)
6 months- 1 year	1 (4.3%)	0 (0%)	1 (1.4%)
1-2 years	0 (0%)	1 (2.1%)	1 (1.4%)
More than 2 years	22 (95.6%)	45 (95.7%)	67 (95.7%)
Position at WIC			
Certifier	18 (78.3%)	33 (70.2%)	51 (72.9%)
Dietitian	5 (21.7%)	12 (25.5%)	17 (24.3%)
	0 (0%)	2 (4.3%)	2 (2.8%)
Race			
White	16 (69.6%)	31 (66.0%)	47 (67.2%)
Other/Multiple Races	7 (30.4%)	15 (31.9%)	22 (31.4%)
Missing	0 (0%)	1 (2.1%)	1 (1.4%)
Hispanic Ethnicity			
No	21 (91.3%)	35 (74.5%)	56 (80.0%)
Yes	2 (8.7%)	11 (23.4%)	13 (18.6%)
Missing	0 (0%)	1 (2.1%)	1 (1.4%)
Education			
High School/GED	2 (8.7%)	3 (6.4%)	5 (7.1%)
Some College or Vocational Training	7 (30.4%)	20 (42.6%)	27 (38.6%)
4 year College Degree	11 (47.8%)	16 (34.0%)	27 (38.6%)
Graduate or Professional Schooling	2 (8.7%)	8(17.0%)	10 (14.3%)
Missing	1 (4.4%)	0 (0%)	1 (1.4%)

Table 2: Oral Health and Specialty Training Demographics of WIC Counselors

	Control Group N=23	Intervention Group N=46	All Counselors N=69
	N (%)	N (%)	N (%)
Training in Oral Health Education			
Yes	16 (69.6%)	22 (46.8%)	38 (54.3%)
No	7 (30.4%)	24 (51.1%)	31 (44.3%)
Missing	0 (0%)	1 (2.1%)	1 (1.4%)
Special Training in Other Areas*			
Nutrition	17 (73.9%)	29 (61.7%)	46 (65.7%)
Health Education	11 (47.8%)	16 (34.0%)	27 (38.6%)
Nursing	5 (21.7%)	8 (17.0%)	13 (18.6%)
Social Work	2 (8.7%)	3 (6.4%)	5 (7.1%)
Medical Assistant	2 (8.7%)	6 (12.8%)	8 (11.4%)
Breastfeeding	4 (17.4%)	7 (14.9%)	11 (15.7%)
How often do you discuss oral health with WIC clients?			
Never	0 (0%)	1 (2.1%)	1 (1.4%)
Rarely	3 (13.0%)	3 (6.4%)	6 (8.6%)
Sometimes	2 (8.7%)	9 (19.1%)	11 (15.7%)
Very Often	11 (47.8%)	25 (53.2%)	36 (51.4%)
Always	6 (26.1%)	9 (19.2%)	15 (21.5%)
Missing	1 (4.4%)	0 (0%)	1 (1.4%)
How knowledgeable do you feel about discussing oral health issues with WIC clients?			
Very Knowledgeable	9 (39.1%)	7 (14.9%)	16 (22.8%)
Somewhat Knowledgeable	10 (43.5%)	39 (83.0%)	49 (70.0%)
Not Knowledgeable	2 (8.7%)	1 (2.1%)	3 (4.3%)
Missing	2 (8.7%)	0 (0%)	2 (2.9%)

*Participants were allowed to select more than 1 area, so will add to greater than 100%.

Table 3: Demographics of WIC Clients

	Control Group N=26	**Intervention Group N=68**	**All Clients N=94**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Age (years)	27.5 (5.2)	29.3 (6.5)	28.8 (6.2)
	N (%)	**N (%)**	**N (%)**
Gender			
Male	1 (3.8%)	6 (8.8%)	7 (7.4%)
Female	25 (96.2%)	59 (86.8%)	84 (89.4%)
Missing	0 (0%)	3 (4.4%)	3 (3.2%)
Race			
White	12 (46.1%)	32 (47.1%)	44 (46.8%)
Other/Multiple	14 (53.9%)	36 (52.9%)	50 (53.2%)
Hispanic Ethnicity			
Yes	8 (30.8%)	27 (39.7%)	35 (37.2%)
No	18 (69.2%)	41 (60.3%)	59 (62.8%)
Education			
Less than High School	2 (7.7%)	7 (10.3%)	9 (9.6%)
High School/GED	13 (50.0%)	26 (39.3%)	39 (41.5%)
Some College or Vocational Training	10 (38.5%)	27 (39.7%)	37 (39.4%)
4 year College Degree	0 (0%)	3 (4.4%)	3 (3.2%)
Graduate or Professional Schooling	1 (3.8%)	3 (4.4%)	4 (4.2%)
Missing	0 (0%)	2 (2.9%)	2 (2.1%)

Table 4: WIC Clients and Oral Health

	Control Group N=26	Intervention Group N=68	All Clients N=94
	N (%)	N (%)	N (%)
When was the last time you took one of your children to see a dentist, either in an office, clinic, or in the emergency room?			
Less than 6 months ago	13 (50.0%)	39 (57.3%)	52 (55.3%)
6 months-1 year ago	3 (11.5%)	11 (16.2%)	14 (14.9%)
1 year-2 years ago	0 (0.0%)	3 (4.4%)	3 (3.2%)
Over 2 years ago	0 (0.0%)	1 (1.5%)	1 (1.1%)
Never	10 (38.5%)	14 (20.6%)	24 (25.5%)
If you have taken your child to the dentist, what was the reason?*			
Regular check-up	16 (61.5%)	51 (75.0%)	67 (71.2%)
To fix cavities/fillings	2 (7.7%)	12 (17.6%)	14 (14.9%)
Tooth pain	0 (0.0%)	1 (1.5%)	1 (1.1%)
Tooth or mouth injury	0 (0.0%)	1 (1.5%)	1 (1.1%)
Other	0 (0.0%)	2 (2.9%)	2 (2.1%)
I have never taken my child to the dentist	10 (38.5%)	14 (20.6%)	24 (25.5%)
When was the last time you went to the dentist?			
Less than 6 months ago	4 (15.4%)	25 (36.8%)	29 (30.8%)
6 months-1 year ago	10 (38.5%)	11 (16.2%)	21 (22.3%)
1 year-2 years ago	5 (19.2%)	12 (17.6%)	17 (18.1%)
Over 2 years ago	6 (23.1%)	17 (25.0%)	23 (24.5%)
Never	1 (3.8%)	3 (4.4%)	4 (4.3%)
Please check ALL the people below who have talked to you about cavities*			
WIC Counselor	11 (42.3%)	32 (47.1%)	43 (45.7%)
Pediatrician/Medical Doctor	15 (57.7%)	41 (60.3%)	56 (59.6%)
Dentist	23 (88.5%)	56 (82.3%)	79 (84.0%)
School Teacher	5 (19.2%)	11 (16.2%)	16 (17.0%)
Other	0 (0.0%)	3 (4.4%)	3 (3.2%)

*Participants were allowed to select more than 1 area, so will add to greater than 100%.

Table 5: Differences in Assessment Scores within WIC Counselor Groups

	WIC Counselor Pre-Assessment	WIC Counselor Post-Assessment	WIC Counselor 3 Month Follow-Up Assessment	p-value*
	Mean (SD)	Mean (SD)	Mean (SD)	
Control Group (N = 21)	76.8 (12.8)	--	74.9 (15.3)	0.530
Intervention Group (N = 47)	72.2 (8.7)	90.7 (11.1)	--	<0.001
Intervention Group (N = 43)	72.5 (8.7)	--	83.7 (7.4)	<0.001
Intervention Group (N = 43)	--	90.3 (11.5)	83.7 (7.4)	0.002

*P-value calculated from paired t-test.

Table 6: Differences in Assessment Scores between the Control and Intervention Groups

	Control	Intervention	p-value*
	Mean (SD)	Mean (SD)	
	N = 23	N = 47	
WIC Counselor Pre-Assessment	76.2 (12.6)	72.2 (8.7)	0.184
	N = 21	N = 43	
WIC Counselor 3 Month Follow-up Assessment	74.9 (15.3)	83.7 (7.4)	0.020
	N = 26	N = 68	
WIC Client 3 Month Follow-up Assessment	62.5 (11.4)	63.9 (8.9)	0.556

*P-value calculated from 2 sample t-test with unequal variances.

Table 7: Differences in WIC Provider Scores Pre- and Post- Intervention by Demographic and Knowledge Variables.

	Pre-Assessment Scores (N=69)	p-value*	3 Month Assessment Scores (N=64)	p-value*
	Mean (SD)		Mean (SD)	
Position at WIC				
Certifier	70.9 (9.8)		79.1 (11.9)	
Dietician	82.1 (6.1)	<0.001	84.2 (8.8)	0.077
Training in Oral Health Education				
Yes	74.1 (11.0)		81.5 (8.1)	
No	73.2 (9.3)	0.700	79.6 (14.8)	0.557
Special Training in Nutrition				
Yes	76.5 (9.9)		81.2 (12.7)	
No	67.7 (8.3)	<0.001	79.9 (8.2)	0.615
Special Training in Health Education				
Yes	74.1 (10.9)		80.5 (7.1)	
No	73.2 (9.8)	0.726	81.0 (13.3)	0.861
Race				
White	74.7 (10.8)		82.9 (7.8)	
Other/Multiple	71.3 (8.6)	0.161	77.4 (15.6)	0.131
Hispanic				
Yes	73.1 (7.7)		82.3 (8.2)	
No	73.7 (10.8)	0.796	80.6 (12.1)	0.554
Education				
Less than 4 years of College	69.2 (8.5)		78.7 (13.4)	
4 years College/ Graduate School	77.2 (10.3)	<0.001	83.1 (8.6)	0.135
How often do you discuss oral health with WIC clients?				
Never, Rarely, or Sometimes	72.1 (11.0)		80.2 (17.9)	
Very Often or Always	74.0 (10.1)	0.523	81.3 (7.8)	0.815
How knowledgeable do you feel about discussing oral health issues with WIC clients?				
Not or Somewhat Knowledgeable	72.8 (9.9)		81.6 (12.3)	
Very Knowledgeable	76.0 (11.8)	0.336	79.7 (7.2)	0.461

*P-value calculated from two sample t-test.

Table 8: Differences in Client Assessment Scores according to Client Demographics

	Assessment Scores (N=94)	**p-value***
	Mean (SD)	
Gender		0.932
Female	63.4 (9.8)	
Male	63.1 (7.4)	
Race		0.014
White	66.1 (8.6)	
Other	61.3 (10.0)	
Hispanic		0.072
Yes	61.2 (9.5)	
No	64.9 (9.5)	
Education		
Less than High School or High School/GED	62.2 (10.4)	
Some College, 4 Year Degree, or Graduate	65.5 (8.3)	0.095
WIC Counselor Discussed Cavities with Me		
Yes	64.2 (10.9)	
No	63.0 (8.5)	0.558
Pediatrician/Medical Doctor Discussed Cavities with Me		
Yes	63.9 (9.6)	
No	63.0 (9.8)	0.664
Dentist Discussed Cavities with Me		
Yes	63.8 (9.7)	
No	62.0 (9.5)	0.505
School Teacher Discussed Cavities with Me		
Yes	59.4 (8.3)	
No	64.4 (9.7)	0.043

*P-value calculated from 2 sample t-test with unequal variances.

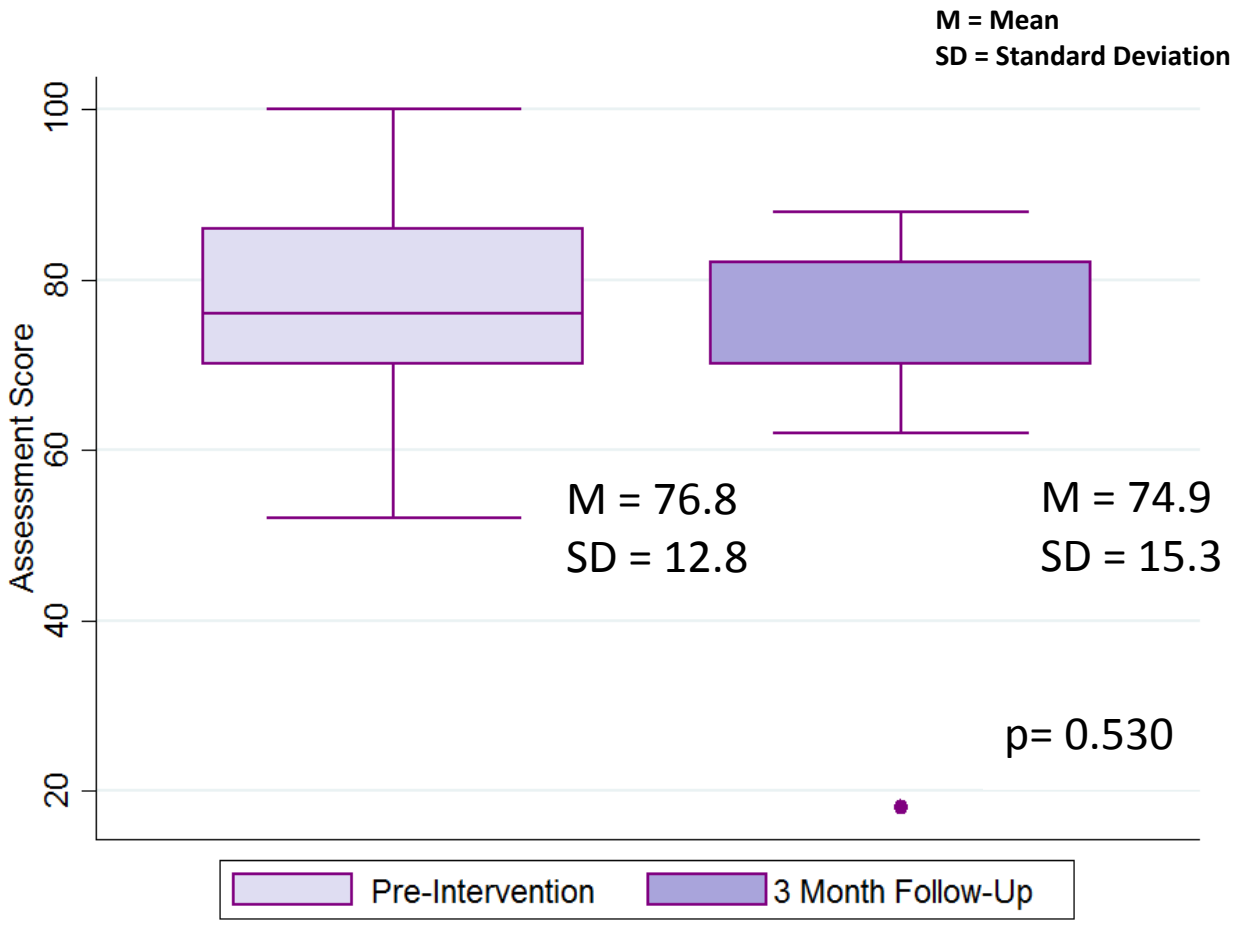
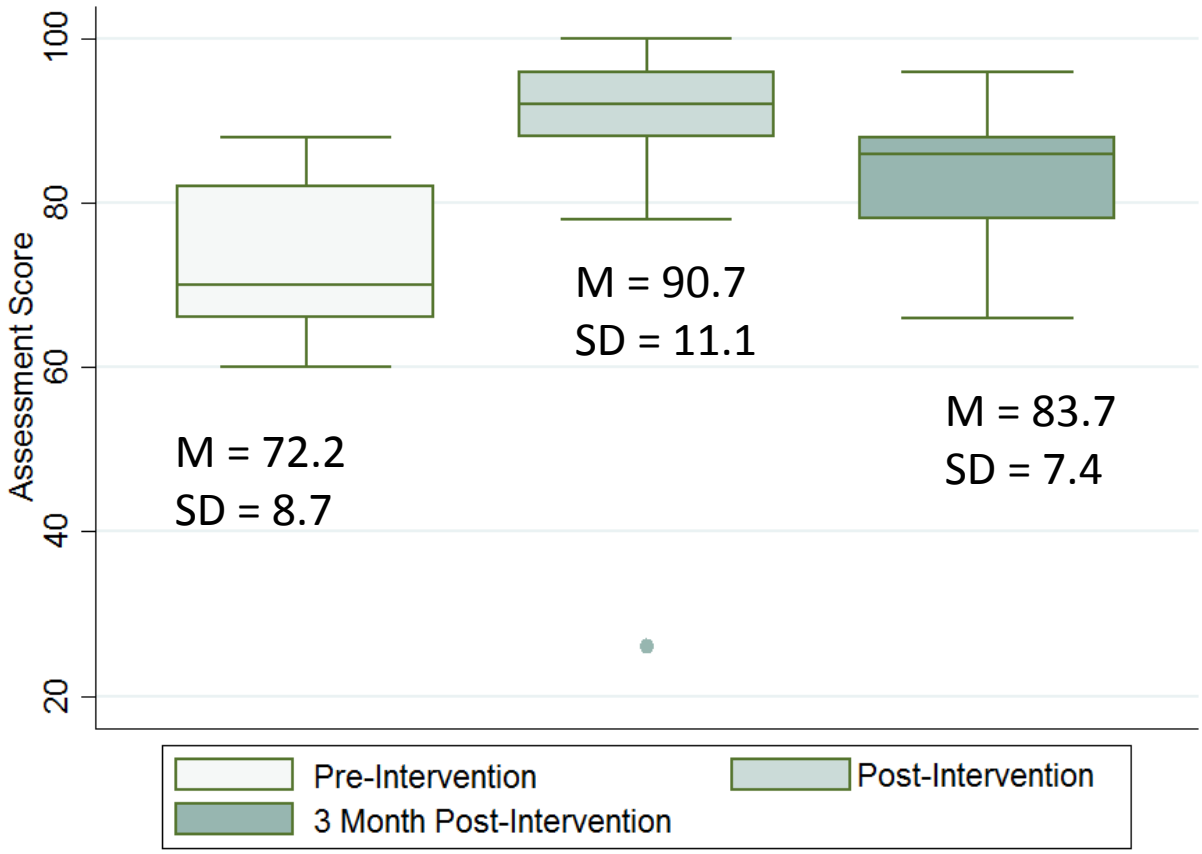


Figure 2: Control Group Assessment Scores Pre-Intervention and 3 Month Follow-Up



Pre-Intervention v. Post-Intervention
p= <0.001

Pre-Intervention v. 3 Month Follow-Up
p= <0.001

Figure 3: Intervention Group Assessment Score Pre-Intervention, Post-Intervention, and 3 Month Follow-Up

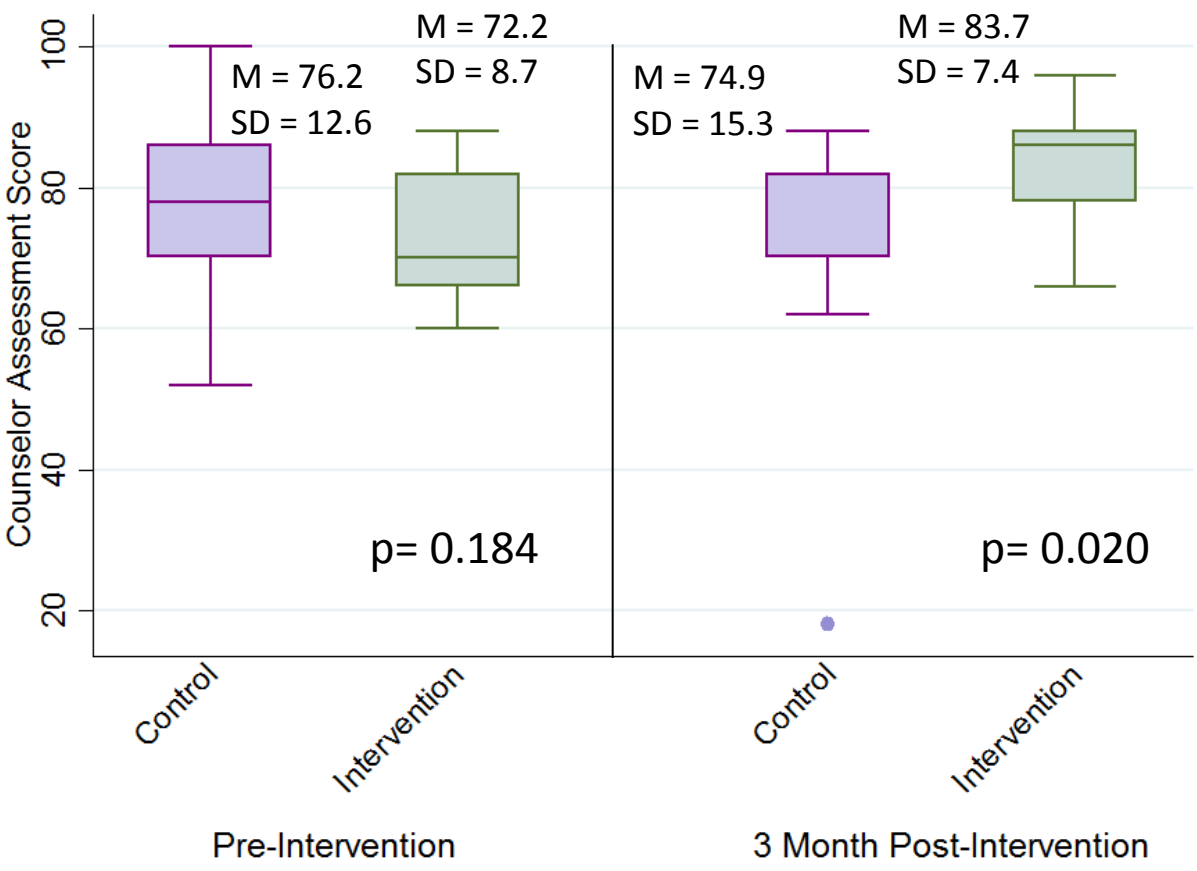


Figure 4: Comparison of Control and Intervention Counselor Assessment Scores Pre-Intervention and 3 Month Follow-Up

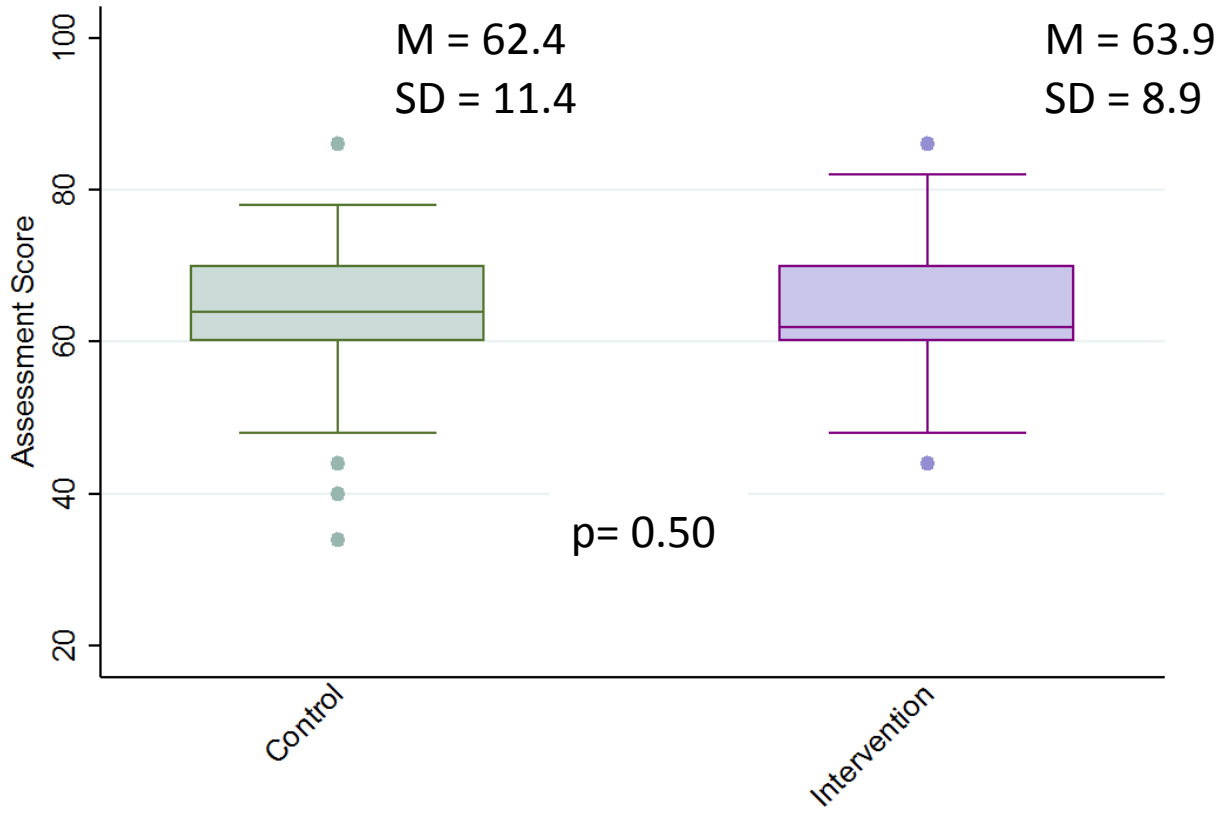


Figure 5: Comparison of Control and Intervention Client Assessment

BIBLIOGRAPHY:

1. *Oral health in America: A Report of the Surgeon General*.; 2000:1-332.

2. Dye BA, Tan S, Smith V et al. Trends in oral health status: United States , 1988–1994 and 1999–2004. *Vital Heal Stat*. 2007;11(248):1-92.

3. Dye BA, Li X, Beltrán-Aguilar ED. *Selected Oral Health Indicators in the United States, 2005-2008*.; 2012:1-7.

4. Edelstein BL. Access to dental care for head start enrollees. *J Public Health Dent*. 2000;60(3):221-9; discussion 230-2.

5. Tinanoff N, Palmer C. Dietary determinants of dental caries and dietary recommendations for preschool children. *J Public Health Dent*. 2000;60(3):197-206.

6. Burt BA, Eklund SA, Morgan KJ, Larkin FE, Guire KE, Brown LO WJ. The effects of sugar intake and frequency. *J Dent Res*. 1988;67(11):1422-1429.

7. Gustafsson BE, Quensel CE, Swenander-Lanke L et al. The Vipeholm dental caries study. The effect of different levels of carbohydrate intake on caries activity in 436 individuals observed for 5 years. *Acta Odont Scand*. 1954;11:232-236.

8. Bellisle F. Meals and snacking, diet quality and energy balance. *Physiol Behav*. 2014; 1-6.

9. Marshall TA, Levy SM, Broffitt B, et al. Dental caries and beverage consumption in young children. *Pediatrics*. 2003;112(3):184-191.

10. American Academy of Pediatric Dentistry Council on Clinical Affairs. Policy on dietary recommendations for infants, children, and adolescents. *AAPD Ref Man*. 2012;34(6):56-58.

11. Tanaka K, Miyake Y, Sasaki S, Hirota Y. Infant feeding practices and risk of dental caries in Japan: the Osaka maternal and child health study. *Pediatr Dent*. 2013;35(3):267-271.

12. Drewnowski A, Darmon N. Food choices and diet costs: an economic analysis. *J Nutr*. 2005;135:900-904.

13. Mobley C, Marshall TA, Milgrom P, Coldwell SE. The contribution of dietary factors to dental caries and disparities in caries. *Acad Pediatr*. 2009;9(6):410-414.

14. Savage JS, Fisher JO, Birch LL. Parental influence on eating behavior: conception to adolescence. *J Law, Med Ethics*. 2007;35(1):22-34.

15. Barker M, Lawrence W, Woadden J, Crozier SR, Skinner TC. Women of lower educational attainment have lower food involvement and eat less fruit and vegetables. *Appetite*. 2008;50(2-3):464-468.

16. Brown K, Ogden J, Vögele C, Gibson EL. The role of parental control practices in explaining children's diet and BMI. *Appetite*. 2008;50(2-3):252-9.

17. Garcia AL, Vargas E, Lam PS, Shennan DB, Smith F, Parrett A. Evaluation of a cooking skills programme in parents of young children - a longitudinal study. *Public Health Nutr*. 2014;17(5):1013-21.

18. Ramos-Gomez FJ, Crystal YO, Ng MW, Crall JJ, Featherstone JD. Pediatric dental care: prevention and management protocols based on caries risk assessment. *J Calif Dent Assoc*. 2010;38(10):746-761.

19. Weinstein P, Harrison R, Benton T. Motivating mothers to prevent caries: confirming the beneficial effect of counseling. *JADA*. 2013;137(6):789-793.

20. Weinstein P. Provider versus patient-centered approaches to health promotion with parents of young children. *Pediatr Dent*. 2006;28(2):172-176.

21. American Academy of Pediatric Dentistry Council on Clinical Affairs. Guideline on infant oral health care. *Pediatr Dent*. 2012;34(5):132-136.

22. Nagahama SI, McNabb K, Vanderlinde M, et al. Improving utilization of preventive dental services by medicaid-enrolled children: focus on the parents. *J Dent Child*. 2002;69(3):325-31, 236.

23. Division of MCH Workforce Development 2012-2020 National Goals. 2012.

24. Baldwin DC. Some historical notes on interdisciplinary and interprofessional education and practice in health care in the USA. *J Inerprofessional Care*. 2007;21(S1):23-37.

25. Grembowski D, Milgrom PM. Increasing access to dental care for medicaid preschool children: the Access to Baby and Child Dentistry (ABCD) program. *Public Health Rep*. 2000;115(5):448-459.

26. Jones K, Tomar SL. Estimated impact of competing policy recommendations for age of first dental visit. *Pediatrics*. 2005;115(4):906-914.

27. Oliveira V, Olmsted J, Ghelfi LM. *The WIC program: background, trends, and issues*.; 2002:1-40.

28. Department of Health. *Washington state WIC: policy and procedure manual*; 2012:1-57.

29. Lewis C, Linsenmayer K, Williams A. Wanting better: a qualitative study of low-income parents about their children's oral health. *Pediatr Dent*. 2010;32(7):518-524.

30. Lee JY, Rozier G, Norton E, Kotch J, Vann WF. Effects of WIC participation on children's use of oral health services. *Am J Public Health*. 2004;94(5):772-777.

31. Lee JY, Rozier RG, Norton EC, Kotch JB, Vann WF. The Effects of the women, infants, and children's supplemental food program on dentally related medicaid expenditures. *J Public Health Dent*. 2004;64(2):76-81.

32. Nowak A, Casamassimo PS. *The Handbook of Pediatric Denistry*. 2011; 2-9.

Appendix A: WIC Counselor Demographic Questionnaire

1) What is <u>your</u> age?

   _____

2) What is your gender?
   - **A. ☐Male**
   - **B. ☐ Female**

3) How long have you worked at WIC?
   - **A. ☐Less than 6 months**
   - **B. ☐6 months-1 year**
   - **C. ☐1-2 years**
   - **D. ☐More than 2 years**

4) What is your position at WIC?
   - **A. ☐Certifier**
   - **B. ☐Dietician**

5) Do you have special training in any of these areas? (Please check all that apply)
   - **A. ☐Nutrition**
   - **B. ☐Health Education**
   - **C. ☐Nursing**
   - **D. ☐Social Work**
   - **E. ☐Medical Assistant**
   - **F. ☐Other (please specify): _____**

6) Have you had training in Oral Health Education?
   - **A. ☐Yes**
   - **B. ☐No**

7) What is your racial/ethnic background? Check all that apply.
   - **A. ☐White**
   - **B. ☐Black**
   - **C. ☐American Indian or Alaska Native**
   - **D. ☐Asian**
   - **E. ☐Pacific Islander**
   - **F. ☐Hispanic or Latino**
   - **G. ☐Other: _____**

8) What is the highest level of school you have completed?
   - **A. ☐Less than High School**
   - **B. ☐High School/GED**
   - **C. ☐Some College or Vocational Training**
   - **D. ☐4 year College Degree**
   - **E. ☐Graduate or Professional Schooling**

9) How often do you discuss oral health with WIC clients?
   - **A. ☐Never**
   - **B. ☐Rarely**
   - **C. ☐Sometimes**
   - **D. ☐Very Often**
   - **E. ☐Always**

10) How knowledgeable do you feel about discussing oral health issues with WIC clients?
   - **A. ☐Very Knowledgeable**
   - **B. ☐Somewhat Knowledgeable**
   - **C. ☐Not Knowledgeable**

11) Please list what WIC locations you work at:

Primary WIC Location:

_____

Other Locations:

_____

_____

_____

Appendix B: WIC Client Demographic Questionnaire

1. What is <u>your</u> age (in years)?

   _____

2. What is your gender?
   - **A. ☐Male**
   - **B. ☐ Female**

3. What is your racial/ethnic background? Check all that apply.
   - **A. ☐ White**
   - **B. ☐ Black**
   - **C. ☐ American Indian/Alaska Native**
   - **D. ☐ Asian**
   - **E. ☐ Pacific Islander**
   - **F. ☐ Hispanic or Latino**
   - **G. ☐ Other (please specify): _____**

5. What is the highest level of school you have completed?
   - **A. ☐Less than High School**
   - **B. ☐High School/GED**
   - **C. ☐Some College or Vocational Training**
   - **D. ☐4 year College Degree**
   - **E. ☐Graduate or Professional Schooling**

4. Please fill in the age for <u>each</u> child less than 18 years old that lives with you.

	Age of Child (in years)
Child 1	
Child 2	
Child 3	
Child 4	
Child 5	
Child 6	
Child 7	

5. When was the last time you took one of your children to see a dentist, either in an office, clinic, or in the emergency room?
   - **A. ☐Less than 6 months ago**
   - **B. ☐6 months – 1 year ago**
   - **C. ☐1 year – 2 years ago**
   - **D. ☐Over 2 years ago**
   - **E. ☐Never**

6. If you have taken your child to the dentist, what was the reason?
   - **A. ☐Regular check-up**
   - **B. ☐To fix cavities/fillings**
   - **C. ☐Tooth pain**
   - **D. ☐Tooth or mouth injury**
   - **E. ☐I don't remember**
   - **F. ☐Other (please specify): _____**
   - **G. ☐I have never taken my child to the dentist**

7. When was the last time <u>you</u> went to the dentist?
   - **A. ☐Less than 6 months ago**
   - **B. ☐6 months – 1 year ago**
   - **C. ☐1 year – 2 years ago**
   - **D. ☐Over 2 years ago**
   - **E. ☐Never**

8. Please check <u>ALL</u> the people below who have talked to you about cavities:
   - **A. ☐ WIC Counselor**
   - **B. ☐ Pediatrician/Medical Doctor**
   - **C. ☐ Dentist**
   - **D. ☐ School Teacher**
   - **E. ☐ Other (please specify): _____**

Appendix C: WIC Counselor and Client Oral Health Assessment

1. How old should a child be before he/she is allowed to drink juice? Please choose ONE.
   - **A. ☐Birth**
   - **B. ☐4 months old**
   - **C. ☐6 months old**
   - **D. ☐1 year old**
   - **E. ☐2 years old**

2. TRUE/FALSE: It is safe for a child's teeth if you mix (dilute) juice with water.
   - **A. ☐True**
   - **B. ☐False**

3. When is the best time for a child to drink juice? Please choose ONE.
   - **A. ☐Only between meals**
   - **B. ☐Once a day during a meal**
   - **C. ☐Once a day before bedtime**
   - **D. ☐It doesn't matter**

4. Which one of these is most likely to cause cavities? Please choose ONE.
   - **A. ☐Eating lots of snacks**
   - **B. ☐Drinking a soda everyday with lunch**
   - **C. ☐Having dessert every night after dinner**

5. When is the best time for a child to eat sweets? Please choose ONE.
   - **A. ☐Between meals**
   - **B. ☐During a meal**
   - **C. ☐Before bedtime**
   - **D. ☐It doesn't matter**

6. TRUE/FALSE: After age 1, breastfeeding more than 7 times a day can put a child at risk for cavities.
   - **A. ☐True**
   - **B. ☐False**

7. TRUE/FALSE: After 18 months of age, when a child gets breast milk AND solid foods together, it can cause cavities.
   - **A. ☐True**
   - **B. ☐False**

8. What is the best liquid to put your baby to sleep with after 18 months of age? Please choose ONE.
   - **A. ☐Juice**
   - **B. ☐Milk**
   - **C. ☐Water**
   - **D. ☐It doesn't matter**

9. Can this snack food cause cavities? Please check YES OR NO:

Cheese	**☐YES**	**☐NO**
Meat	**☐YES**	**☐NO**
Candy	**☐YES**	**☐NO**
Green Vegetables	**☐YES**	**☐NO**
Fruit	**☐YES**	**☐NO**
Crackers	**☐YES**	**☐NO**
Nuts	**☐YES**	**☐NO**
Chips	**☐YES**	**☐NO**
Dried Fruit	**☐YES**	**☐NO**
Fruit Snacks	**☐YES**	**☐NO**
Cookies	**☐YES**	**☐NO**
Cereal	**☐YES**	**☐NO**

10. Can this drink cause cavities? Please check YES OR NO:

Water	**☐YES**	**☐NO**
Juice	**☐YES**	**☐NO**
Milk	**☐YES**	**☐NO**
Chocolate Milk	**☐YES**	**☐NO**
Gatorade	**☐YES**	**☐NO**
PediaSure	**☐YES**	**☐NO**
Soda or Pop	**☐YES**	**☐NO**