

Fall 11-15-2016

Parental Attitudes/ Locus of Health Control and Caries Experience in Their 3-5 Year Old Children

Cassandra Garcia

Follow this and additional works at: https://digitalrepository.unm.edu/dehy_etds



Part of the [Dental Hygiene Commons](#)

Recommended Citation

Garcia, Cassandra. "Parental Attitudes/ Locus of Health Control and Caries Experience in Their 3-5 Year Old Children." (2016).
https://digitalrepository.unm.edu/dehy_etds/16

This Thesis is brought to you for free and open access by the Electronic Theses and Dissertations at UNM Digital Repository. It has been accepted for inclusion in Dental Hygiene ETDs by an authorized administrator of UNM Digital Repository. For more information, please contact disc@unm.edu.

Cassandra Garcia
Candidate

Dental Medicine
Department

This thesis is approved, and it is acceptable in quality and form for publication:

Approved by the Thesis Committee:

Christine Nathe RDH, MS, Chairperson

Demetra Logothetis RDH, MS

Diana Aboytes RDH, MS

**Parental Attitudes/ Locus of Health Control and
Caries Experience in Their 3-5 Year Old Children**

By

Cassandra Garcia, RDH

B.S., Dental Hygiene, University of New Mexico, 2012

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

Master of Science

Dental Hygiene

The University of New Mexico

Albuquerque, New Mexico

December, 2016

Dedication

First and foremost, I dedicate this research to all children who have had the misfortune of encountering dental decay; especially the little boy who inspired me to dig deeper into the minds of parents of 3-5 year old children. He and his mother came in to see me during a rotation at a health commons office where he cringed to the touch and was very fearful. Upon examination I discovered he had severe baby bottle tooth decay. When I informed his mother about his oral condition, she told me it was because he drinks bath water. I asked her what he drinks as a beverage and the source he receives it; she said he always drinks juice from a sippy cup. I asked her if she dilutes the juice with water and she turned to me and asked, "You can do that?" What?! It dawned on me that information I thought everyone should know, may not be the case. People from different backgrounds such as low socio economic status, no education, or low income have disadvantages that affect many aspects of their life, including dental care. That's the moment I decided to focus my research on the attitudes of parents and how their influences directly affect their children. What are these parents thinking and how can I use their attitudes as a tool to educate them on oral health? How do I help these families become aware about the consequences of their actions and instill value in preventative oral habits? This little boy and these questions gave me the drive to be a voice for the little humans of the world and lend a hand in creating awareness. Through this project I have learned so much about myself and have gained insight on my role in the dental community. I have learned that I am not black and white, nor am I all shades of grey. I have chosen to pick every color of the rainbow and learned to dance in every shade. These splashes of color have painted the portrait of me and who I am. I am a wife to my high school sweet heart and love my life, mommy to a precious Ava Jewel and amazing little guy Ezra, daughter to a loving wonderful woman, a sister, granddaughter, niece, aunt, cousin,

friend, and free spirit. I dream big and set no limits. I love to the fullest and feel like the luckiest person in the world to have so many amazing people in my life who love me. All praise to God. I have proven to myself that anything is possible. Since graduating with my BS in Dental Hygiene in 2012 I have gotten married, had my Jewel, had my Ezy, all while working full time, being a student, full time mommy and wife. These past few years have been packed in all the best ways. No dream is worth putting on hold. I cannot wait to open a day care with a functional operator where I can open my door to the community, provide a safe haven for children as they develop, and perform preventative services for all ages. Reach out to neighboring day care facilities and lend my hands where needed. No dream is too big. No task is too great. Always stay positive and keep moving forward. Thank you to everyone who believes in me. You're awesome!

Quotes by me, for me:

"To see significant change, significant change must be made."

"You stop, where you stop yourself."

Acknowledgements

I heartily acknowledge Christine Nathe, my advisor and dissertation chair, for continuing to encourage me through the years of classroom teachings and the long number of months writing and rewriting these chapters. Her guidance and professional style will remain with me as I continue my career.

I also thank my committee members, Diana Aboytes, and Demetra Logotheitis for their valuable recommendations pertaining to this study and assistance in my professional development. Gratitude is extended to my statistician John Pesko for his guidance and assistance to help bring my results to light. I will always be grateful for what you did for me.

To my best friend, my husband and love of my life, Horacio Garcia, thank you for the many years of support. To my children Ava Jewel, Ezra, and my unborn baby boy, I did this for you to show you that there are no limits in life. Mommy loves you with all her heart forever and ever. Mom, your love and encouragement is greatly appreciated.

**Parental Attitudes/ Locus of Health Control and
Caries Experience in Their 3-5 Year Old Children**

By

Cassandra Garcia

B.S., Dental Hygiene, University of New Mexico, 2012

M.S., Dental Hygiene, University of New Mexico, 2016

ABSTRACT

Purpose: Childhood caries represents a public health issue especially for the Head Start population due to many disadvantages. Behavioral risk factors such as locus of health control (LoC) could act as indirect casual agents in the development of dental disease, but has not been fully studied. This research was to assess the relationship between parental attitudes/ health locus of control, parental age, and parental marital status with caries experience in their preschool children by using a validated survey.

Methods: The target population assessed in this study was the parents of children enrolled in Head Start Programs, in Santa Fe County, in New Mexico. Study data included questionnaires in regards to children's and parents demographics, dental caries experience, and 13 attitudinal items regarding locus of control (LoC) in caries prevention.

Results: This study overwhelmingly suggests that there is no statistical evidence of a relationship between the number of caries of children and parental marital status, age, or LoC. An additive Poisson regression model would appear to agree that parental age, attitude, nor marital status explain a significant amount of variability in number of caries, as all p-values are greater than even a liberal cutoff of 0.1.

Conclusion: The data does not contradict the null hypothesis that parental attitudes towards oral health do not affect their children's oral health or occurrence of dental caries, but the ability of psychological characteristics to explain oral health was limited in this study, given the underrepresentation of individuals exhibiting an external LoC. It is plausible that individuals with high internal LoC also tend to be more vigilant in regard to proactive dental care, leading to the results we saw of few caries.

Table of Contents

List of Figures	ix
List of Tables	x
Chapter I Introduction	1
Introduction	1
Statement of the Problem	2
Significance of the Problem	2
Operational Definitions	5
Chapter II Review of Literature	6
Introduction	6
Review	6
History of Head Start Programs	6
Barriers to Dental Care in Head Start Children	7
Benefits of Head Start Program	8
Importance of Nutrition and Dental Caries Relationship	9
The Importance of Early Intervention and Prevention	10
Importance of Assisted Brushing and Parents Attitudes	12
Theory of Locus of Control	14
Summary	15
Chapter III Methods and Materials	16
Sample Description	16
Research Design	16
Data Collection and Analysis	17

Chapter IV Variables, Data Analysis, Results, Discussion and Conclusion	19
Variables	19
Data Analysis	19
Results	20
Discussion	29
Conclusion	31
Chapter V Article Submission for Journal of Dental Hygiene	33
Parental Attitudes/ Locus of Health Control and Caries Experience in Their 3-5 Year Old Children	
Abstract	33
Background	34
Methods	39
Variables and Data Analysis	41
Results	42
Discussion	51
Conclusion	53
Appendices	55
Appendix A Survey	56
Appendix B Head Start Permission Letter	58
Appendix C Human Research Protections Office Approval Letter	59
Appendix D Survey Consent Form	61
References	63

List of Figures

Figure 1: Number of dental caries _____	21
Figure 2: Parental age _____	22
Figure 3: Parental LoC scores _____	23
Figure 4: Parental marital status _____	24

List of Tables

Table 1. ANOVA table for Poisson regression model	29
---	----

Chapter I

Introduction

Introduction

Dental hygienists play an integral role in promoting oral health and are dedicated to helping patients prevent dental disease. Dental hygienists are aware of various target populations, know how to assess their needs, implement as necessary, and integrate specific care with instructional services required by the target population. The target population that was assessed in this study was the parents of children enrolled in Head Start programs in Santa Fe County, New Mexico. These families have many disadvantages including low income, low socioeconomic status (SES), little to no education, and limited resources including dental care. Due to these disadvantages, families are not equipped with the knowledge of preventive strategies, do not understand the importance of nutrition, or are not aware how parental involvement will affect their child's oral health. Unfortunately, it has been recognized that children's oral health is related to their families' SES and their mothers' education level.^{1,2} As a result, families do not understand the importance of good oral care or the importance of the primary dentition. Moreover, in order to fully investigate the complex interactions of the risk factors involved in the etiology of dental decay, research has focused on socioeconomic, psychological and behavioral risk factors as these could act as indirect casual agents.² This research is aimed to assess the attitudes of parents of 3-5 year old Head Start children and how their attitudes can directly impact their children's oral health. This research helped to assess the relationship between parental attitudes/ health locus of control, parental age, and parental marital status with caries experience in their preschool children by using a validated survey. This information highlights the importance of early intervention through preventative dental services,

education on nutrition, education to parents on their role to assist their children, and more specifically how their attitudes can influence their children's oral health and quality of life.

Statement of the problem

Null hypothesis: Parental attitudes towards oral health do not affect their children's oral health or occurrence of dental caries.

Significance of the Problem

The Head Start program is a program operated within the United States Department of Health and Human Services that provides comprehensive early childhood education, health, nutrition, and parent involvement services to low-income families and their children. Head Start facilities serve over one million families throughout the United States in both urban and rural communities. Eligibility is primarily income-based, although each local program includes other eligibility criteria, such as disabilities and services needed by other family members. This population is vulnerable to dental disease due to their SES, education level, and income level.³

Early Childhood Caries (ECC) is tooth decay that occurs in the primary dentition of children under the age of five. This is significant because tooth decay causes pain and infection. Unfortunately, some children live with this pain every day, especially those families of low SES, due to low income, health literacy, value for oral health, and access to dental care. Some parents and caregivers do not recognize the important role that primary dentition play in healthy development. The primary dentition is important for eating, holding space for the permanent dentition, talking, and smiling. ECC adversely impacts development and learning and can affect what a child eats, how they speak, and ultimately how they feel about themselves. Such an impact can result in poor overall health and well-being.⁴

By implementing oral health education into Head Start programs, families gain a better understanding about oral health and the importance of early intervention. Good oral health is an important part of overall wellness and a child cannot be truly healthy if he or she has dental decay. Awareness can be achieved through education and early intervention. Studies have shown that early intervention is important in preventing dental caries. In order to prevent dental caries, involvement and education must take place before the first cavity develops. An effective strategy is to work with both parents and children while involved in Head Start and the focus should be on preventing dental caries in erupting teeth. Program staff can support children and families to embrace positive oral health habits such as daily brushing and regular dental visits. Families can learn about the importance of primary dentition, the decay process, importance of nutrition, and help their family have good oral health.^{5,6}

Good nutrition is important for the oral cavity and most Head Start families do not know that the foods and beverages consumed have a direct influence on the incidence and progression of dental decay. Oral bacteria ferment sugars and make acid as a byproduct, which is harmful to dentition. The acid breaks down enamel, causing demineralization, and eventually leads to dental caries. Some influencing factors include the form of the food, whether it is liquid, solid, sticky or slow to dissolve. Frequency and consumption of sugary foods and beverages have a direct impact on the health of dentition and the progression of dental decay. Families must be educated on the importance of limited sugar consumption to reduce their cavity risk. Education on nutrition and intervention will help families understand the importance of healthy eating habits and the role it plays in dental decay.^{4,7}

Furthermore, in order to fully investigate the complex interactions of the risk factors involved in the etiology of dental decay, research has focused on socioeconomic, psychological

and behavioral risk factors as these could act as indirect casual agents. For behavioral risk factors, human behaviors are often studied through measurement of a person's attitudes. This is based on psychological concepts, which presume that attitudes are relevant determinants of a person's behavior and that behavior can be predicted from measurable behavioral intentions. One of the theories explaining behavior patterns is Locus of Control (LoC). This theory was the basis of the research and helped to determine how parental locus of control affects their children's oral health. This information allowed us to assess parental attitudes and the child's dental decay experience.^{2, 8}

This type of research is important to society and this target population due their limitations. These are families of low SES, who do not have access to dental care, or are not educated on proper oral health care strategies. Many adults do not know the risks involved with poor oral and the impact it can have on their children. These children should not be living with the pain they do. In most cases these children are unable to speak for themselves or may believe what they are feeling is normal. If parents are not actively involved in their children's oral care, there can be many consequences in their children's future. It is the role of the dental hygienist to bring awareness to these families through preventative strategies including educating on early prevention strategies, nutrition, oral care, and help motivate parents to have a positive attitude about oral health.

Operational definitions

Socioeconomic status- Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

Head Start- The Head Start program is a program of the United States Department of Health and Human Services that provides comprehensive early childhood education, health, nutrition, and parent involvement services to low-income children and their families

Early prevention- Involves educating on the importance of preventative measures such as practicing good eating habits, brushing teeth, and using fluoride products to prevent decay before the tooth erupts

Nutrition- the process of providing or obtaining the food necessary for health and growth: eating healthy to reduce the risk of dental decay

Education- the process of receiving or giving systematic instruction or information; referring to educating families on oral health

Locus of control- Locus of control refers to the extent to which individuals believe they can control events affecting them. Individuals who have an internal locus of control believe events in their life derive primarily from their own actions. Individuals who have an external locus of control tend to blame outside forces for everything.

Chapter II

Review of Literature

Introduction

This review of literature aims to broaden the understanding of parental attitudes and caries experience in their Head Start children. This specific population has many disadvantages that are pointed out through the literature. This literature will review the role Head Start programs have in educating on the importance of oral health and looking at ways to improve oral health in children ages 3-5 will be discussed.

Literature was reviewed using the PubMed/MeSH search engines to access the database Medline focusing on keywords such as “head start programs”, “education”, “nutrition”, “dental caries”, “fluoride”, “prevention”, “locus of control”, among several others.

This review explores the history of Head Start programs, barriers to dental care in Head Start children, and the benefits of Head Start programs. The importance of nutrition and dental caries relationship will be discussed. The benefits of assisted tooth brushing, the importance of early prevention/ intervention, and more specifically, parental health locus of control and caries experience in their preschool children

Review

History of Head Start Programs

Head Start is a national early childhood program for low income families in the United States. It was created in 1964 as part of The War on Poverty. Sargent Shriver took the lead in assembling a panel of experts to develop a comprehensive child development program that would help communities meet the needs of disadvantaged preschool children. Part of the government’s thinking on poverty was influenced by new research on the effects of poverty, as

well as the impacts of education. This new research indicated there was an obligation to help disadvantaged groups, compensating for inequality in social or economic conditions. The Head Start program was designed to help break the cycle of poverty, providing preschool children of low-income families with a comprehensive program to meet their emotional, social, health, nutrition, and psychological needs. In the summer of 1965 an 8 week Head Start program was launched and since then has been reauthorized to expand to full-day and full- year services.³ Compared with children from high income families, children from low income families have an increased risk for health disparities and higher than average rates of dental caries. Effective health promotion and disease prevention strategies have the potential to reduce the health burdens of vulnerable children.⁹

Barriers to Dental Care in Head Start Children

Access to dental care in low-income families can be problematic and unfortunately dental caries is still a prevalent disease in this population. Low socioeconomic status of the family and parents' poor oral health habits have been found to contribute to the development of dental caries. Parents' habits, knowledge, attitudes, and education level have been found to influence their children's oral health status.¹⁰ Culture norms and practices also influence a large variety of social factors, such as values, beliefs, and customs, affecting children's oral health. Culture can compromise religion, health beliefs, diet, language, family structure, and medical and dental approaches.^{5, 10} Sociodemographic characteristics affect oral health knowledge and attitudes of parents with a lower level of education, which negatively affect their oral health practices. A higher prevalence of dental caries and lower tooth brushing frequency was found in 3 year old children living in rural areas, when compared with those from urban settings.^{1, 10} Head Start children, like other low income children in the U.S., experience more decay, that is often more

extensive, thus have more pain and suffering than higher income children. When they do get dental care it is often insufficient to meet all their needs.⁶ Head Start programs are beneficial in helping to get these children dental care, however the problem facing Head Start programs is how to ensure that all children in need obtain dental care and that the care is sufficient. While a recent study of 54 head start centers in North and South Carolina highlights some of the barriers that inhibit success in providing complete care. Of the 3,375 dentists practicing in those two states, only 7 percent reported that they currently accept Head Start children as patients, while 23 percent reported accepting Medicaid patients. Over one-third (35%) stated that they would not accept Head Start children, explaining that the children are too young for them treat (15%), that payments were insufficient (30%), or they were too busy to see these young children (39%). This survey reflects recognized barriers to dental care for low-income children on Medicaid.⁶

In conclusion, parent's habits, socioeconomic status, attitudes, education levels, culture, sociodemographic characteristics, and dental provider availability affect oral health directly.

Benefits of Head Start Program

Head Start programs provide children and families with much advantageous support to help these low income families. These programs recognize the importance between school readiness and health and coordinate health related services such as basic screenings, health education, and referrals to health providers. Each program has infrastructure to coordinate services, as well as support for routine home visits and parent education workshops. A director and designated managers are typically provided in 6 service areas: education, health, mental health, nutrition, disabilities, and family services. Through effective health promotion and disease prevention strategies Head Starts have the potential to reduce the health burdens of vulnerable children. Programs such as the Anderson School of Management at the University of

California, Los Angeles have worked to provide a structured framework for health promotion that builds staff leadership using systematic training and implementation strategies. Trained Head Start staff is able to implement health promotion programs for their families using culturally adapted, low- literacy materials on various prevention topics.⁹

Growing up in poverty significantly increases the likelihood that children will start school well behind their advantaged peers in key areas of language development and literacy skills. With this disadvantage many children may start school without the social emotional maturity and classroom behaviors that foster “readiness to learn,” which can impact their rate of progress once in school, and poorly contribute to lifelong milestones such as school performance, high school graduation rates, and long-term employment potential. This problem of understanding this trend has made promoting school readiness a national priority. Head Start children show rapid growth executive control skills which help these children to organize their thinking and behavior with increasing flexibility, decrease their reactive responding to contextual cues and contingencies, and engage in self-regulated and rule-governed behavior. The long- term impact of preschool intervention may affect the development of mental systems that support learning and adaptive behavior. For this reason, several groups, such as the Committee of Integrating the Science of Early Childhood Development have highlighted the importance of promoting self-regulation and social competence in Head Start programs as a means to develop the motivation, cooperation, and focused persistence needed for social and academic success in school.¹¹

Programs and committees work together to promote health and school readiness in these Head Start programs which will help these children and families develop a healthy future.

Importance of Nutrition and Dental Caries Relationship

Dental caries also known as tooth decay, cavities, or caries, is a breakdown of teeth due to the activities of bacteria. Early childhood caries (ECC) is a virulent form of dental caries characterized by an overwhelming infectious challenge usually associated with poor dietary habits, found mostly on primary maxillary anterior teeth.¹² Studies showed that the predominant microbial characteristic of ECC is the bacterial strain *Streptococcus mutans*, which exceeds 30% of the cultivable plaque flora.¹² This dense level of *S. mutans* has been found to be the agent that causes ECC along with diet playing a critical role in the clinical expression of ECC. Caries promoting sugars such as glucose, fructose, and sucrose are readily metabolized by *S. mutans* to organic acids that demineralize enamel and dentin. These sugars can be found in drinks and high carbohydrate foods. Dentition becomes affected when children are frequently consuming these sugary foods. Some of the factors that make a difference in the progression of dental decay include the form of the food, whether it is liquid, solid, sticky or slow to dissolve. Caries risk is greatest if sugars are consumed at high frequency and are in a form that is retained in the mouth for long periods. Sucrose is the most cariogenic sugar because it can form glucan that enables firm bacterial adhesion to teeth and limits diffusion of acid and buffers in the plaque.^{7, 12, 13} The role of diet in the acquisition of the infection and the development of the disease is critical.

The Importance of Early Intervention and Prevention

Dental caries is an oral disease which has a high prevalence despite the availability of prevention and prophylactic means, including the use of daily fluoride toothpastes, water fluoridation, dental sealants, oral health education, various antiseptic mouth rinses, as well as dental visits. Chemotherapeutics for dental caries prevention have been proven to be effective in the prevention of cariogenic biofilm formation in the oral cavity. These agents exert an indirect effect on the biofilm by inhibiting the growth of oral bacteria and are more beneficial when they

contain fluoride. Fluoride is important in the prevention of dental caries and is considered to be an effective anticaries agent. Fluoride has several mechanisms of action including: 1) suppression of demineralization, by substituting hydroxyl groups within calcium hydroxyapatite structure, creating a new more acid resistant fluorapatite mineral; 2) stimulation of the remineralization by constantly absorbing it along with calcium and phosphate ions to the tooth surface from saliva, and again resulting in the development of fluorapatite-like mineral; 3) inhibition of bacterial metabolism.¹³ Fluoride has been effective at reducing caries incidence in children younger than age 5 years and is supported in preventing caries in high risk children. More strategies to reduce the amount of bacteria include parental counseling to improve oral hygiene and the use of xylitol. Xylitol is a naturally occurring sugar with properties that reduce levels of caries-forming bacteria in plaque and saliva. Xylitol comes in various forms such as syrup, topically via wipes, gums, or snack foods.⁴

In conjunction with positive parental and educator attitudes, it is clearly evident that children need dental hygiene training. This type of intervention will help to decrease oral plaque and the prevalence of dental decay. A study was conducted by observing children's current brushing habits followed by education on proper brushing techniques which included behavioral requirements of angle, motion, location and duration. The children were given a pretest and assessed on their tooth brushing skills. Afterwards they were given training and consisted of 4 components; (1) Simple instructions were used to describe each step in proper brushing sequence. (2) Modeling consisted of demonstrating correct brushing by exaggerating the motions and providing examples of good and poor brushing. (3) Physical guidance was used as a correction procedure by which the trainer gently wrapped his or her hand around the child's hand so that both of them can hold the brush, and move the brush in the desired motion and angle. (4)

Descriptive praise was initially given after each occurrence of a correct component of brushing. The results showed as the number of brushing skills increased, the amount of plaque on the children's teeth decreased. The training was a success and the training produced good results with children previously thought to be too young to learn the complex skills required for thorough and accurate brushing.¹⁴

Education on prevention of cariogenic behaviors is one approach to preventing and reducing ECC. Helping the Head Start population utilize daily prevention aids will help to reduce to the amount of biofilm formation in the oral cavity. Educating children on proper brushing techniques is proper intervention to reduce the amount of plaque and caries in children.^{4, 7, 13, 14}

Importance of Assisted Brushing and Parents Attitudes

Parents' habits and knowledge about oral health have been found to influence their children's oral health status. Research has proven it is important to provide the population with guidelines on children's oral health behavior and its relationship with oral health and dental caries. As providers we need to address the factors that influence children's oral hygiene activities such as parents' attitudes and involvement, so we can provide them with good oral health and improve quality of life.¹⁰ There is evidence that good knowledge and oral hygiene positively affects children's dental health. Studies have been done and have concluded that parental attitudes toward children's oral health were significantly associated with their own oral health behavior and understanding the importance of development of oral hygiene skills in their children.¹⁵

ECC is significant in the Head Start population and the parents of these high-risk children often wait until caries in primary teeth is advanced and become symptomatic before bringing

their children to the dentist. It is important to intervene through education and motivation. Motivational interviewing has been used in many different settings and is a brief counseling session where the parent is helped explore and verbalize the reasons for changing the health behavior and to find the reasons for changing themselves. A study was done to compare a motivation group (group A), traditional health education group (group B) and a control group (group C), which showed that the average number of decayed was $0.23 + 0.58$ in group A that was significantly less as compared to $0.39 + 0.79$ and $1.17 + 1.32$ in group B and C, respectively.¹⁶ Evaluating different educational methods such as motivational interviewing can help to reduce dental caries and show the importance of positive encouragement.

School and family play an important role in the development of children. Therefore, it is important for educators to value and understand the importance of oral health. Children need to be aware about health and valuing it should be developed early during the Head Start years, when children are able to absorb information enough to incorporate oral health care into their daily life habits. A study was done to evaluate the practices and attitudes towards oral health care in education professionals working in 24 public municipal pre-schools in the state of Rio de Janeiro, Brazil. The results were satisfactory in that the educators valued oral health and continually gave support to the children and families. The education professionals who took part in the study demonstrated positive attitudes regarding the children's oral health care and they recognize their role in promoting healthy habits and are interested in undertaking integrated oral health education.¹⁷

Parental knowledge and attitudes toward oral health can promote appropriate oral hygiene skills in their children. Different educational methods can be incorporated such as

traditional education and motivational interviewing. The attitudes and roles of educators play an important role in healthy habits developed in children.^{15, 16, 17}

Theory of Locus of Control

Dental caries etiology is multifactorial and in order to fully investigate the complex interactions of the risk factors involved in the etiology of disease, research has focused on socioeconomic, psychological and behavioral risk factors as these could act as indirect casual agents. For behavioral risk factors, human behaviors are often studied through measurement of a person's attitudes. This is based on psychological concepts, which presume that attitudes are relevant determinants of a person's behavior and that behavior can be predicted from measurable behavioral intentions. One of the theories explaining behavior patterns is Locus of Control (LoC).^{2, 18}

Locus of control theory was established in the 1950's by Julian Rotter. Locus of control refers to the extent to which individuals believe they can control events affecting them. Individuals who have an internal locus of control believe events in their life derive primarily from their own actions. These individuals believe that he or she can influence events and their outcomes: for example, a person who is decay free praises themselves. Individuals who have an external locus of control tend to blame outside forces for everything. These people believe one's health is depended on luck, fate, or chance. A more internal locus of control is generally seen as desirable, that way a person is able to successfully experience the sense of personal control and responsibility.⁸

A study was done using a sample size of 285 preschool children and their parents. The study data included children's dental status recorded and parental questionnaires with 13

attitudinal items regarding locus of control in caries prevention. The association between parental locus of control and children's caries experience and level of untreated caries was analyzed using logistic regression, adjusting for the effect of key sociodemographic variables. The findings supported the hypothesis that higher internal parental locus of control is associated with better control of both untreated caries and caries experience in their preschool children and highlight that a more internal locus of control within the family is advantageous in the prevention of dental caries.²

Summary

This review explores the history of Head Start programs, barriers to dental care in Head Start children, the benefits of Head Start programs, importance of nutrition and dental caries relationship, importance of assisted tooth brushing, the importance of early prevention, and parental attitudes. There are various ways to help reduce the prevalence of ECC in the Head Start population and educate on the benefits of a healthy oral cavity.

Chapter III

Materials and Methods

Sample Description

The target population that was assessed in this study was the parents of children enrolled in Head Start programs, in Santa Fe County, in New Mexico. The aim of this research was to assess the relationship between parental locus of health control, parental age, and parental marital status with caries experience in their 3-5 year old children. A validated survey questionnaire was distributed to a sample size of 394 parents and students from 7 different head start facilities, in Santa Fe County. The Head Start facilities were Flores del Sol, Sweeny, Agua Fria, Tierra Contenta, La Cominidad de los Niños, Nambe, and Arroyo Seco.

This sample was chosen because they met the requirements of age, SES, and enrolled in Head Start. Santa Fe County was of interest because the sample size was adequate, this county is similar in region, and all 7 centers are non-tribal.

Research Design

This research helped to assess the relationship between parental attitudes/ health locus of control, parental age, and parental marital status with caries experience in their preschool children by using a self-reporting validated survey (see Appendix A). The survey contained a portion of demographics regarding both children and parents, with 13 parental attitudinal items regarding locus of control in caries prevention. The survey was distributed via paper to reduce the limitation of internet access and to ensure every enrollee in Santa Fe County had an opportunity to participate in this study. The survey was printed double sided with both English and Spanish version at the expense of the investigator. Permission was obtained and approved by

the Director of the Head Start/Early Head Start program to conduct this research and have the teachers act as the distributors and collectors of the survey (see Appendix B). This research was approved by the UNM Human Research Protections Office on August 16, 2016 (see Appendix C). Head Start teachers were informed about this research project at the annual start of school meeting on August 5th, 2016, by the lead investigator. At that time the teachers were asked to participate in the project as distributors and collectors of the survey. Teachers who agreed to participate were given an introduction of the study and verbal instructions on their role in the study. Written instructions for the distributors were given on the day of distribution. The investigator distributed the surveys to the facilities with cover pages stating the purpose of the research, informing the survey is voluntary and anonymous, and all other relevant information (see Appendix D). The survey was distributed during the 3rd week of the Head Start school year, August 29th-September 7th, 2016. It was sent home with the children on a Monday (8/29) and asked to be returned by Friday (9/2). In addition, the following Tuesday and Wednesday (9/6 and 9/7), 10 extra surveys were placed in the classroom, and parents were asked to fill one out if they hadn't already done so. Since the survey was anonymous there was no way to record who had filled one out, that is why there was some left in the class the following week for 2 days. The survey was out for 9 days total, including the weekend. The parents were aware this research was voluntary and anonymous with no penalties if they did not participate, there would be no follow up, and no treatment given to their children. The information gathered was for research purposes only and to be used as an educational tool.

Data Collection and Analysis

The teachers/ distributors were given manila folders to place surveys in upon collection. Collection happened when the survey was returned to the teacher or were collected immediately

if the survey was filled out in the classroom. On the 10th day the surveys were collected from each facility, and stored at Novitski hall on north campus in a locked filing cabinet. Data was entered into an excel program, and the investigator worked with John Pesko (a statistician from the University of New Mexico) to interpret the data. After all data had been entered, the surveys were destroyed using the shred box, Shred Company, located at Novitski hall. The information gathered had minimal risk. The information gathered was used as an educational tool and allowed us to examine and assist parents in understanding their role and involvement in helping their children have great oral health.

In reporting the survey results, the lead investigator will present graphical and numeric summaries of the survey responses of interest — the age, marital status, and locus of control score for the parents, and the number of caries of the child. Age and locus of control score are considered to be continuous variables, marital status is categorical, and number of caries is a count variable. Density plots are used to display the distribution of the continuous variables, while bar plots are used for marital status and number of caries. The investigator will examine the relationship between age and number of caries using a scatter plot and Kendall's tau will be reported along with a corresponding p-value from the corresponding significance test. We do the same for the relationship between locus of control score and number of caries. For a comparison of the number of caries by marital status group we present side-by-side box plots to graphically assess any distributional differences in number of caries, and we augment this with a formal significance test for difference in typical number of caries between each group using a Mann-Whitney U test as the distribution of caries does not appear to be normally-distributed. Finally, we look at a Poisson regression model with number of caries as the response and main effects for age, marital status, and locus of control as our predictors.

Chapter IV

Variables, Data Analysis, Results, Discussion, and Conclusion

Variables and Data Analysis

Our primary objective was to investigate the relationship between parents' attitude (LoC), age, and marital status with the number of caries in the primary dentition experienced by their children. Parents were asked to complete a questionnaire in regard to their age, relationship to the child, and marital status, as well as provide information about the child's age, sex, Head Start experience, history of care by a dental provider, and caries experience. This questionnaire also sought to assess if attitudinal items associated with parental oral health beliefs appear related to the child's history of dental decay. The well-known psychological model, "Locus of Control" (LoC) was used to gauge parental attitudes. The LoC postulates that personal attitudes and beliefs are behavioral predictors, and that attitudinal questionnaire items were taken from a standardized and validated questionnaire originally created for an international study on childhood caries.² "Agree" responses to questions 1, 2, 5, 7, and 11 indicate more internal LoC, while "Disagree" responses to these questions indicate more external LoC. Similarly, "Agree" responses to 3R, 9R, and 13R, and the questions related to beliefs in bad luck/ chance: 4R, 6R, 8R, 10R, and 12R indicate more external LoC while "Disagree" responses to these questions indicates more internal LoC. A "Total LoC" score was calculated for each person, adding together all responses indicating internal LoC, then, subtracting all responses indicating more external LoC, yielding a score ranging from -13 (most external) to 13 (most internal).

Results

The target population that was assessed in this study was the parents of children enrolled in Head Start programs, in Santa Fe County, in New Mexico. A validated survey questionnaire was distributed to a sample size of 394 parents and students from 7 different head start facilities, in Santa Fe County. The Head Start facilities were Flores del Sol, Sweeny, Agua Fria, Tierra Contenta, La Cominidad de los Niños, Nambe, and Arroyo Seco. Of a possible 394 responses, 128 surveys were returned. Responses which lacked information on number of caries, marital status, attitudinal questions, children's age for the study (3-5), and parental age were removed from the study, resulting in a sample of 98 complete cases.

The following describes the demographic breakdown of the sample, which was composed of 44% boys and 56% girls. The parental age ranged from 18 to 57 years old, with a typical (median) age of 29. Note 5 responses were done by a person who was "other" and not the parent, most likely a grandparent who were all above age 51. Most of the children, 61% were decay free and had zero caries reported, while 39% reported decay ranging from 1-10 caries. About a third of parents were married, while the rest reported being single. 82% of children had seen a dental provider within the past year, while 9% had seen a dental provider more than a year ago, and information was not available for the remaining 9%.

Univariate graphical summaries in Figures 1, 2, 3, and 4 show the distribution of our variables of interest.

The bar plot of number of dental caries in this population depicts strong right-skewness (see figure 1) — most children had 0 caries, 75% had 2 or less, and a handful of few extreme cases had up to 10 caries.

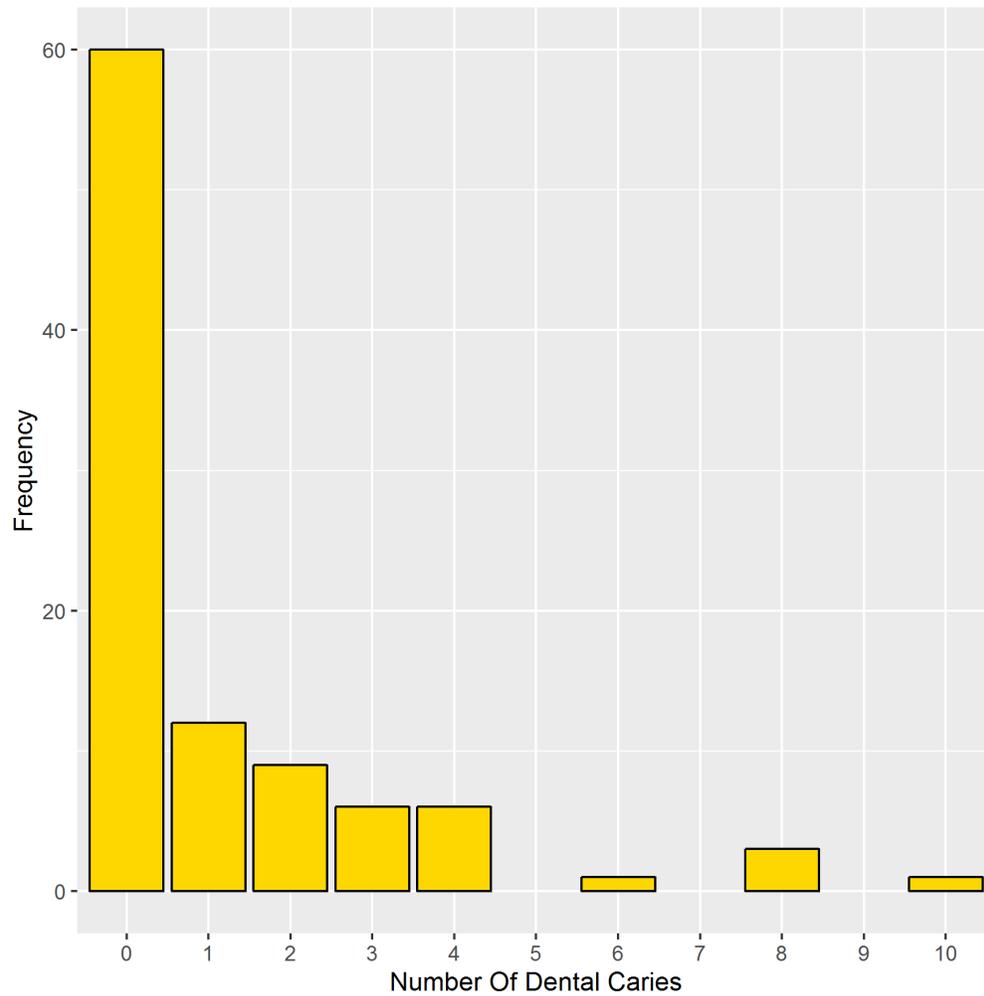


Figure 1: Number of dental caries

The density plot of parental age shows that most individuals were between 20 and 30 years old (see figure 2).

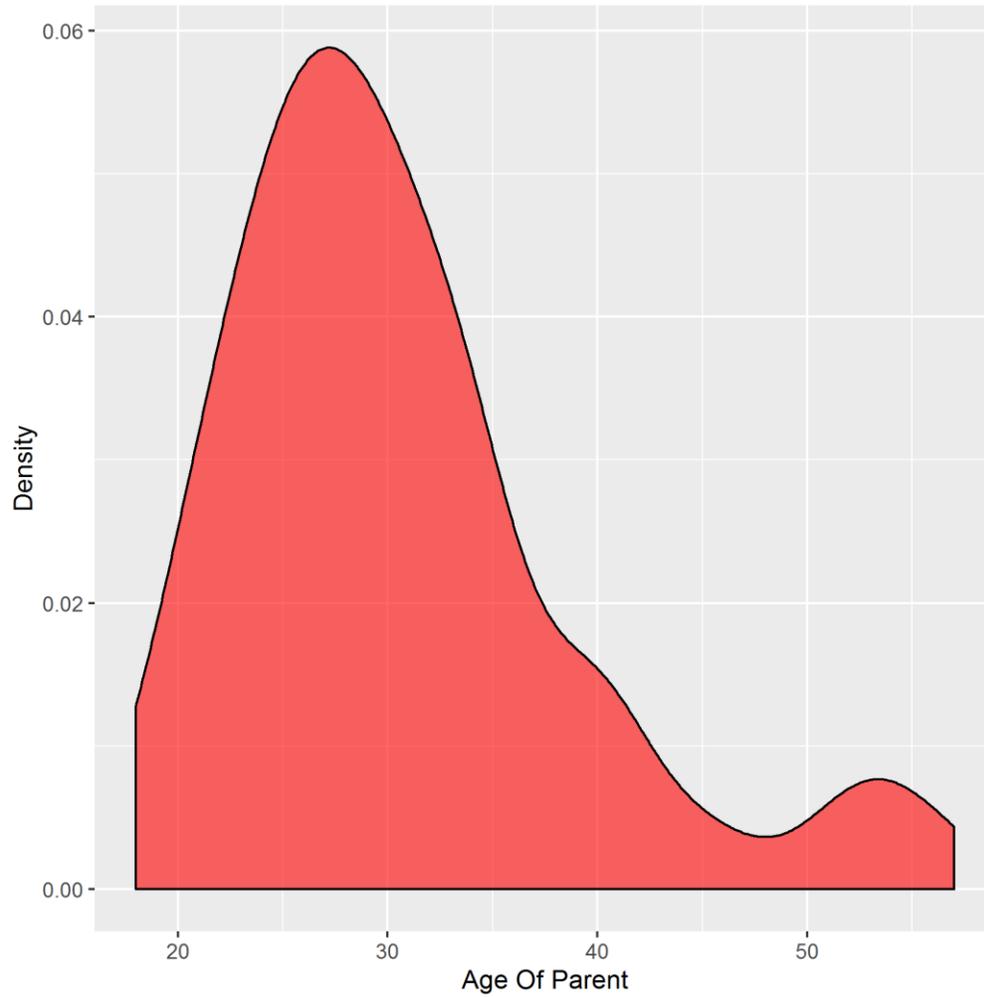


Figure 2: Parental age

The LoC density plot reveals that most respondents demonstrated an overwhelmingly internal locus of control personality type (median score of 9), with only 5 people exhibiting an external LoC with scores of less than zero (see figure 3).

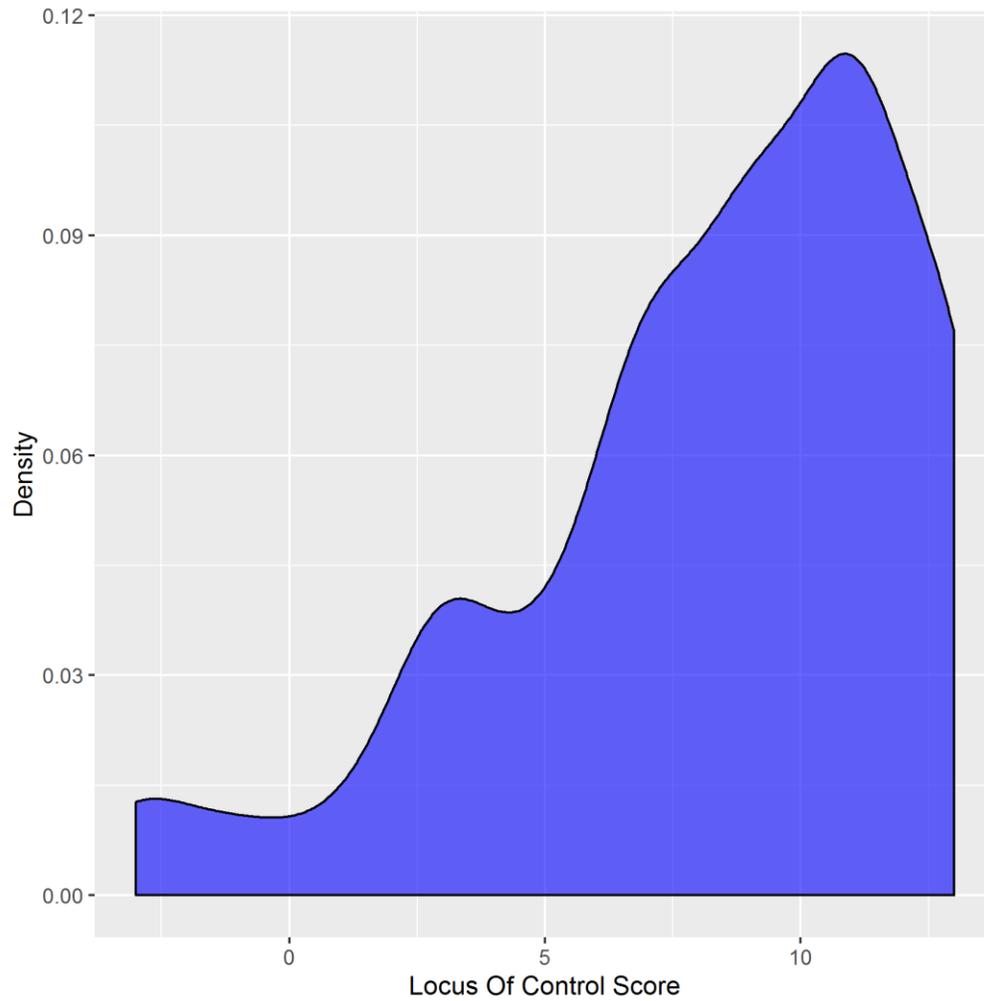


Figure 3: Parental LoC scores

Marital status is shown below in a bar plot (see figure 4), which shows that almost two-thirds of our sample consists of single parents.

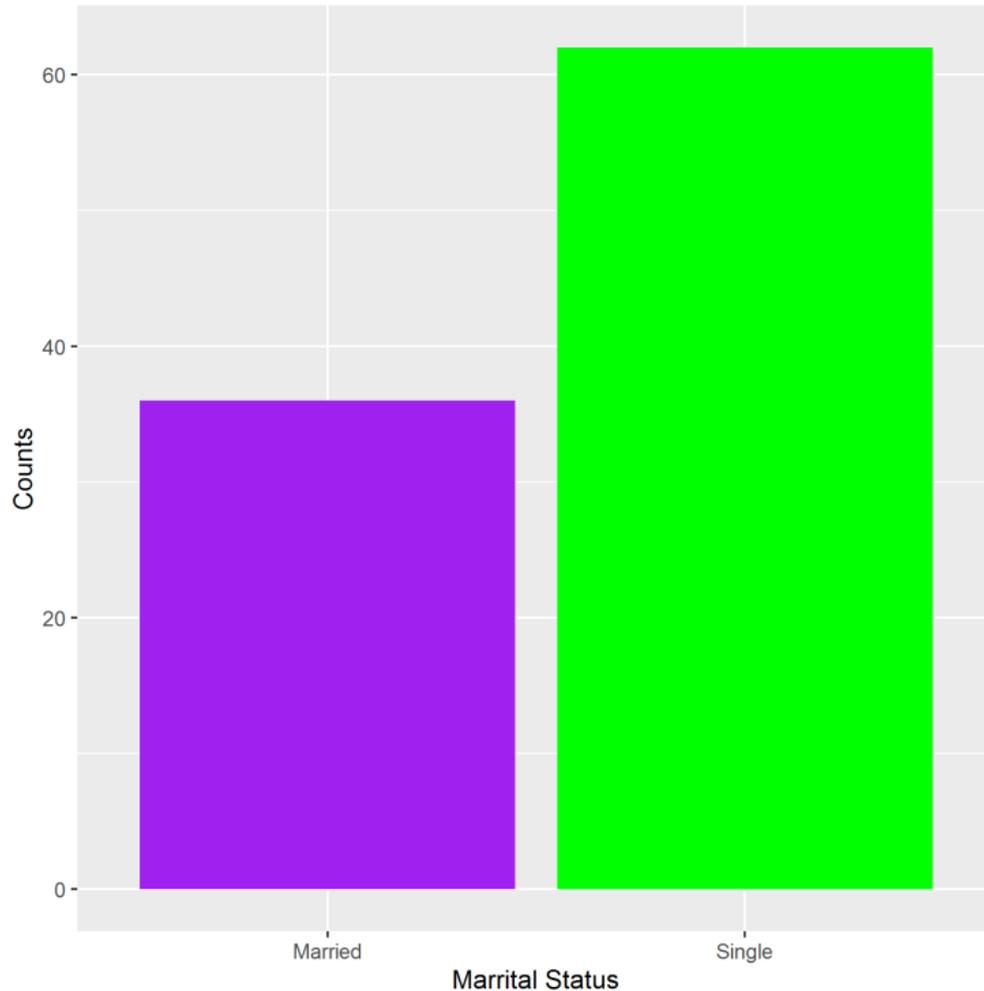


Figure 4: Parental marital status

Bivariate plots were constructed to explore the relationship between number of caries a child had and the age (Figure 5), attitude (Figure 6), and marital status (Figure 7) of their parents. No obvious relationship presents itself in these plots, and an additive Poisson regression model would appear to agree that parental age, attitude, nor marital status explain a significant amount of variability in number of caries, as all p-values are greater than even a liberal cutoff of 0.1. The ANOVA table for this model is shown in Table 1.

Scatter plots are used to display the relationship between two count variables, with point size scaled to reflect number of respondents at that location (larger = more people). For example, there were 5 respondents with LoC of 9 whose children had 0 caries, while only one respondent had a LoC of 1 and a child with 8 caries.

Figure 5 shows the parental age and number of dental caries in their children. For the association between age and number of caries, a scatter plot was constructed. No relationship is apparent between the two variables, and we see that Kendall's tau is nearly zero with a non-significant p-value. Again, we conclude that there is no evidence of a relationship between age of parent and the number of caries their children have.

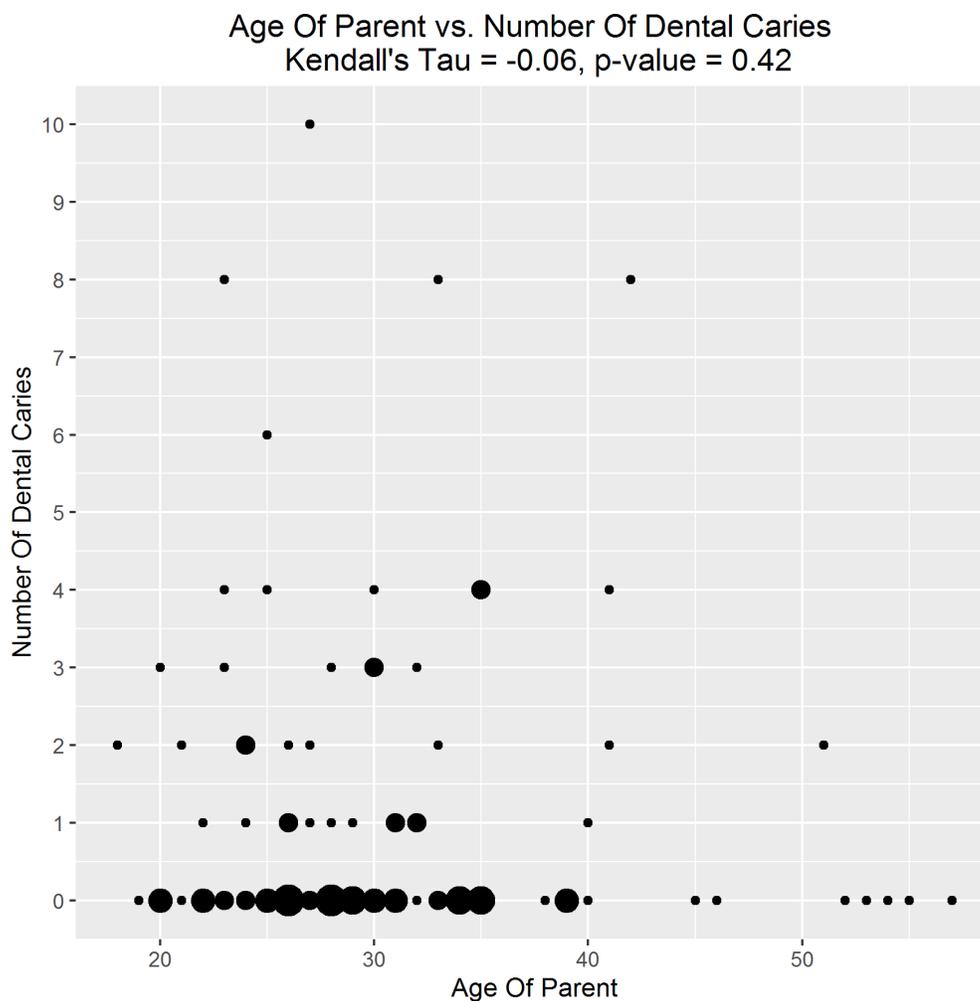


Figure 5: Parental age and number of dental caries

Figure 6 shows the LoC score of the parents vs the number of caries their children have. It may appear that there is a slight positive relationship between LOC and number of caries at first glance, but considering the weight of the points, it is clear that there is no meaningful relationship between LoC and number of caries. With Kendall's tau equal to 0.03 (p-value=0.75) we see no association between parental locus of control score and number of caries, and no apparent relationship presenting itself in the scatter plot.

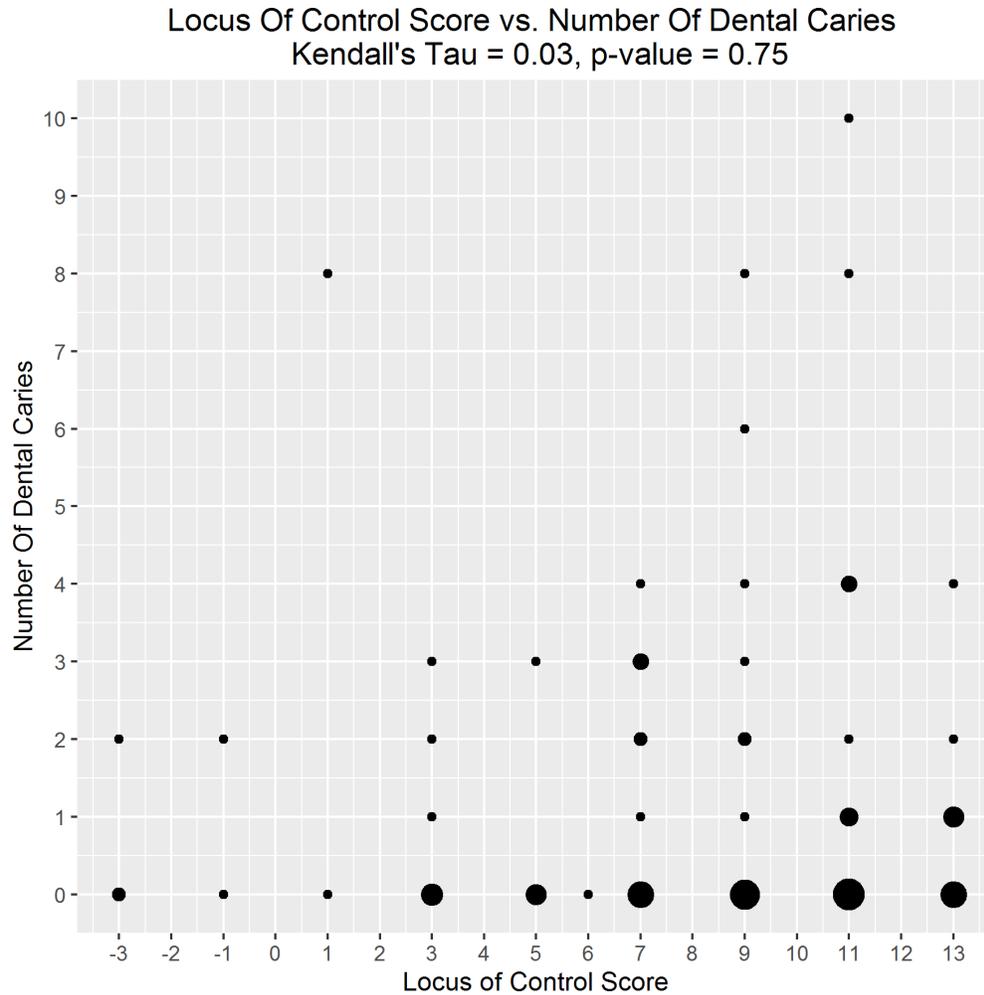


Figure 6: Parental LoC and number of caries in their children.

Figure 7 displays side-by-side boxplots of number of caries for married and single parents. A Mann-Whitney U test was used to assess if there is a difference between the typical number of caries for single and married parents' children. The test statistic $W=1124.5$ corresponds to a p-value of 0.95, indicating that our sample provides no evidence of a difference between groups. Considering the box plots and the significance test, we conclude that there's no difference between single and married people in terms of the number of caries their children have.

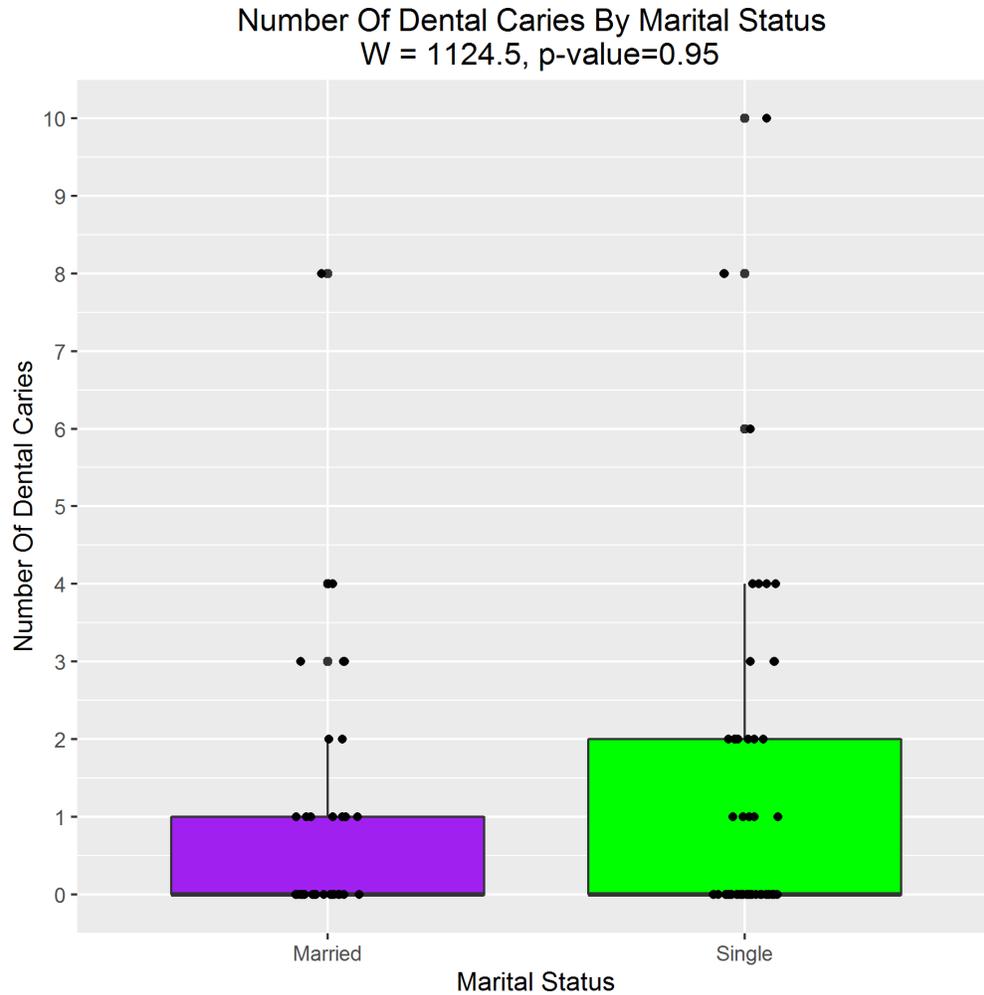


Figure 7: Boxplot of number of caries for married and single parents.

An ANOVA table for a Poisson regression model with parental age, parental marital status, and LoC score as predictors was created (see Table 1). The last column, $\Pr(>F)$ represents the p-value for each predictor. All are above 0.10, and thus the sample provides no evidence of a relationship between parental age, marital status, or LoC with number of caries.

Table 1: ANOVA table for Poisson regression model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Age	1	1.7	1.650	0.393	0.533
Status	1	1.1	1.063	0.253	0.616
LOC	1	0.0	0.032	0.008	0.931
Residuals	94	395.3	4.205		

Discussion

This study overwhelmingly suggests that there is no statistical evidence of a relationship between the number of caries of children and parental marital status, parental age, or parental LoC. Our sample is peculiar in a few ways, however, given the abundance of single parents and individuals with a high internal locus of control. The results we observed seem reasonable, however, as number of dental caries is probably more closely related to things like frequency of brushing and flossing, diet, number of cleanings per year, amount of fluoride exposure, and genetic factors rather than a parent's age, marital status, or LoC, which, in retrospect, can probably at best serve only as surrogate variables for these more direct predictors. Overall, the distribution of number of cavities reveals our sample to be typical, with most children both having no cavities and having visited the dentist within the past year, and only a few extreme cases having not visited the dentist recently and having lots of caries. This would indicate the benefits of a proactive approach to dental health, rather than a reactive one.

The data does not contradict the null hypothesis that parental attitudes towards oral health do not affect their children's oral health or occurrence of dental caries, but the ability of psychological characteristics to explain oral health was limited in this study, given the underrepresentation of individuals exhibiting an external LoC. In other words, it is plausible that individuals with high internal LoC also tend to be more vigilant in regard to proactive dental care, leading to the results we saw of few caries.

It is worth noting that 36% of children in this study were in their 2nd or 3rd year of head start which could show that they have already received oral health education and may have been seen by a dental provider who rotates through the Head Start programs in this study. The director of Head Start stated that a dental care team will go to each Head Start program twice during a school for caries evaluation, education, and provide fluoride treatments. Projects and dental care days are carried out by Head Start programs which can help improve the overall attitudes of parents. It is possible that the benefits of Head Start programs do exist and through consistent oral education it decreases the overall amount of decay in this population. These findings may represent greater disease awareness on the part of the parents and their children having dental problems.

Looking into the role environmental issues may have played in influencing the observed family decisions, it should be noted that in the Head Start population usually are given Medicaid dental insurance, which this whole population would qualify for, since it is an income-based program. There is theoretically no reason that children shouldn't have access to dental care, which is consistent with the vast majority of the sample having said they saw dental provider recently. Pediatricians usually inform parents about their obligation to bring the child for the first dental check-up shortly after the eruption of the first tooth. This is left entirely to the

responsibility of the parents without any incentives or penalties (e.g. dental insurance companies do not monitor the periodicity of the preventive dental checkups of the insured subjects), and it is common practice for parents to bring their child to the dentist for the first time when the child has dental pain or another major dental problem, which could contribute to the 39% of children who had decay. To further investigate this issue, it would be useful to ask parents their reason for visiting the dental clinic at the time of the survey.

It goes without saying that in self-reported questionnaire data there is the risk that the respondents report what they perceive as the correct answer rather than what they actually believe or do. The number of caries reported may not fully represent the amount of decay present because it does not account for current active decay or untreated caries. Accessing official dental records or screening the children may increase the reliability of such a survey in comparison to relying on self-reporting. A potential sampling bias exists in that the parents of these children were only able to answer the caries experience question because they had been to a dental provider- the ability for the parents to diagnose decay on their own is unlikely. In regard to the psychological profile, the amount of internal LoC questions vs the amount of external LoC questions were not evenly distributed and therefore, could cause bias in answering the questions (i.e. people may have a greater tendency to “Disagree” than “Agree”, or vice-versa). Finally, we have a very unique population here in New Mexico, so to better generalize the results it would be useful to pool together similar studies from other areas in a meta-analysis.

Conclusion

The study findings provide no statistical evidence that a relationship does exist between number of caries in children and parental age, marital status, or LoC. Almost all of the population did have an internal LoC personality which makes it plausible that individuals with

high internal LoC also tend to be more vigilant in regard to proactive dental care, leading to the results we saw of few caries. However, the ability of psychological characteristics to explain oral health was limited in this study, given the underrepresentation of individuals exhibiting an external LoC. To more completely assess the relationship between LoC and number of caries, we would hope to survey individuals with a broader range of total LoC scores.

Chapter V

Article for submission to Journal of Dental Hygiene

Parental Attitudes/ Locus of Health Control and Caries Experience in Their 3-5 Year Old Children

Abstract

Purpose

Childhood caries represents a public health issue especially for the Head Start population due to many disadvantages. Behavioral risk factors such as locus of health control (LoC) could act as indirect casual agents in the development of dental disease, but has not been fully studied. This research was to assess the relationship between parental attitudes/ health locus of control, parental age, and parental marital status with caries experience in their preschool children by using a validated survey.

Methods

The target population assessed in this study was the parents of children enrolled in Head Start Programs, in Santa Fe County, in New Mexico. Study data included questionnaires in regards to children's and parents demographics, dental caries experience, and 13 attitudinal items regarding locus of control (LoC) in caries prevention.

Results

This study overwhelmingly suggests that there is no statistical evidence of a relationship between the number of caries of children and parental marital status, age, or LoC. An additive Poisson regression model would appear to agree that parental age, attitude, nor marital status explain a significant amount of variability in number of caries, as all p-values are greater than even a liberal cutoff of 0.1.

Conclusion

The data does not contradict the null hypothesis that parental attitudes towards oral health do not affect their children's oral health or occurrence of dental caries, but the ability of psychological characteristics to explain oral health was limited in this study, given the underrepresentation of individuals exhibiting an external LoC. It is plausible that individuals with high internal LoC also tend to be more vigilant in regard to proactive dental care, leading to the results we saw of few caries.

Background

The Head Start program is a program operated within the United States Department of Health and Human Services that provides comprehensive early childhood education, health, nutrition, and parent involvement services to low-income families and their children. Head Start facilities serve over one million families throughout the United States in both urban and rural communities and were designed to help break the cycle of poverty, providing preschool children of low-income families with a comprehensive program to meet their emotional, social, health, nutrition, and psychological needs.^{1,2,3}

Low socioeconomic status (SES) of the family and parents' oral health habits, knowledge, attitudes, and education level have been found to contribute to the development of dental caries and influence their children's oral health status.¹⁰ Culture norms and practices also influence a large variety of social factors, such as values, beliefs, and customs, affecting children's oral health. Culture can compromise religion, health beliefs, diet, language, family structure, and medical and dental approaches.^{5, 10}

Sociodemographic characteristics affect oral health knowledge and attitudes of parents with a lower level of education, which negatively affect their oral health practices. A higher

prevalence of dental caries and lower tooth brushing frequency was found in 3 year old children living in rural areas, when compared with those from urban settings. Compared with children from high income families, children from low income families have an increased risk for health disparities and higher than average rates of dental caries.^{1, 10}

Access to dental care in low-income families can be problematic and unfortunately dental caries is still a prevalent disease in this population. When they do get dental care it is often insufficient to meet all their needs and the problem facing Head Start programs is how to ensure that children in need obtain sufficient dental care.⁶ A recent study of 54 head start centers in North and South Carolina highlights some of the barriers that inhibit success in providing complete care. Of the 3,375 dentists practicing in those two states, only 7 percent reported that they currently accept head start children as patients, while 23 percent reported accepting Medicaid patients. Over one-third (35%) stated that they would not accept Head Start children, explaining that the children are too young for them treat (15%), that payments were insufficient (30%), or they were too busy to see these young children (39%). This survey reflects recognized barriers to dental care for low-income children on Medicaid.⁶

Head Start programs provide children and families with much advantageous support and help recognize the importance between school readiness and health. Each program coordinate health related services such as basic screenings, health education, and referrals to health providers and have infrastructure to coordinate services, as well as support for routine home visits and parent education workshops. A director and designated managers are typically provided in 6 service areas: education, health, mental health, nutrition, disabilities, and family services. Through effective health promotion and disease prevention strategies head starts have the potential to reduce the health burdens of vulnerable children.⁹

Dental caries also known as tooth decay, cavities, or caries, is a breakdown of teeth due to the activities of bacteria. Early Childhood Caries (ECC) is tooth decay that occurs in the primary dentition of children under the age of five. This is significant because tooth decay causes pain and infection. Unfortunately, some children live with this pain every day, especially those families of low SES, due to low income, health literacy, value for oral health, and access to dental care. Some parents and caregivers do not recognize the important role that primary dentition play in healthy development. The primary dentition is important for eating, holding space for the permanent dentition, talking, and smiling. ECC adversely impacts development and learning and can affect what a child eats, how they speak, and ultimately how they feel about themselves. Such an impact can result in poor overall health and well-being.⁴ Studies showed that the predominant microbial characteristic of ECC is the bacterial strain *Streptococcus mutans*, which exceeds 30% of the cultivable plaque flora.¹² This dense level of *S. mutans* has been found to be the agent that causes ECC along with diet playing a critical role in the clinical expression of ECC. Good nutrition is important for the oral cavity and most Head Start families do not know that the foods and beverages consumed have a direct influence on the incidence and progression of dental decay. Oral bacteria ferment sugars and make acid as a byproduct, which is harmful to dentition. The acid breaks down enamel, causing demineralization, and eventually leads to dental caries. Some influencing factors include the form of the food, whether it is liquid, solid, sticky or slow to dissolve. Frequency and consumption of sugary foods and beverages have a direct impact on the health of dentition and the progression of dental decay.^{7, 12, 13}

Chemotherapeutics for dental caries prevention have been proven to be effective in the prevention of cariogenic biofilm formation in the oral cavity. These agents exert an indirect effect on the biofilm by inhibiting the growth of oral bacteria and are more beneficial when they

contain fluoride. Fluoride is important in the prevention of dental caries and is considered to be an effective anticaries agent. Fluoride has several mechanisms of action including: 1) suppression of demineralization, by substituting hydroxyl groups within calcium hydroxyapatite structure, creating a new more acid resistant fluorapatite mineral; 2) stimulation of the remineralization by constantly absorbing it along with calcium and phosphate ions to the tooth surface from saliva, and again resulting in the development of fluorapatite-like mineral; 3) inhibition of bacterial metabolism.¹³ Fluoride has been effective at reducing caries incidence in children younger than age 5 years and is supported in preventing caries in high risk children. More strategies to reduce the amount of bacteria include parental counseling to improve oral hygiene and the use of xylitol. Xylitol is a naturally occurring sugar with properties that reduce levels of caries-forming bacteria in plaque and saliva. Xylitol comes in various forms such as syrup, topically via wipes, gums, or snack foods.⁴

In conjunction with positive parental and educator attitudes, it is clearly evident that children need dental hygiene training. This type of intervention will help to decrease oral plaque and the prevalence of dental decay. A study was conducted by observing children's current brushing habits followed by education on proper brushing techniques which included behavioral requirements of angle, motion, location and duration. The children were given a pretest and assessed on their tooth brushing skills. Afterwards they were given training and consisted of 4 components; (1) Simple instructions were used to describe each step in proper brushing sequence. (2) Modeling consisted of demonstrating correct brushing by exaggerating the motions and providing examples of good and poor brushing. (3) Physical guidance was used as a correction procedure by which the trainer gently wrapped his or her hand around the child's hand so that both of them can hold the brush, and move the brush in the desired motion and angle. (4)

Descriptive praise was initially given after each occurrence of a correct component of brushing. The results showed as the number of brushing skills increased, the amount of plaque on the children's teeth decreased. The training was a success and the training produced good results with children previously thought to be too young to learn the complex skills required for thorough and accurate brushing.¹⁴ Helping the Head Start population utilize daily prevention aids will help to reduce to the amount of biofilm formation in the oral cavity. Educating children on proper brushing techniques is proper intervention to reduce the amount of plaque and caries in children.^{4, 7, 13, 14}

There is evidence that knowledge and good oral hygiene positively affects children's dental health. Studies have been done and have concluded that parental and educator attitudes toward children's oral health were significantly associated with their own oral health behavior and understanding the importance of development of oral hygiene skills in these children.^{15, 17} Different educational methods such as motivational interviewing can help to reduce dental caries and show the importance of positive encouragement.¹⁶

In order to fully investigate the complex interactions of the risk factors involved in the etiology of dental decay, research has focused on socioeconomic, psychological and behavioral risk factors as these could act as indirect casual agents. For behavioral risk factors, human behaviors are often studied through measurement of a person's attitudes. This is based on psychological concepts, which presume that attitudes are relevant determinants of a person's behavior and that behavior can be predicted from measurable behavioral intentions. One of the theories explaining behavior patterns is Locus of Control (LoC). Locus of control refers to the extent to which individuals believe they can control events affecting them. Individuals who have an internal locus of control believe events in their life derive primarily from their own actions.

These individuals believe that he or she can influence events and their outcomes: for example, a person who is decay free praises themselves. Individuals who have an external locus of control tend to blame outside forces for everything. These people believe one's health is depended on luck, fate, or chance. A more internal locus of control is generally seen as desirable, that way a person is able to successfully experience the sense of personal control and responsibility.⁸

A study was done using a sample size of 285 preschool children and their parents. The study data included children's dental status recorded and parental questionnaires with 13 attitudinal items regarding locus of control in caries prevention. The association between parental locus of control and children's caries experience and level of untreated caries was analyzed using logistic regression, adjusting for the effect of key sociodemographic variables. The findings supported the hypothesis that higher internal parental locus of control is associated with better control of both untreated caries and caries experience in their preschool children and highlight that a more internal locus of control within the family is advantageous in the prevention of dental caries.²

This theory will be the basis of the research to determine how parental locus of control affects their children's oral health. This information will allow us to assess parental attitudes and the child's dental decay experience.^{2, 8}

Methods

This research will help to assess the relationship between parental attitudes/ health locus of control, parental age, and parental marital status with caries experience in their preschool children by using a self-reporting validated survey. The survey will contain a portion of demographics regarding both children and parents, with 13 parental attitudinal items regarding

locus of control in caries prevention. The survey was distributed via paper to reduce the limitation of internet access and to ensure every enrollee in Santa Fe County had an opportunity to participate in this study. The survey was printed double sided with both English and Spanish version at the expense of the investigator. Permission was obtained and approved by the Director of the Head Start/Early Head Start program to conduct this research and have the teachers act as the distributors and collectors of the survey. This research was approved by the UNM Human Research Protections Office on August 16, 2016. Head Start teachers were informed about this research project at the annual start of school meeting on August 5th, 2016, by the lead investigator. At the time the teachers were asked to participate in the project as distributors and collectors of the survey. Teachers who agreed to participate were given an introduction to the study and verbal instructions on their role in the study. Written instructions for the distributors were given on the day of distribution. The investigator distributed the surveys to the facilities with cover pages stating the purpose of the research, informing the survey is voluntary and anonymous, and all other relevant information. The survey was distributed during the 3rd week of the Head Start school year, August 29th-September 7th, 2016. It was sent home with the children on a Monday (8/29) and asked to be returned by Friday (9/2). In addition, the following Tuesday and Wednesday (9/6 and 9/7), 10 extra surveys were placed in the classroom, and parents were asked to fill one out if they haven't already done so. Since the survey was anonymous there was no way to record who has filled one out, that is why there were some left in the class the following week for 2 days. The survey was out for 9 days total, including the weekend.

In reporting the survey results, the lead investigator will present graphical and numeric summaries of the survey responses of interest — the age, marital status, and locus of control

score for the parents, and the number of caries of the child. Age and locus of control score are considered to be continuous variables, marital status is categorical, and number of caries is a count variable. Density plots are used to display the distribution of the continuous variables, while bar plots are used for marital status and number of caries. The investigator will examine the relationship between age and number of caries using a scatter plot and Kendall's tau will be reported along with a corresponding p-value from the corresponding significance test. We do the same for the relationship between locus of control score and number of caries. For a comparison of the number of caries by marital status group we present side-by-side box plots to graphically assess any distributional differences in number of caries, and we augment this with a formal significance test for difference in typical number of caries between each group using a Mann-Whitney U test as the distribution of caries does not appear to be normally-distributed. Finally, we look at a Poisson regression model with number of caries as the response and main effects for age, marital status, and locus of control as our predictors.

Variables and Data Analysis

Our primary objective was to investigate the relationship between parents' attitude (LoC), age, and marital status with the number of caries in the primary dentition experienced by their children. Parents were asked to complete a questionnaire in regard to their age, relationship to the child, and marital status, as well as provide information about the child's age, sex, head start experience, history of care by a dental provider, and caries experience. This questionnaire also sought to assess if attitudinal items associated with parental oral health beliefs appear related to the child's history of dental decay. The well-known psychological model, "Locus of Control" (LoC) was used to gauge parental attitudes. The LoC postulates that personal attitudes and beliefs are behavioral predictors, and that attitudinal questionnaire items were taken from a

standardized and validated questionnaire originally created for an international study on childhood caries.² “Agree” responses to questions 1, 2, 5, 7, and 11 indicate more internal LoC, while “Disagree” responses to these questions indicate more external LoC. Similarly, “Agree” responses to 3R, 9R, and 13R, and the questions related to beliefs in bad luck/ chance: 4R, 6R, 8R, 10R, and 12R indicate more external LoC while “Disagree” responses to these questions indicates more internal LoC. A “Total LoC” score was calculated for each person, adding together all responses indicating internal LoC, then, subtracting all responses indicating more external LoC, yielding a score ranging from -13 (most external) to 13 (most internal).

Results

The target population that was assessed in this study was the parents of children enrolled in Head Start Programs, in Santa Fe County, in New Mexico. A validated survey questionnaire was distributed to a sample size of 394 parents and students from 7 different head start facilities, in Santa Fe County. The head start facilities were Flores del Sol, Sweeny, Agua Fria, Tierra Contenta, La Cominidad de los Niños, Nambe, and Arroyo Seco. Of a possible 394 responses, 128 surveys were returned. Responses which lacked information on number of caries, marital status, attitudinal questions, children’s age for the study (3-5), and parental age were removed from the study, resulting in a sample of 98 complete cases.

The following describes the demographic breakdown of the sample, which was composed of 44% boys and 56% girls. The parental age ranged from 18 to 57 years old, with a typical (median) age of 29. Note 5 responses were done by a person who was “other” and not the parent, most likely a grandparent who were all above age 51. Most of the children, 61% were decay free and had zero caries reported, while 39% reported decay ranging from 1-10 caries. About a third

of parents were married, while the rest reported being single. 82% of children had seen a dental provider within the past year, while 9% had seen a dental provider more than a year ago, and information was not available for the remaining 9%.

Univariate graphical summaries in Figures 1, 2, 3, and 4 show the distribution of our variables of interest.

The bar plot of number of dental caries in this population depicts strong right-skewness (see figure 1) — most children had 0 caries, 75% had 2 or less, and a handful of few extreme cases had up to 10 caries.

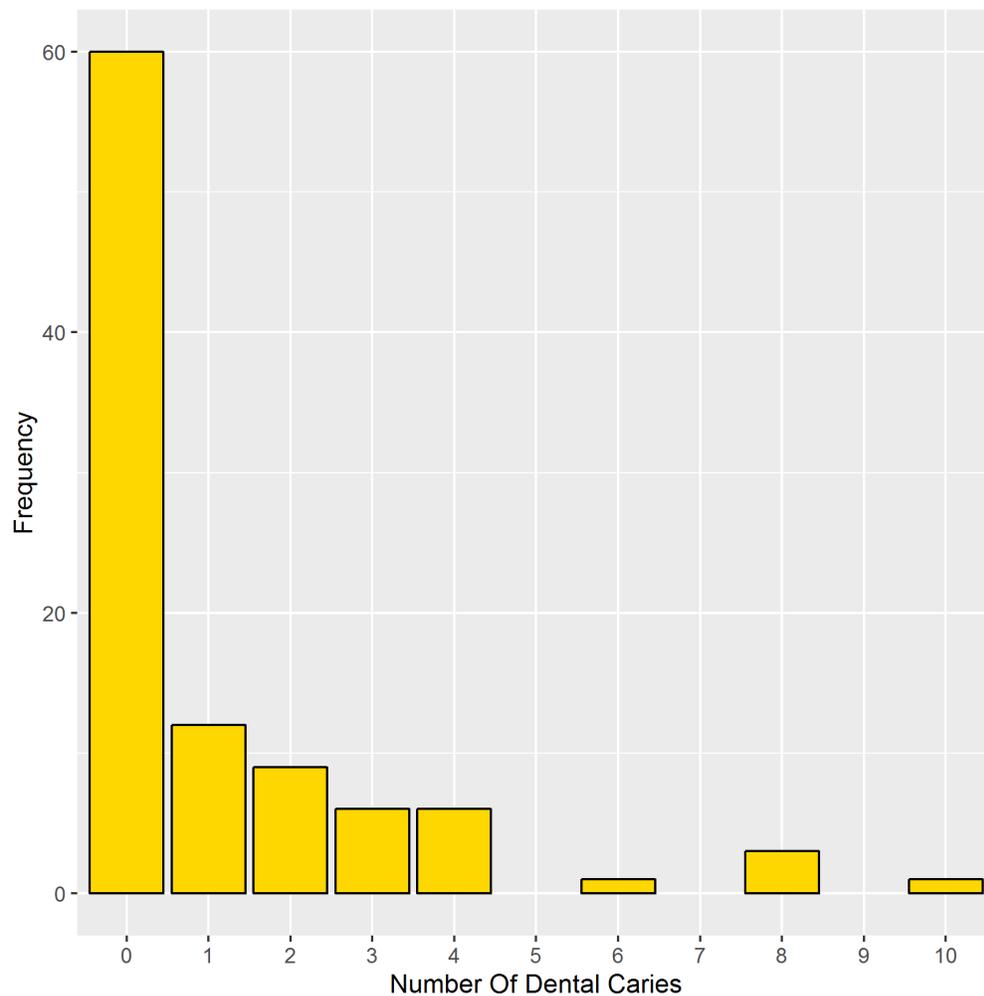


Figure 1: Number of dental caries

The density plot of parental age shows that most individuals were between 20 and 30 years old (see figure 2).

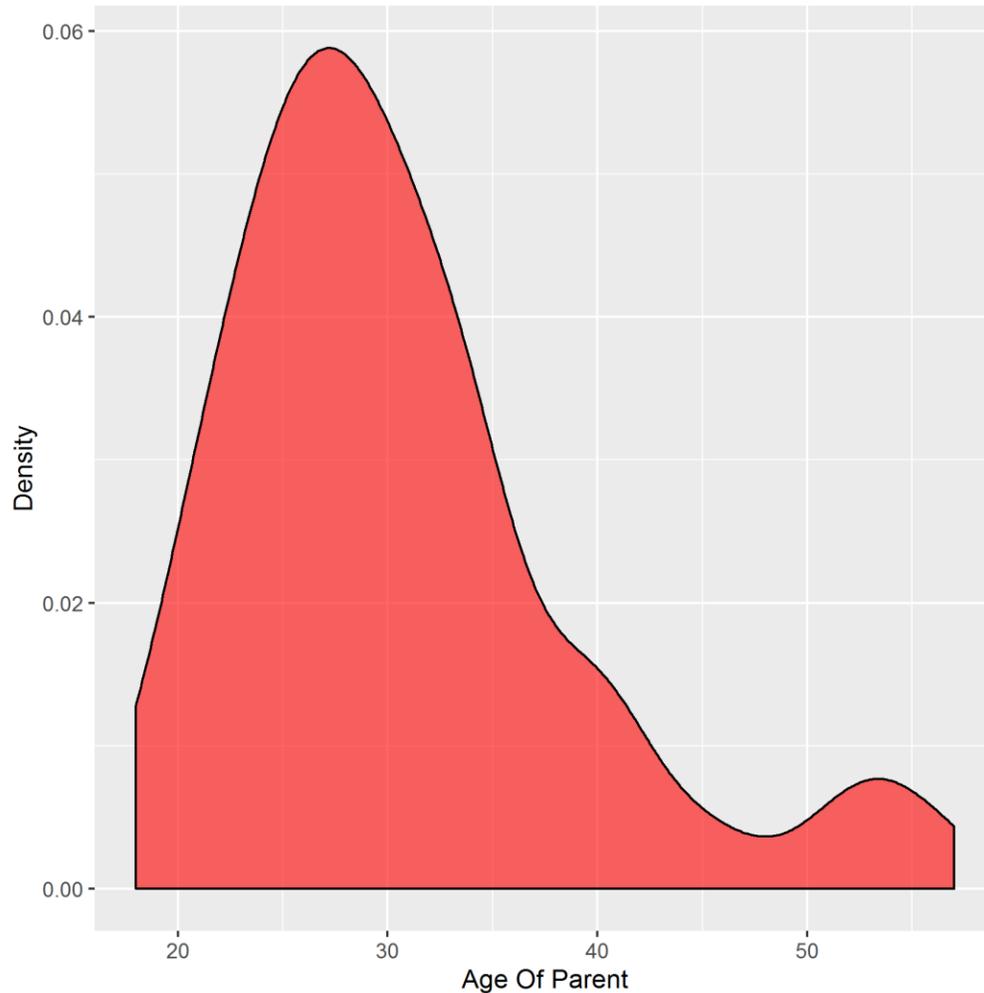


Figure 2: Parental age

The LoC density plot reveals that most respondents demonstrated an overwhelmingly internal locus of control personality type (median score of 9), with only 5 people exhibiting an external LoC with scores of less than zero (see figure 3).

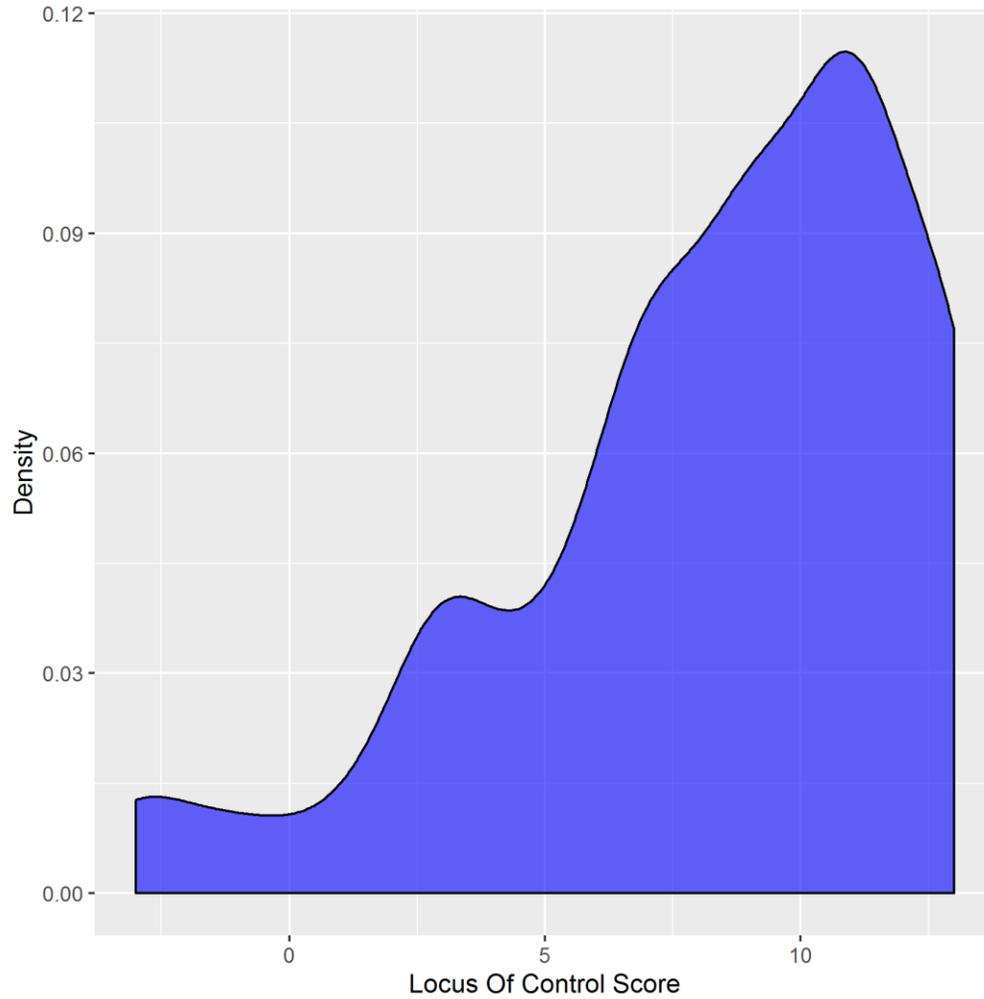


Figure 3: Parental LoC scores

Marital status is shown below in a bar plot (see figure 4), which shows that almost two-thirds of our sample consists of single parents.

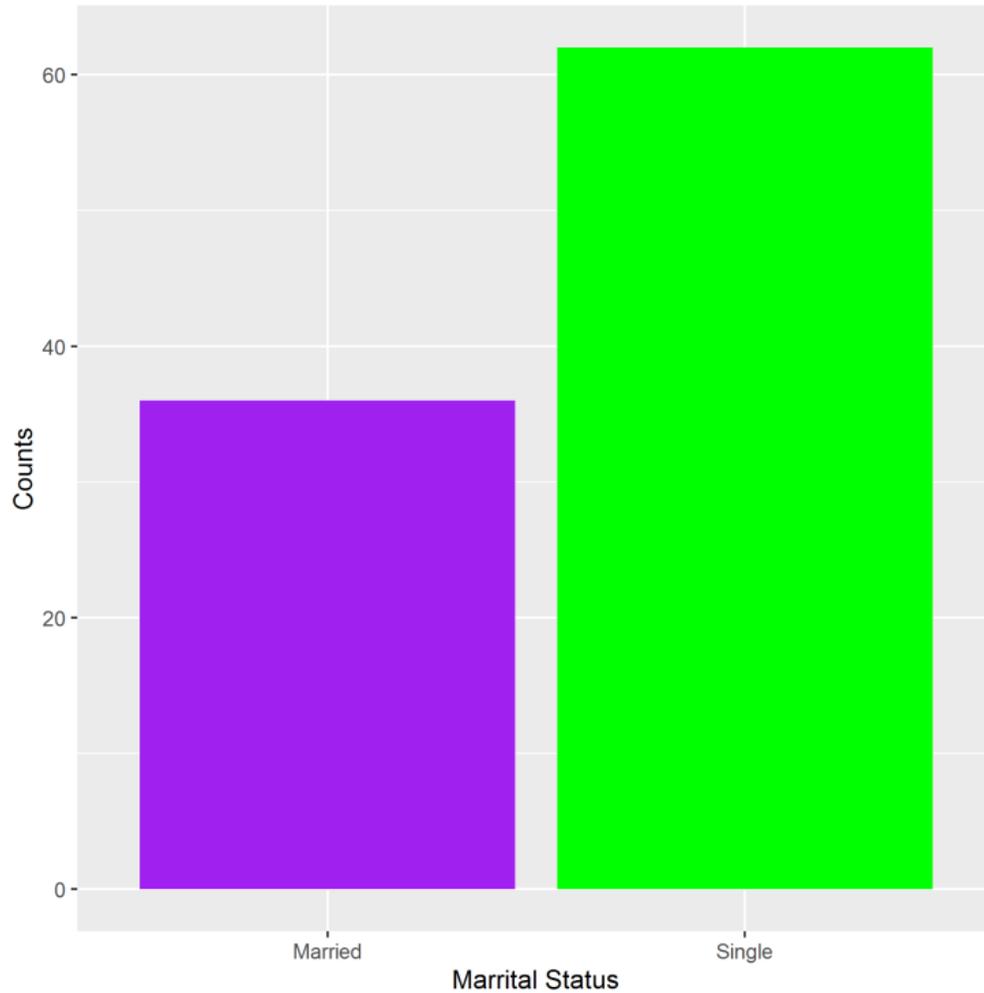


Figure 4: Parental marital status

Bivariate plots were constructed to explore the relationship between number of caries a child had and the age (Figure 5), attitude (Figure 6), and marital status (Figure 7) of their parents. No obvious relationship presents itself in these plots, and an additive Poisson regression model would appear to agree that parental age, attitude, nor marital status explain a significant amount of variability in number of caries, as all p-values are greater than even a liberal cutoff of 0.1. The ANOVA table for this model is shown in Table 1.

Scatter plots are used to display the relationship between two count variables, with point size scaled to reflect number of respondents at that location (larger = more people). For example, there were 5 respondents with LoC of 9 whose children had 0 caries, while only one respondent had a LoC of 1 and a child with 8 caries.

Figure 5 shows the parental age and number of dental caries in their children. For the association between age and number of caries, a scatter plot was constructed. No relationship is apparent between the two variables, and we see that Kendall's tau is nearly zero with a non-significant p-value. Again, we conclude that there is no evidence of a relationship between age of parent and the number of caries their children have.

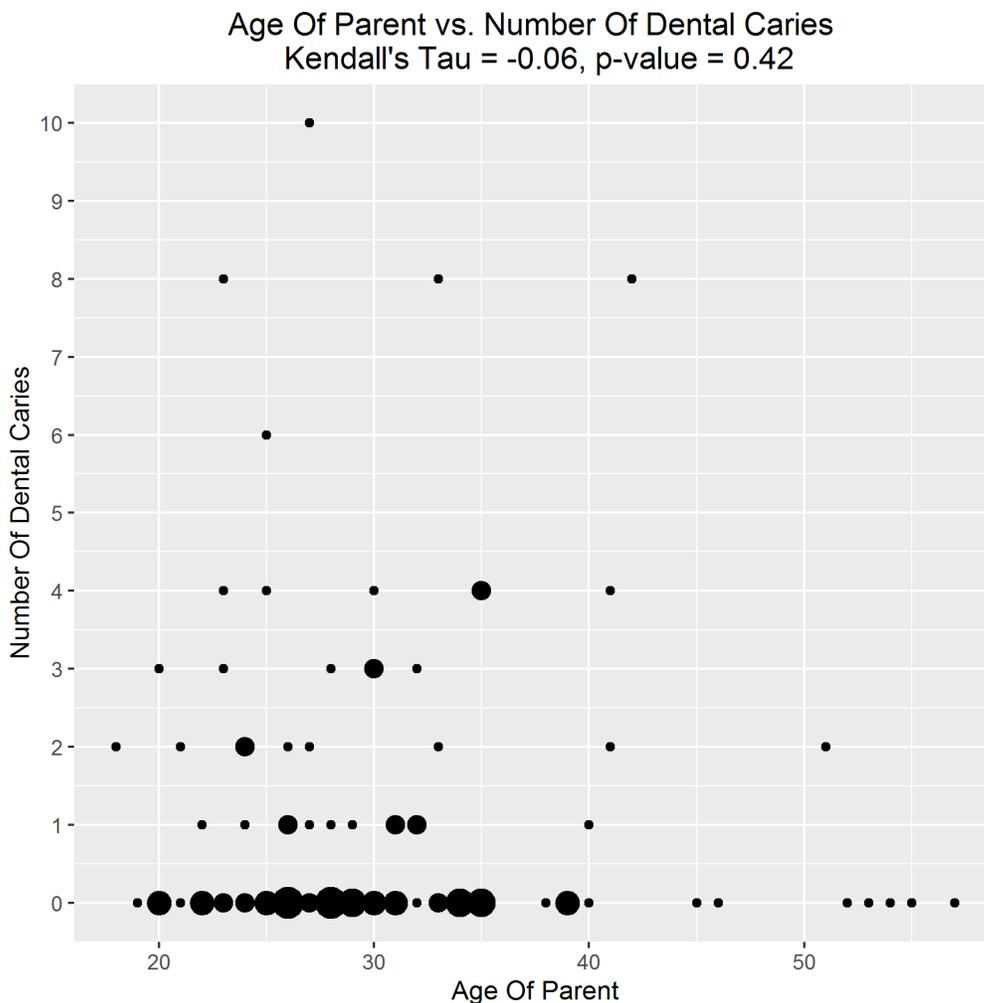


Figure 5: Parental age and number of dental caries

Figure 6 shows the LoC score of the parents vs the number of caries their children have. It may appear that there is a slight positive relationship between LOC and number of caries at first glance, but considering the weight of the points, it is clear that there is no meaningful relationship between LoC and number of caries. With Kendall's tau equal to 0.03 (p-value=0.75) we see no association between parental locus of control score and number of caries, and no apparent relationship presenting itself in the scatter plot.

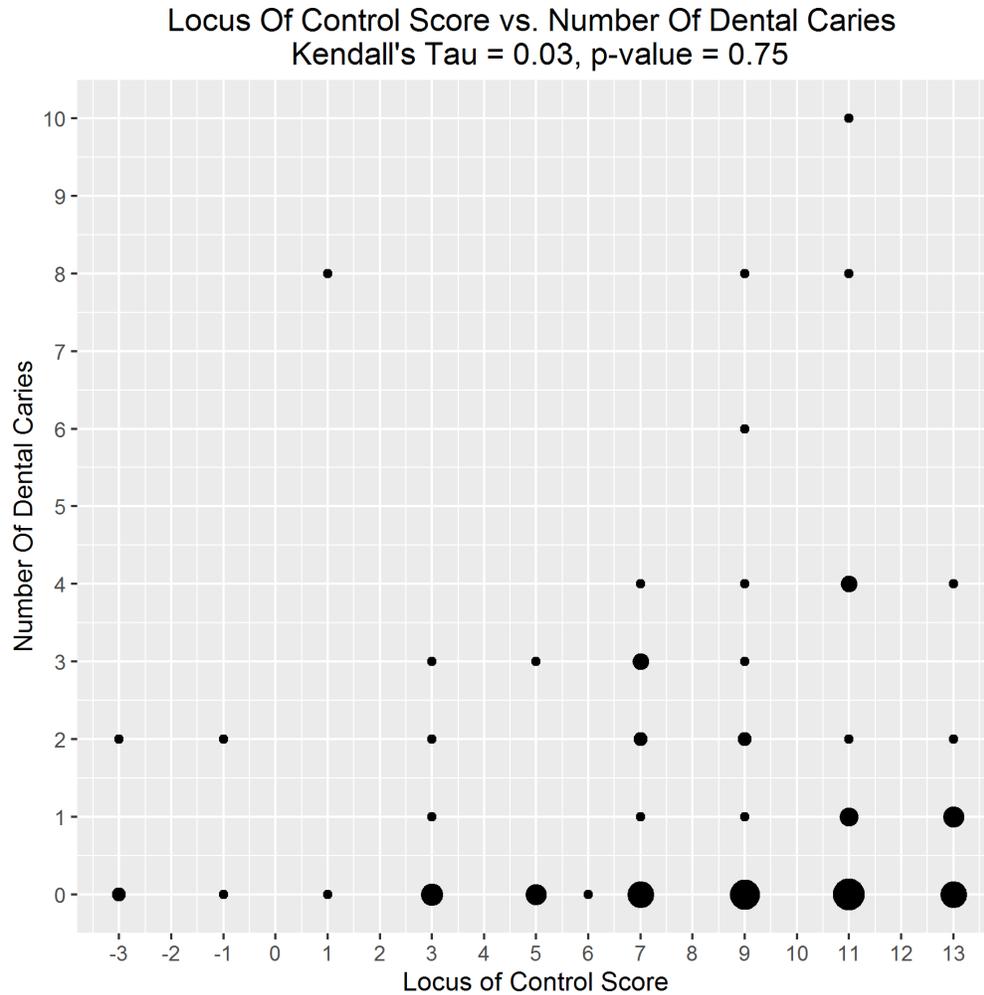


Figure 6: Parental LoC and number of caries in their children.

Figure 7 displays side-by-side boxplots of number of caries for married and single parents. A Mann-Whitney U test was used to assess if there is a difference between the typical number of caries for single and married parents' children. The test statistic $W=1124.5$ corresponds to a p-value of 0.95, indicating that our sample provides no evidence of a difference between groups. Considering the box plots and the significance test, we conclude that there's no difference between single and married people in terms of the number of caries their children have.

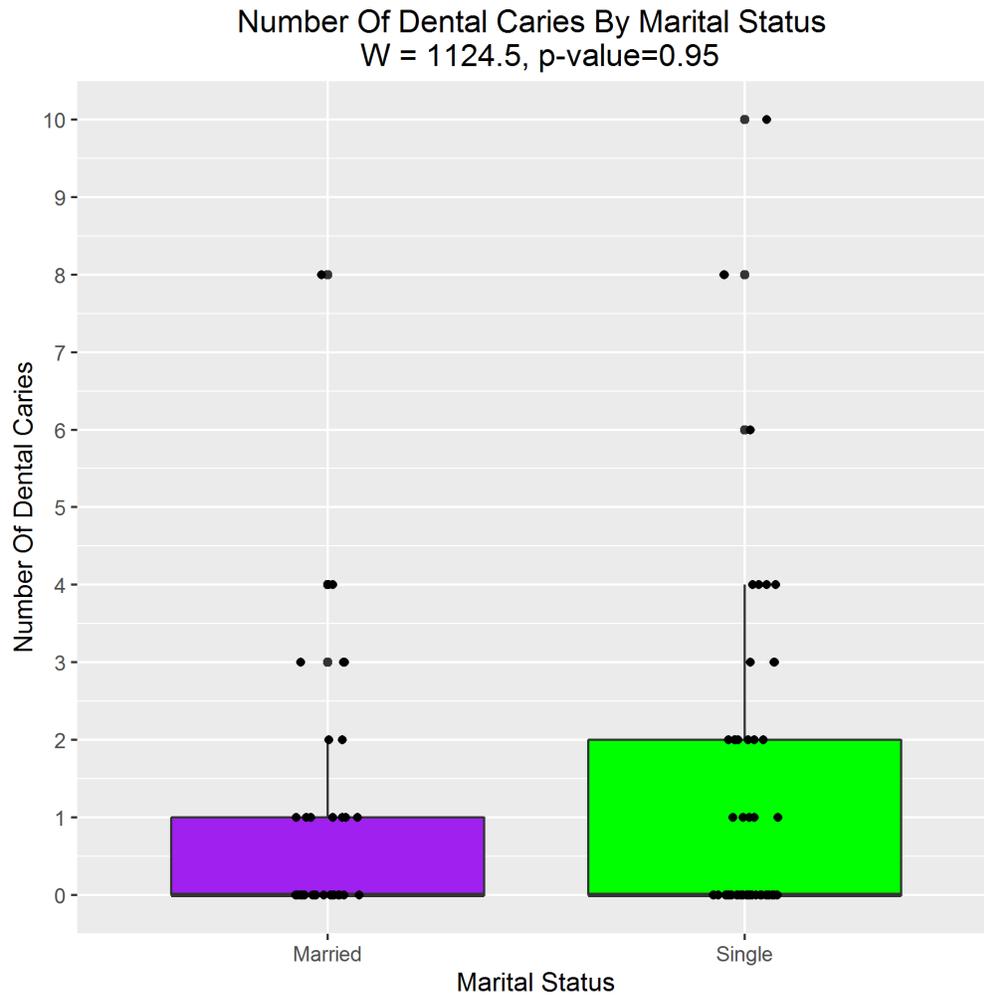


Figure 7: Boxplot of number of caries for married and single parents.

An ANOVA table for a Poisson regression model with parental age, parental marital status, and LoC score as predictors was created (see Table 1). The last column, $\text{Pr}(>F)$ represents the p-value for each predictor. All are above 0.10, and thus the sample provides no evidence of a relationship between parental age, marital status, or LoC with number of caries.

Table 1: ANOVA table for Poisson regression model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Age	1	1.7	1.650	0.393	0.533
Status	1	1.1	1.063	0.253	0.616
LOC	1	0.0	0.032	0.008	0.931
Residuals	94	395.3	4.205		

Discussion

This study overwhelmingly suggests that there is no statistical evidence of a relationship between the number of caries of children and parental marital status, parental age, or parental LoC. Our sample is peculiar in a few ways, however, given the abundance of single parents and individuals with a high internal locus of control. The results we observed seem reasonable, however, as number of dental caries is probably more closely related to things like frequency of brushing and flossing, diet, number of cleanings per year, amount of fluoride exposure, and genetic factors rather than a parent's age, marital status, or LoC, which, in retrospect, can probably at best serve only as surrogate variables for these more direct predictors. Overall, the distribution of number of cavities reveals our sample to be typical, with most children both having no cavities and having visited the dentist within the past year, and only a few extreme cases having not visited the dentist recently and having lots of caries. This would indicate the benefits of a proactive approach to dental health, rather than a reactive one.

The data does not contradict the null hypothesis that parental attitudes towards oral health do not affect their children's oral health or occurrence of dental caries, but the ability of

psychological characteristics to explain oral health was limited in this study, given the underrepresentation of individuals exhibiting an external LoC. In other words, it is plausible that individuals with high internal LoC also tend to be more vigilant in regard to proactive dental care, leading to the results we saw of few caries.

It is worth noting that 36% of children in this study were in their 2nd or 3rd year of head start which could show that they have already received oral health education and may have been seen by a dental provider who rotates through the Head Start Programs in this study. The director of Head Start stated that a dental care team will go to each Head Start Program twice during a school for caries evaluation, education, and provide fluoride treatments. Projects and dental care days are carried out by Head Start Programs which can help improve the overall attitudes of parents. It is possible that the benefits of Head Start Programs do exist and through consistent oral education it decreases the overall amount of decay in this population. These findings may represent greater disease awareness on the part of the parents and their children having dental problems.

Looking into the role environmental issues may have played in influencing the observed family decisions, it should be noted that in the Head Start population usually are given Medicaid dental insurance, which this whole population would qualify for, since it is an income-based program. There is theoretically no reason that children shouldn't have access to dental care, which is consistent with the vast majority of the sample having said they saw dental provider recently. Pediatricians usually inform parents about their obligation to bring the child for the first dental check-up shortly after the eruption of the first tooth. This is left entirely to the responsibility of the parents without any incentives or penalties (e.g. dental insurance companies do not monitor the periodicity of the preventive dental checkups of the insured subjects), and it is

common practice for parents to bring their child to the dentist for the first time when the child has dental pain or another major dental problem, which could contribute to the 39% of children who had decay. To further investigate this issue, it would be useful to ask parents their reason for visiting the dental clinic at the time of the survey.

It goes without saying that in self-reported questionnaire data there is the risk that the respondents report what they perceive as the correct answer rather than what they actually believe or do. The number of caries reported may not fully represent the amount of decay present because it does not account for current active decay or untreated caries. Accessing official dental records or screening the children may increase the reliability of such a survey in comparison to relying on self-reporting. A potential sampling bias exists in that the parents of these children were only able to answer the caries experience question because they had been to a dental provider- the ability for the parents to diagnose decay on their own is unlikely. In regard to the psychological profile, the amount of internal LoC questions vs the amount of external LoC questions were not evenly distributed and therefore, could cause bias in answering the questions (i.e. people may have a greater tendency to “Disagree” than “Agree”, or vice-versa). Finally, we have a very unique population here in New Mexico, so to better generalize the results it would be useful to pool together similar studies from other areas in a meta-analysis.

Conclusion

The study findings provide no statistical evidence that a relationship does exist between number of caries in children and parental age, marital status, or LoC. Almost all of the population did have an internal LoC personality which makes it plausible that individuals with high internal LoC also tend to be more vigilant in regard to proactive dental care, leading to the

results we saw of few caries. However, the ability of psychological characteristics to explain oral health was limited in this study, given the underrepresentation of individuals exhibiting an external LoC. To more completely assess the relationship between LoC and number of caries, we would hope to survey individuals with a broader range of total LoC scores.

Appendices

Appendix A Survey_____	56
Appendix B Head Start Permission Letter_____	58
Appendix C Human Research Protections Office Approval Letter_____	59
Appendix D Survey Consent Form_____	61

Appendix A- Survey

HRRC Approved Document
HRRC #16-253
Approved: 8/16/2016
Effective Date: 8/16/2016

Dental Care Questions

1. How old is your child? (in years) _____
2. Please circle the gender of your child. Boy Girl
3. Is this your child's first year enrolled in head start? (Circle one) Yes No
4. Has your child ever seen a dental provider? (circle one)
If yes, how long ago? (circle one) Yes No
less than 1 year more than 1 year
5. How many dental caries/ cavity/ silver teeth has your child had? _____
6. Your relationship to the child (circle one) Parent other
7. How old are you? (in years) _____
8. Please circle parental marital status single married

Survey

- | | Please circle your response | |
|---|------------------------------------|----------|
| 1. As a family, we are confident that we can reduce the chances of our child getting tooth decay. | Agree | Disagree |
| 2. As parents, it is our responsibility to prevent our child getting tooth decay. | Agree | Disagree |
| 3. It is the responsibility of the dentist to prevent our child getting tooth decay. | Agree | Disagree |
| 4. No matter what we do, our child is likely to get tooth decay. | Agree | Disagree |
| 5. We can prevent tooth decay in our child by reducing sugary foods and drinks between meals. | Agree | Disagree |
| 6. It just happens that children get tooth decay. | Agree | Disagree |
| 7. If we brush our child's teeth twice a day, we can prevent our child getting tooth decay in the future. | Agree | Disagree |
| 8. If our child gets tooth decay, it is by chance. | Agree | Disagree |
| 9. It would not make any difference to our child getting tooth decay, if we helped him/her brush every day. | Agree | Disagree |
| 10. Some people just naturally have soft teeth. | Agree | Disagree |
| 11. As a family, we intend controlling how often our child has sugary foods or drinks between meals. | Agree | Disagree |
| 12. It is just bad luck if our child gets tooth decay. | Agree | Disagree |
| 13. The dentist is the best person to prevent tooth decay in our child. | Agree | Disagree |

Nathe Survey 7/13/16

Preguntas de cuidado dental

- | | | |
|---|----------------------|--------------------|
| 1. ¿Cuántos años tiene tu niño? (en años) _____ | | |
| 2. Círcule del sexo de su hijo/a. | Niño | Niña |
| 3. ¿Esta su hijo/a inscrito en la preescolar? (Círcule uno) | Sí | No |
| 4. ¿Ha visto su hijo un proveedor dental? (círcule uno)
En caso afirmativo, ¿Cuánto tiempo hace? (círcule uno) | Sí
menos de 1 año | No
más de 1 año |
| 5. ¿Cuántas caries dental / cavidad / dientes de plata tiene su hijo/a? | _____ | |
| 6. Su relación con el menor (círcule uno) | los padres | otros |
| 7. ¿Qué edad tienes? (en años) _____ | | |
| 8. Estado civil (círcule uno) | soltera/o | casada/o |

Encuesta
Círculo por favor su respuesta

- | | | |
|---|------------------|---------------------|
| 1. Como familia, estamos seguros de que podemos reducir las posibilidades de que nuestro niño/a tenga caries. | Estoy de acuerdo | no estoy de acuerdo |
| 2. Como padres, es nuestra responsabilidad para evitar que a nuestro niño/a tenga caries | Estoy de acuerdo | no estoy de acuerdo |
| 3. Es responsabilidad del dentista para evitar que a nuestro niño/a tenga caries. | Estoy de acuerdo | no estoy de acuerdo |
| 4. No importa lo que hacemos, nuestro hijo es propenso a contraer caries. | Estoy de acuerdo | no estoy de acuerdo |
| 5. Podemos prevenir la caries en el niño/a mediante la reducción de alimentos azucarados y bebidas entre comidas | Estoy de acuerdo | no estoy de acuerdo |
| 6. Sólo sucede que los niños consiguen caries. | Estoy de acuerdo | no estoy de acuerdo |
| 7. Si cepilla los dientes de nuestro hijo/a dos veces al día, nosotros podemos evitar que a nuestro niño/a tenga caries en el futuro. | Estoy de acuerdo | no estoy de acuerdo |
| 8. Si nuestro niño/a tiene caries en los dientes, es por casualidad. | Estoy de acuerdo | no estoy de acuerdo |
| 9. No haría ninguna diferencia para nuestro hijo/a que caries, si le ayudamos a cepillar todos los días | Estoy de acuerdo | no estoy de acuerdo |
| 10. Algunas personas tienen naturalmente los dientes suaves. | Estoy de acuerdo | no estoy de acuerdo |
| 11. Como familia, tenemos la intención de controlar cuantas veces nuestro hijo/a tiene alimentos azucarados o bebidas entre comidas. | Estoy de acuerdo | no estoy de acuerdo |
| 12. Es solo mala suerte si nuestro niño/a tiene caries en los dientes. | Estoy de acuerdo | no estoy de acuerdo |
| 13. El dentista es la mejor persona para prevenir la caries nuestros niño/a. | Estoy de acuerdo | no estoy de acuerdo |

Appendix B

Head Start Permission Letter



June 9, 2016

Dear Sir/Madam:

Cassandra Garcia RDH, has received permission, as part of her thesis project, to distribute a survey to the parents of the children enrolled in our Santa Fe County Head Start programs. Our teachers will act as distributors and collectors of her survey.

The purpose of Ms. Garcia's study is for evaluation and will only be used as an educational tool. No names or unique identifiers will be used. This survey's goal is to assess parental attitudes and the relationship between parental health locus of control and caries (cavities) experienced in their 3-5 year old children.

PMS will not hold Cassandra accountable to provide treatment to the children or to follow up with the families.

Please let me know if you have any questions or concerns.

Sincerely,

A handwritten signature in cursive script that reads "Erica Stubbs".

Erica Stubbs
Director of Children's Services

Appendix C

Human Research Protections Office Approval Letter



*Human Research Review Committee
Human Research Protections Office*

August 16, 2016

Christine Nathe
University of New Mexico
MSC09 5020
Albuquerque, NM 87131
(505) 272-8147
Fax: (505) 272-5584
CNathe@salud.unm.edu

Dear Christine Nathe:

On 8/16/2016, the HRRC reviewed the following submission:

Type of Review: Initial Study
Title of Study: Parental Attitudes/ Locus of Health Control and
Caries Experience in Their 3-5 Year Old Children

Investigator: Christine Nathe
Study ID: 16-253
Submission ID: 16-253
IND, IDE, or HDE: None

Submission Summary: Initial Study
Documents Approved: • Nathe Survey consent form
• Nathe Survey 7.13.16
• Nathe Protocol 7.13.16

Review Category: EXEMPTION: Categories (2) Tests, surveys, interviews, or
observation.

Determinations/Waivers: Documentation of Consent not required.
HIPAA Authorization Addendum Not Applicable.

Submission Approval Date: 8/16/2016
Approval End Date: None
Effective Date: **8/16/2016**

The HRRC approved the study from 8/16/2016 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 8/16/2016 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

Because it has been granted exemption, this research is not subject to continuing review.

Please use the consent documents that were approved and stamped by the HRRC. The stamped and approved consents are available for your retrieval in the "Documents" tab of the parent study.

This determination applies only to the activities described in this submission and does not apply should you make any changes to these documents. If changes are being considered and there are questions about whether HRRC review is needed, please submit a study modification to the HRRC for a determination. A change in the research may disqualify this research from the current review category. You can create a modification by clicking Create Modification / CR within the study.

In conducting this study, you are required to follow the Investigator Manual dated April 1, 2015 (HRP-103), which can be found by navigating to the IRB Library.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas F. Byrd". The signature is fluid and cursive, with a large initial 'T' and 'B'.

Thomas F. Byrd, MD
HRRC Chair

Appendix D- Survey Consent Form

HRRC Approved Document
 HRRC #16-253
 Approved: 8/16/2016
 Effective Date: 8/16/2016

Invitation to join the study

We would like to ask you to participate in a scientific study, which aims to provide a better understanding of why some children develop tooth decay. Before you decide whether or not to participate in the study, you need to understand what research is being carried out and what it will involve. Please read the following information carefully. If there is anything unclear, or if you need more information, please do not hesitate to contact us. Thank you for your time.

What is the purpose of the study?

The purpose of this study is to better understand why some children develop tooth decay and others do not. Although there are theories on how dental decay develops, for this study, we are interested in the so called minor risk factors for dental decay (such as your health, attitudes, and beliefs), which themselves do not directly cause dental decay, but could play a role in the process of the disease development.

Why have I been chosen?

You have been chosen because you are the parent/guardian of a child aged 3 to 5 years that is enrolled in a Head Start program in Santa Fe County. We expect to involve 394 families (parents/guardians) in this study.

Do I have to participate?

It is up to you to decide whether or not to participate. This survey is anonymous and voluntarily. There are no consequences if you choose not to participate. Participating in the study will not have any effect on your dental care. There is no pay for participation.

What will happen if I participate?

If you agree to participate, you will be asked to answer a questionnaire on dental health and related topics. In the questionnaire you are free not to answer any question without giving any reason. If you decide to take part in this study, all collected information will be confidential and anonymous.

What will happen if my child participates?

Your child will not participate in this study. Participation in this study is strictly for the parents in the form of a survey. No dental treatment will be given.

Are there any risks of participating in the study?

There are no risks in participating in this study.

What are the possible benefits of taking part?

There is no direct benefit to you or your child. However, we hope that our study will provide more knowledge of why some children develop tooth decay.

Who is organizing and funding the research?

The study is conducted by the UNM HSC Dental Hygiene Program. The study is a component of a graduate student project and the primary investigator is a dental hygiene faculty member.

Contact for further information

If you have questions regarding your legal rights as a research subject, you may call the UNMHSC Office of Human Research Protections at (505) 272-1129. For further information, please contact grad student Cassandra Garcia at 505-930-3222 or chair committee member Christine Nathe at (505) 272-8147.

By returning this survey in the envelope provided, you will be agreeing to participate in the above described research study.

Nathe Survey Cover Head. 8/11/16

Invitación para formar parte del estudio (encuesta)

Nosotros agradecería su participación en un estudio científico (encuesta) que tiene como objetivo proporcionar un mejor entendimiento de por qué algunos niños desarrollan caries dentales. Antes de decidir si usted desea o no participar en el estudio, necesita comprender el propósito de la investigación y lo que implica. Por favor lea la siguiente información. Si hay algo que no está claro, o si necesita más información, no dude en contactarnos. Gracias por su tiempo.

¿Cuál es el propósito del estudio?

El propósito de este estudio es tener mejor entendimiento el por qué algunos niños desarrollan caries dentales y otros no. Aunque hay teorías sobre las caries dentales y cómo se desarrollan, para este estudio nos interesa comprender los llamados factores de riesgo menores tal como la salud, actitudes, y creencias que directamente no causan las caries dentales, pero pueden ser factores asociados en la prevalencia del desarrollo de la enfermedad.

¿Por qué he sido la elegida?

Ha sido elegido porque ustedes son los padres o guardianes de un niño/a de 3 a 5 años de edad que está inscrito en un programa de Head Start en el Condado de Santa Fe. Esperamos la participación de 394 familias (padres) en este estudio.

¿Tengo que participar?

Usted decide si participa o no. Esta encuesta es anónima y voluntaria. No hay ninguna consecuencia si usted decide no participar. Participantes en el estudio no tendrá ningún efecto en su cuidado dental. No hay compensación monetaria por su participación.

¿Qué pasará si participo?

Si usted acepta participar, se le pedirá responder a un cuestionario sobre salud dental y temas relacionados. En el cuestionario usted es libre de no responder a cualquier pregunta sin dar razón. Si usted decide participar en este estudio, toda la información será confidencial y anónima.

¿Qué pasará si mi hijo participa?

Su hijo/a no participará en este estudio. Participación en este estudio es estrictamente para los padres o guardianes en la forma de una encuesta. No se habrá ningún tratamiento dental.

¿Existe algún riesgo de participar en el estudio?

No hay riesgos ni consecuencias negativas en participar en este estudio.

¿Cuáles son los posibles beneficios de participar?

No existe ningún beneficio directo para usted o su hijo/a. Sin embargo, esperamos que nuestro estudio proporcione mayor conocimiento de por qué algunos niños desarrollan caries dentales.

¿Que es la organización y quien financia la investigación?

El estudio es realizado por el programa de Higiene Dental de HSC de la Universidad de Nuevo Mexico. Este estudio es un componente de un proyecto de estudiantes de posgrado y el investigador principal es un miembro de la facultad de higiene dental.

Contacto para más información

Si tiene preguntas acerca de sus derechos legales como un tema de investigación, puede llamar al UNMHSC oficina de humana investigación protecciones en (505) 272-1129. Para más información, póngase en contacto con el estudiante graduado Cassandra Garcia miembro del Comité 505-930-3222 o silla Christine Nathé en (505) 272-8147.

Devolviendo esta encuesta en la envoltura siempre que va aceptando participar en el anterior descrito estudio de investigación.

Nathe Survey Cover Head. 8/11/16

References

1. Dos Santos Junior VE, de Sousa RMB, Oliveira MC, de Caldas Junior AF, Rosenblatt A. Early childhood caries and its relationship with perinatal, socioeconomic and nutritional risks: a cross-sectional study. *BMC Oral Health*. 2014;14:47. doi:10.1186/1472-6831-14-47.
2. Lenčová, Erika et al. "Relationship between Parental Locus of Control and Caries Experience in Preschool Children – Cross-Sectional Survey." *BMC Public Health* 8 (2008): 208. *PMC*. Web. 22 Mar. 2016.
3. Head Start. "Head Start History." Head start An Office of the Administration for Children and Families. Early Childhood Learning & Knowledge Center (ECLKC). 15 April 2011. Web. 16 April 2015.
4. Chou R, Cantor A, Zakher B, Mitchell JP, Pappas M. Prevention of Dental Caries in Children Younger Than 5 Years Old: Systematic Review to Update the U.S. Preventive Services Task Force Recommendation. Evidence Synthesis No. 104. AHRQ Publication No. 12-05170-EF-1. Rockville, MD: Agency for Healthcare Research and Quality; 2014.
5. Milgrom P, Weinstein P, Huebner C, Graves J, Tut O. Empowering Head Start to Improve Access to Good Oral Health for Children from Low Income Families. *Maternal and child health journal*. 2011;15(7):876-882. doi:10.1007/s10995-008-0316-6.
6. Edestein, B. L. (2000), Access to Dental Care for Head Start Enrollees. *Journal of Public Health Dentistry*, 60: 221–229. doi: 10.1111/j.1752-7325.2000.tb03332.x
7. Berkowitz DDS, Robert J. Causes, Treatment and Prevention of Early Childhood Caries: A Microbiologic Perspective. *J Can Dent Assoc* 2003; 69(5):304–7
8. The Social Learning Theory of *Julian B. Rotter* (1916 - 2014) Mearns, J. (2009). Social learning theory. In H. Reis & S. Sprecher (Eds.), *Encyclopedia of human relationships* (vol. 3) (pp. 1537-1540). Thousand Oaks, CA: Sage
9. Herman A, Nelson BB, Teutsch C, Chung PJ. A Structured Management Approach to Implementation of Health Promotion Interventions in Head Start. *Preventing Chronic Disease*. 2013;10:E155. doi:10.5888/pcd10.130015.
10. de Castilho AR, Mialhe FL, Barbosa TS, Puppim-Rontani RM. Influence of family environment on children's oral health: a systematic review. *J Pediatr (Rio J)*. 2013;89:116–23.
11. BIERMAN KL, NIX RL, GREENBERG MT, BLAIR C, DOMITROVICH CE. Executive functions and school readiness intervention: Impact, moderation, and mediation in the Head Start REDI program. *Development and psychopathology*. 2008;20(3):821-843. doi:10.1017/S0954579408000394.
12. Dietary determinants of dental caries and dietary recommendations for preschool children. Norman Tinanoff, Carol A. Palmer, Refuat Hapeh Vehashinayim. 2003 April; 20(2): 8-23, 78.
13. Povilas Kalesinskas, Tomas Kačergius, Arvydas Ambrozaitis, Vytautė Pečiulienė, Dan Ericson. Reducing dental plaque formation and caries development. A review of current methods and implications for novel pharmaceuticals. *Stomatologija, Baltic Dental and Maxillofacial Journal*. 16: 44-52, 2014
14. Poche C, McCubbrey H, Munn T. The development of correct toothbrushing technique in preschool children. *Journal of Applied Behavior Analysis*. 1982;15(2):315-320. doi:10.1901/jaba.1982.15-315.

15. Giedrius Vanagas, Žemyna Milašauskienė, Vilius Grabauskas, Aušra Mickevičienė. Associations between parental skills and their attitudes toward importance to develop good oral hygiene skills in their children. *Medicina (Kaunas)*. 2009; 45(9)
16. Manchanda K, Sampath N, Sarkar AD. Evaluating the effectiveness of oral health education program among mothers with 6-18 months children in prevention of early childhood caries. *Contemporary Clinical Dentistry*. 2014;5(4):478-483. doi:10.4103/0976-237X.142815.
17. Antunes, Leonardo dos Santos, Antunes, Lívia Azeredo Alves, & Corvino, Marcos Paulo Fonseca. (2008). Educative practices and attitudes within the pre-school environment: evaluating the education professionals. *Brazilian Oral Research*, 22(4), 340-345.
18. Pine CM, Adair PM, Petersen PE, Douglass C, Burnside G, Nicoll AD, Gillett A, Anderson R, Beighton D, Jin-You B, Broukal Z, Brown JP, Chestnutt IG, Declerck D, Devine D, Espelid I, Falcolini G, Ping FX, Freeman R, Gibbons D, Gugushe T, Harris R, Kirkham J, Lo EC, Marsh P, Maupome G, Naidoo S, Ramos-Gomez F, Sutton BK, Williams S. Developing explanatory models of health inequalities in childhood dental caries. *Community Dent Health*. 2004;21:86–95