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Dental Therapists Providing Access to Oral Health Care to Children in Florida

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by

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THESIS

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Dedication

This thesis is dedicated to the children that look upon health professionals with hope and admiration that they too may positively impact the lives of others when they grow up. Remembering myself as a young girl who was greatly impacted by the compassion of dental professionals, inspired the passion within to become a dental hygienist. It is small actions that can be most influential in shaping a young dream.

To my mother who has always supported and encouraged me to achieve my goals in life and education. You instilled in me as a young girl the importance of education and helping others along the way. As I watched you safeguard children in need within the Florida protective services system, I knew that I too wanted to help children in our community. Thank you for demonstrating compassion for others as you raised us.

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I would like to recognize the Florida Dental Hygienists' Association grassroots efforts as they pursue the goal of the dental therapy position in Florida. It is because of this mission to provide oral health care to those that are the most vulnerable, I began this endeavor.

Lastly, I would especially like to thank the school-based nurses throughout the state of Florida for taking the time to complete the survey on dental therapy and access to oral health care needs. Your candid answers were vital in developing my thesis work. Thank you for all you do for the children in our Florida schools.

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ABSTRACT

The state of Florida has proposed the establishment of the dental therapy mid-level provider to alleviate the lack of access to oral health care of the underserved population. Despite the success in other states opposition exists this workforce model. The purpose of this research is to evaluate the attitudes of Florida school-based nurses regarding the development of dental therapists to address the states oral health access issues. A survey queried a random sample of 300 Florida school-based nurses regarding dental therapy and access to oral health care issues among the school age children population. Twenty-three school-based nurses responded (7.8%). Results indicated school location and household income status support the access to oral health care needs of children. Further results indicate that children in rural areas are more likely to have dental decay and lack of access to care. A correlation could not be established due to the limited response rate.

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Chapter One

Introduction

A healthy mouth and teeth are essential components of a child's well-being. There is a strong correlation between poor oral health status and other systemic diseases, such as diabetes, heart disease, stroke, and preterm and low-weight births.[1] Tooth decay, is the number one chronic childhood illness in America and can have devastating consequences on a child's health and wellness. Left untreated, severe tooth decay can lead to malnourishment, anemia, emergency surgery, life-threatening secondary infections and death.[2] The effects of tooth decay can impact a child's self-esteem, future employment prospects, social development, and overall quality of life. Approximately more than 40% of children have dental cavities by the time they reach kindergarten and with one in five U.S. children going without dental care.[2] The percentage of children and adolescents aged 5 to 19 years with untreated tooth decay is twice as high for those from low-income families (25%) compared with children from higher-income households (11%).[3] Dental decay is also associated with poor performance in schools and absenteeism. Children with poor oral health are three times more likely to miss school as a result of dental pain.[2] Parents average 2.5 absent days from work per year due to their children's dental problems.[1] Despite the evidence supporting the necessity for good oral health, access to dental care is a critical and multifaceted problem in United States and remains one of the most unmet need of children.[4]

Statement of the Problem

What are the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida? As a

healthcare professional, school-based nurses provide an insight with the oral health care challenges faced by children in the school-based setting.

Significance of the problem

Dental caries is almost completely preventable, but access to preventative care is out of reach for many families.[5] More than 18 million low-income children went without dental care, including routine exams, in 2014.[6] Untreated oral disease, such as caries, worsens with time and eventually requires more serious and expensive treatment.[5] When children lack dental care, untreated decay and dental infection can result in preventable emergency room visits or more complicated and expensive dental and medical interventions later in life.[6] More than 212,000 U.S. children had dental emergency visits in 2012, more than two-thirds of which were covered by Medicaid.[4] In 2012, the U.S. health care system spent $1.6 billion on dental related visits with an average cost of $745 per visit.[5] Lack of access to a dental provider and the high costs of dental services are a major cause of these dental problems.[7] Access to dental services for children through early and periodic screening, and treatment programs will eliminate the costs associated with children visits to the emergency room. As Bersell reveals, in 2011, the Pew Children's Dental Campaign assessed the level of care for children in the United States and graded all 50 states based on eight benchmarks related to sealants, fluoridation, Medicaid, and expanded care delivery models. While no state accomplished all eight goals, Maryland led the nation, meeting seven of the eight benchmarks. Hawaii accomplished only one of the benchmarks, reflecting the lowest performance. Florida, Hawaii, and New Jersey received two consecutive "F" grades.[8]

Florida is among one of the disproportionally states lacking in access to care for children. The 2017 Medicaid annual report shows that 40% of children in Florida with

Medicaid were seen by a dentist over a 12-month period compared to the national average of 48%.[9] Therefore 60% of children in Florida with Medicaid were not seen by a dentist in 2017. There is a significant proportional difference between children with Medicaid who have access to care from children with private dental care coverage. The percentage of dentists participating in Medicaid for child dental services in 2017 was 30% within the state of Florida compared to the national U.S. average of 42%.[9] The Healthy People 2020 oral health goal for children with untreated dental decay in their primary or permanent teeth (6–9 years) is to be at 25.9%.[7] With lack of access to care for children in Florida this goal will not be meet. A number of factors contribute to the lower levels of preventive care that children in low-income, minority, and rural households receive, including barriers to transportation, a scarcity of dental providers in many communities, and cost.[6] Dentists have a disproportionate presence in suburbs whereas those who are most in need of care are concentrated in inner cities and rural communities.[7] Rural children are less likely to have dental insurance than their urban counterparts and more likely to seek care for preventable dental problems in overburdened emergency rooms.[4] In 2010, the Government Accountability Office reported that the most frequent barrier children enrolled in Medicaid faced in obtaining dental care was finding a dentist who would accept Medicaid payment.[10] The Health Resources and Services Administration (HRSA) estimates it would take a net increase of nearly 9,500 providers to address the unmet need today.[7] Fortunately, two policy solutions proved to increase access to dental care for children are gaining ground across the country: School-based sealant programs have been shown to reduce decay by an average of 60% over five years, and adding midlevel providers; often called dental therapists, to the dental team can help vulnerable populations get the preventive and routine restorative treatment they need.[4] A

dental therapist has been a proposed solution to bridge the gap between children in Florida whom need access to oral health care and Medicaid providers.

Operational Definitions

Dental Therapist-

A licensed oral health professional who practices as part of the dental team to provide basic preventive services, restore teeth for children and adults, and remove primary (baby) teeth under supervision by a licensed dentist.

Access to oral health care-

How easy or difficult it is for individuals to initiate interactions with oral health care providers, including considerations such as geographic location of facilities, hours of operation, cost of services, and the extent to which a population perceives these aspects as convenient.

Oral disease-

Dental cavities, periodontal (gum) disease, oral cancer, oral infectious diseases, trauma from injuries, and hereditary lesions.

Dental Caries/Decay-

Breakdown of teeth due to acids made by bacteria.

Oral health disparities-

Describes a disproportionate burden or risk of death, disease, disability, and ill oral health on a particular population or group. This is placed primary concern on gender, race or ethnicity, education or income, disability, geographic location, and sexual orientation.

DMFT-

The oral epidemiology index decay-missing-filled index or decayed, missing, and filled teeth is one of the most common methods for assessing dental caries prevalence in permeant teeth.

Chapter Two

Literature Review

Introduction

The review of literature aims to broaden the understanding of the dental therapist role in providing access to oral health care to children in Florida. Though there are different opinions on the establishment of the dental therapist model in Florida, this literature will explore the advantages of implementing the dental therapist to help the underserved population in Florida.

Medical and dental literature was reviewed using the PubMed/MeSH search engines to access the database focusing on keywords such as “dental therapist”, “access to care”, and “children’s oral health”.

The international dental therapist models in New Zealand, Canada, Hong Kong, and Singapore will be discussed throughout this review. Alaska and Minnesota’s U.S. educational models will be considered for standards of current practices. The economic comparison costs will be explored between dentists and dental therapists. Access to oral care in Florida will also be examined within the review.

International Approach to Dental Therapists

Dental therapists serve in both developed and developing countries. More than 52 countries have developed a dental therapist position, practicing in public, school-based programs, to address children’s access to care. Worldwide, the dental therapist’s scope of practice includes examination, diagnosis, and treatment planning, exposing radiographs, oral health education, preventive services such as prophylaxis, fluoride therapy, pit and fissure sealants, and dietary counseling, preparation of cavities in primary and permanent teeth,

placement of preformed stainless-steel crowns, and extraction of primary teeth. In most countries, dental therapists are public health employees in school-based dental programs. Global studies have demonstrated high enrollment in school-based programs and improved access to care, essentially for the entire population of elementary school children.[11] New Zealand pioneered the development of dental therapists, with the first class of 29 school dental nurses graduating from a two-year post-high school vocational training program in Wellington, New Zealand, in 1923.[12] Today there are 610 dental therapists in New Zealand caring for the countries 850,000 school children.[13] Epidemiological data available since 1965 document that New Zealand has been more elective in treating dental caries in its public school-based program of care provided by dental therapists, than has the United States in its system of care in private offices by dentists.[12] A recent report of the oral health of New Zealand's children documented that at the end of a given school year essentially none of the children in the School Dental Service had untreated tooth decay.[13] Five of the top six countries of the world on the Human Development Index employ dental therapists in their oral health workforces: Australia, Netherlands, United States, New Zealand, and Canada. Other countries employing dental therapists in the top 50 countries of the Index are Hong Kong, Singapore, United Kingdom, Brunei, and Barbados.[12] Australia's school dental service using dental therapists was initiated in 1966. Studies show 62% of children ages 6-12 yearly visit the school dental service allowing for lower decay rates and more restored teeth.[11] Canada implemented its school-based dental therapist program in 1974. After 6 years, 76% to 90% of the children had all their treatment needs completed during the school year.[11] Hong Kong established the School Dental Care Service in 1981, resulting in improved access to care of Hong Kong school children. By 2011, the participation rate of primary school

children reached 95%.[11] Singapore's School Dental Service began in 1946. An oral health survey done in 2008 determined the decay (D), filled or treated decay (F), and missing (M) teeth (T) of children aged 12 years to be 0.7, enabling Singapore to achieve one of the lowest DFMTs in the world. By 2009, the dental service's dental therapists had rendered 89% to 96% of elementary school children "dentally fit".[11] The degree to which dental caries in children has been treated globally is a reliable indicator of the accessibility and effectiveness of dental care by a dental therapist.

Dental Therapists in the United States

In 2005 the dental health aide therapist model was introduced in Alaska, providing access to oral health care to remote rural areas of the state. Dental therapists are now providing quality, routine dental care in Alaska to more than 40,000 children and families that had otherwise, gone without.[14] In 2009, Minnesota became the first state with an authorizing environment to create dental therapist graduate educational programs to help address oral care issues.[14] As of December 2018, there are 92 dental therapists in Minnesota that work in public clinics and private practices to treat more of the states' underserved population. Private practices are using dental therapists to serve more patients on Medicaid. Public health centers are utilizing dental therapists as a cost-effective way to increase capacity to serve more patients on Medicaid and offer free or low-cost care to more low-income uninsured patients. According to a 2014 report from the Minnesota Department of Health and Board of Dentistry to the state legislature evaluating the impacts of dental therapists in Minnesota, dental therapists served 6,338 new patients over a 13-month period, 84% of whom were public program enrollees or from underserved communities.[5] Additionally, the report found that benefits attributable to dental therapists in Minnesota

included direct costs savings (estimated between $35,000 and $62,000) and a reduction in wait time for patients, which made it possible for clinics to see more underserved patient's.[5] The development of dental therapists is supported by many US public health and philanthropic organizations, including the American Association of Public Health Dentistry and the American Public Health Association but opposed by the American Dental Association, most constituent state dental associations, the American Academy of Pediatric Dentistry, and other dental specialty organizations.[11] With the growing practice environment and evolving health care delivery system 10 states including, Arizona, Connecticut, Idaho, Maine, Michigan, New Mexico, Nevada, Oregon, Vermont, and Washington, have also authorized the position of the dental therapist following the Minnesota model in a variety of ways. There are several states that are pursuing dental therapist providers to improve access to care including Kansas, Massachusetts, North Dakota, Washington, Wisconsin, and the state of Florida.

Educational Changes in Oral Health Care

Following the initial Minnesota dental therapist education model, one can obtain a Bachelor of Science in Dental Hygiene or Master of Dental Therapy dual degree within 32 months to 3 years.[15] Advance standing for licensed registered dental hygienists provides an opportunity to obtain a degree in dental therapy within 14-16 months. As a result of their education and training, dental therapists are able to deliver patient-centered care because they understand the history, culture, and language of their patients and provide continuity of care in communities that face recruitment and retention challenges.[5]

The American Dental Association's Commission on Dental Accreditation (CODA) established standards for dental therapy education programs in 2015.[16] Graduates will

perform all the functions defined by the program's state-specific dental board or regulatory agency provided that the curriculum content is presented at the level, depth, and scope required by the individual state. The scope of practice of a dental therapist is about one quarter that of a general dentist, focusing on restorative procedures. The curriculum as stated by the CODA dental therapy education program standards include biomedical and dental science instruction in dental therapy education and understanding of basic biological principles. The CODA curriculum standards for dental therapy programs are listed in detail as the following;

> Core information in the fundamental structures, functions and interrelationships of the body systems in each of the following areas: head and neck and oral anatomy, oral embryology and histology, physiology, chemistry, biochemistry, microbiology, immunology, general pathology and/or pathophysiology, nutrition, and pharmacology. The same standards for dental science instruction will consist of a core of information in tooth morphology, oral pathology, oral medicine, radiology, periodontology, cariology, atraumatic restorative treatment, operative dentistry, pain management, dental materials, dental disease, etiology and epidemiology, preventive counseling and health promotion, patient management, pediatric dentistry, geriatric dentistry, medical and dental emergencies, oral surgery, prosthodontics, and infection and hazard control management, including provision of oral health care services to patients with bloodborne infectious diseases.[17]

With the provided curriculum and CODA standards once graduating from an accredited school, dental therapists will be skillful in providing technically competent care.

Safety Within the Profession

A study was conducted in the U.S. comparing the work of dentists to dental therapists which included direct clinical evaluations, and chart reviews of restorations on children. The technical quality of restorations placed by dental therapists was demonstrated to be either equal to or superior to that of dentists, with fewer than 10% of procedures evaluated were judged to be unsatisfactory.[18] In Minnesota, the first evaluation of dental therapists jointly conducted by the state health department and the board of dentistry was released in 2014. Among its findings was that therapists were practicing safely, allowing clinics to expand capacity to treat more underserved patients and reducing wait and travel times for care, with reports of high patient satisfaction.[19] As states move forward, it is important to adopt the core CODA-approved pathway for dental therapists, as well as the dual degree pathway for advanced standing dental therapists, to ensure that the existing workforce is maximized and to create new opportunities to recruit students from rural, underserved areas and ethnically diverse communities.[5] With new educational efforts to improve dental student and practitioner capacity to care for vulnerable populations and provide culturally sensitive care, dental therapists can play a vital role on the impact of children's oral health.

Florida Legislation

Florida has actively pursued the dental therapy position in Florida legislation since 2019. The Florida legislation House Bill 465 and Senate Bill 716 authorizing dental therapy were withdrawn for consideration in the Health Care Appropriations and Health and Human Services Subcommittees, May 2019. The 2020 Florida legislation House Bill 979 is proposed with dental therapy authorizing Medicaid to reimburse for dental services provided in a mobile dental unit that is owned by, operated by, or contracted with a health access setting or

another similar setting or program; requiring the chair of the Board of Dentistry to appoint a Council on Dental Therapy effective after a specified timeframe; requiring the board to adopt certain rules relating to dental therapists; providing application requirements and examination and licensure qualifications for dental therapists; limiting the practice of dental therapy to specified settings, etc.[20] The 2020 Florida legislation Senate Bill 152 proposes dental therapy as authorizing Medicaid to reimburse for dental services provided by certain mobile dental units; creates Council on Dental Therapy; specifies licensure requirements, services, limitations, & prohibitions relating to practice of dental therapy; requires DOH, in consultation with Board of Dentistry & AHCA, to submit reports to Legislature by specified dates; requires specified information & recommendations to be included in such reports.[20] All services, treatments, and competencies identified by CODA in its dental therapy education accreditation standards will be encompassed within the scope of practice of a licensed Florida dental therapist. The following state-specific services, if the dental therapist's education included curriculum content satisfying CODA criteria for state-specific dental therapy services including: evaluating radiographs, placement of space maintainers; pulpotomies on primary teeth; dispensing and administering nonopioid analgesics including nitrous oxide, anti-inflammatories, and antibiotics as authorized by the supervising dentist within the parameters of the collaborative management agreement established; oral evaluation and assessment of dental disease and formulation of an individualized treatment plan if authorized by a supervising dentist and subject to any conditions, limitations, and protocols specified by the supervising dentist in the collaborative management agreement.[21] Dental therapists will practice under a collaborative management agreement with a

supervising dentist. The agreement will outline how and where the dental therapist will practice.

Economic Issue

Developing and deploying dental therapists for children is rational economics. Studies have documented the cost effectiveness of dental therapists, relative to dentists, particularly in programs for children. The costs to society to train and educate dental therapists in a 32 month to 3-year program would be far less than that of educating a comparable number of dentists over 8 years after high school. Reported total expenditures for the 4 years of dental school average $233,000 to $312,000 compared to the total cost of dental therapist training of about $124,000.[21] Based on the costs provided at least 3 dental therapists could be trained in two fifths the time at the same equivalent cost as 1 dentist. Economic considerations also strongly favor utilizing oral health therapists to provide primary care for children rather than dentists.[13] It is not reasonable for dentists to perform basic restorative and minor surgical procedures for children when a dental therapist can do so safely and effectively. There is an important role for dentists, focusing on problems that cannot be managed by a dental therapist. Dentists can hire and supervise dental therapists to expand routine care to more patients, grow their practices, offer evening and weekend hours, and expand care locations to underserved populations in community settings. Numerous studies have also tracked the economic impact on practice both public and private that employ dental therapists. The Minnesota state evaluation found that two thirds of clinics employing dental therapists reported considerable personnel cost savings. One clinic saved $62,000 annually, and others estimated annual savings to be $35,000 to $50,000 per dental therapist over hiring a dentist.[19] The opportunity for more cost-effective care is related, in

part, to the salary difference between dental therapists and dentists. First-year findings from a Minnesota community health center employing a dental therapist demonstrated that the Medicaid revenue the dental therapist generated exceeded the cost of their employment by more than $30,000.[19] Financial support for dental therapists will vary depending on their employment. In a school-based program, their salaries could be paid out of the school district's which could be subsidized by Medicaid. For dental therapists employed in a public health care centers may be reimbursed by Medicaid or bill fee for service. A private dental practice that employs a dental therapist will bill whatever source is available, such as insurance, Medicaid, or fees for service. Because dental therapists are less expensive to hire, dental practices can provide care for more patients on Medicaid even with lower reimbursement rates and still be profitable.[5] Dental therapists can relieve the financial burden resulting from limited resources for oral health care of the vulnerable and underserved populations.

Focusing on the Access to Oral Health Care

The fact that high levels of a preventable disease persist in underserved children and that the majority of these children still do not access dental care provides a strong argument for enhanced efforts to address this important health problem.[18] It is imperative to treat access to oral health care as the social justice issue it is by expanding the traditional dental delivery system to serve underserved communities. With our evolving health care delivery system, dental therapists can work in a public or private sector. Dental therapists in Florida could work collaboratively with dentists in children's primary care. Adding an oral health therapist to the dental team could result in an increase in the numbers of dentists providing care for children, as well as expand the capacity for dentists already caring for children to see more

children.[13] Pediatricians and family physicians are now receiving training in oral health care in a number of settings around the country and are conducting oral exams and applying fluoride varnish to children's teeth, for which they are being remunerated.[13] Dental therapists in Florida could also work collaboratively with pediatricians by working in a pediatric office to provide oral health access to care. As previously stated, dental therapists in Florida could practice in private offices, public schools, public health clinics, centers, or departments. Ideally, children should be engaged in environments in which they normally function, if the access problem is to be effectively addressed.[13] Today, more than 73,000 full or part-time registered nurses provide health care for children in schools.[22] School based dental therapy would be a cost-effective way of managing the oral health needs of the children in Florida. In some schools, dental hygienists currently provide dental screenings and preventive dental services, with referral to dentists for children who need definitive care for fillings and other pathology.[22] Unfortunately, there is little evidence that school screening and referral programs are effective for ensuring that children from low income families are ultimately seen by a dentist for treatment.[22] Dental therapists in school based programs throughout Florida could provide the preventative and restorative services that are being diagnosed but untreated. Providing necessary dental care to children in their schools is an international practice of documented effectiveness.[22] Whether oral health care is provided in schools, community health centers, or private practices, the concept of social justice demands that priority be given to those least able to care for themselves: children.[22] As Nash declared,

> Our nation's health care system, if it is to be just, must be committed to maximally benefiting the "worst off." Poor and minority children, the most vulnerable individuals in our nation, and the worst off, have the highest prevalence of oral

disease, the poorest access to oral health care and the poorest overall oral health. Justice demands they be maximally benefited in order that they ultimately have "equal opportunity" to do well.[22]

Attitudes Toward Dental Therapy

In spite of their long-standing presence in oral health care, the use of dental therapists still generates controversy. The American Dental Association (ADA) and organized dentistry in the U.S. have strongly opposed the implementation of dental therapists. Many of the ADA's members believe that non-dentists cannot be trained to develop treatment plans or perform irreversible procedures in a shortened curriculum.[23] Previous studies also reveal a common set of themes regarding cost-effectiveness, patient acceptance, and provider acceptance as a basis for opposition. Research internationally and within the U.S. about dentists' perceptions and attitudes towards introducing dental therapists as a part of the dental care team demonstrates a clear lack of knowledge in relation to the skill, training, limitations, or cost effectiveness of dental therapists.[24] There are many dentists in the U.S. who support the dental therapist initiative. Advocates for this mid-level dental provider model describe a need for providers trained in a shorter time and at less expense than that of the typical dental curriculum if access to care in underserved communities is to improve.[23] It has been stated that the routine nature of many visits to the dental practice means that the dental therapist can increasingly take on a range of duties from dentists, recognizing their limitations, in order to free up our time for more technically demanding work.[25] In between these positions are dentists who advocate for training dental therapists who would focus only on access to oral health care for children. Those who believe dental therapists will best serve the public if they

provide care as part of a dental team working under both general and indirect supervision of a dentist.[22]

Mid-Level Providers

Advocates of the creation of a mid-level dental provider suggest that it is akin to the development of the physician assistant and nurse practitioner models that were developed in response to the shortage of physicians, particularly those in primary care.[23] The physician assistant (PA) and nurse practitioner (NP) models were developed in the 1960's to relieve the shortage of primary care doctors in the U.S. and to increase access to health care for the underserved population. Many in the medical community, objected to these new models. Despite objections, the PA and NP models were established and have grown which has allowed for increased access to healthcare in the U.S. Currently, there are 246 accredited PA programs and over 400 academic institutions with NP programs. In 1977, the U.S. Congress enacted the Rural Health Clinics Act (Public Law 95-210), which encourages the use of PAs, NPs, and certified nurse midwives in rural areas.[23]

Summary

Disparities in oral health disease rates and access to care persist despite growing national attention. A shortage of providers in thousands of U.S. communities and for those who are publicly insured is well documented.[19] Inadequate access to oral health care for America's children has also been documented, with consequent disparities in oral health among children.[13] Children suffer disproportionately and most severely from dental diseases. Despite the barriers, the dental community has the social and moral obligation to address the problem of access to care, particularly for children. Children should receive priority preference; therefore, the most effective and economical utilization would be of dental

therapists providing access to oral health care. The care provided by dental therapists has been documented to be equivalent in quality to that of dentists and is more economical.[26] Dental therapy is not a limited solution to providing access to care to children in Florida. Training a group of dental professionals that are members of, and share the language and culture of, the community that they will serve greatly improves communication, trust, patient satisfaction, and adherence to advice and treatment.[5] A dental therapist can increase access to care for all populations, especially children who are most affected by barriers to oral health services.

Chapter Three

Methods and Materials

The purpose of this research was to evaluate the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida. Previous studies have focused on the implementation of the dental therapy position in the United States to eliminate the barrier of access to oral health care. The study ascertained the need for the dental therapy position to alleviate the barrier to access to oral health care among children in the state of Florida. Florida school-based nurses were surveyed regarding the dental therapy position and access to oral health care issues among the school age children population.

Study Population

The target population for this study included school-based nurses who are actively licensed and provide health care to children throughout the state of Florida. The school-based nurses were contacted via email during the academic term in which more information was provided on the survey asking for their participation. Contact information was obtained through the Florida Department of Health website.

Research Design

The study used a descriptive research design that employed quantitative methodologies to emphasis two primary goals: to obtain Florida school-based nurses' opinions toward the dental therapy position and their opinions on access to oral health care for children in Florida. Survey design provided a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population.[27] The survey also queried the demographics of participants to include years of practice in a school-based setting and whether the participants provide care in schools within urban or rural areas.

The anonymous survey was conducted through SurveyMonkey.com. The study was conducted during the academic term when school-based nurses were most available to participate. There was a two-week window when participants could complete the survey.

The survey included eleven questions: four questions on access to oral health care, four questions on the dental therapy position, and three demographic questions.

The questions regarding access to oral health care of children in Florida provided understanding of the oral health related issues children face during the school year. School nurses provide insight with regard to oral health concerns that they see within their schools. The survey included the following questions:

1. Does your school have a school-based oral health program? (e.g. Sealant, fluoride, dental treatment programs) (Yes, No, Unsure)
2. Percentage of children with noted oral health problems during annual health screenings? (0%-20%, 21%-40%, 41%-60%, 61%-80%, 81%-100%)
3. Percentage of tooth related visits to the school clinic? (0%-20%, 21%-40%, 41%-60%, 61%-80%, 81%-100%)
4. Has it been reported that students have missed school due to oral pain? (Yes or No)

The questions regarding school-based nurses' attitudes toward the dental therapy position provide the viewpoint of a healthcare professional that is faced with the challenges of oral health care for children in the school-based setting.

The survey included the following questions:

1. Are you familiar with the dental therapy position? (I am familiar, I have never heard of dental therapy, I have heard of dental therapy but don't know much about it)

2. The dental therapy position can bridge the gap in access to oral health care for children in the state of Florida? (Strongly agree, Agree, Disagree, Strongly disagree, Unsure)

3. The dental therapy position can provide a positive impact on the oral health of your schools' students? (Strongly agree, Agree, Disagree, Strongly disagree, Unsure)

4. Do you have concerns with the dental therapy position and the proposed care to children in the state of Florida? (Yes or No. If yes, please identify those concerns)

The demographic questions provide information that confirms how long the school-based nurse have been faced with the oral health care challenges in the school settings. Analysis of location of the school and percentage of children on free/reduced lunch provide insight in the economic challenges faced by the student population.

The survey included the following questions:

1. Is your school located in an urban or rural area? (Urban or Rural)
2. Percentage of children on free or reduced lunch at your school? (0%-20%, 21%-40%, 41%-60%, 61%-80%, 81%-100%)
3. How many years have you held a nursing license? (0-10, 11-20, 21-40, 40 or more)
4. How many years of practice have you worked in a school-based setting? (0-10, 11-20, 21-40, 40 or more)

Data Collection

Upon approval from the University of New Mexico's Institutional Review Board and Human Research Protection Office 300 school-based nurses were randomly selected throughout the state of Florida asking for participation in the study. The subjects in the population were sampled by a random process, using random number table, so that each person remaining in the population had the same probability of being selected for the sample.[28] The surveys were divided in two strata (urban and rural) based on the demographic response from the school-based nurse participants. The survey was conducted through SurveyMonkey.com which included informed consent for the anonymous survey coded with anonymous identifiers. It was conveyed that the information obtained was to be used for educational and research purposes only.

Survey Instrument

A quantitative data method was conducted throughout the descriptive study. Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.[29] This study conducted quantitative survey research to determine the relationship between opinions of the dental therapist position and access to oral health care for children in Florida. Quantitative methods involve the processes of collecting, analyzing, interpreting, and writing the results of a study.[27] This study conducted quantitative methods to analyze the relationship between the demographic data presented in relation to the survey questions.

Validity and reliability are important principles in the quantitative research and was established throughout the study. *Validity* is the accuracy of the study measurement. There

are four types of validity that researchers should consider: statistical conclusion validity, internal validity, construct validity, and external validity.[30] *Statistical conclusion validity (SCV)* holds when the conclusions of a research study are founded on an adequate analysis of the data, generally meaning that adequate statistical methods are used whose small-sample behavior is accurate, besides being logically capable of providing an answer to the research question.[31] *Internal validity* is concerned with the consistency of the study design. The degree of control exerted over potential extraneous variables determines the level of internal validity.[32] *Construct validity* is the extent in which a study measures what it claims to be measuring. Researchers generally establish the construct validity of a measure by correlating it with a number of other measures and arguing from the pattern of correlations that the measure is associated with these variables in theoretically predictable ways.[33] *External validity* determines whether causal relationships can be generalized to different measures, persons, settings, and times. *Reliability* is the dependability of a study measurement. In quantitative research, reliability refers to exact replicability of the processes and the results.[35]

Data Analysis

In reporting the data results, the study presented numeric and graphical summaries of the survey responses of interest including demographic information, attitude to the dental therapy position, and opinion on access to oral health care for children in Florida. Demographic data (rural, urban) is considered a dichotomous variable and is qualitative in nature as the data is represented in two values. Survey questions regarding school-based nurses' attitudes toward the dental therapy position are categorical variable and qualitative in nature as the data is categorically presented. The open-ended question regarding school-based nurses concerns with the dental therapy position provided further understanding to the

attitudes of the school-based nurses. All survey questions in regard to dental therapy were rated using a five point Likert-type scale, with five possible values, from strongly agree to unsure with the exception of one survey question on familiarity of dental therapy which rated answers from I am familiar to I have never heard of dental therapy. Survey questions regarding access to oral health care of children in Florida, and demographic data on free/reduced lunch status and years in school setting are continuous variable and is quantitative in nature as the data is represented numerically. Bar graphs were used to display the dichotomous, categorical, and continuous variable data. The study examined the relationship between urban and rural survey data using the chi-square test. The Chi-square statistic is a non-parametric (distribution free) tool designed to analyze group differences when the dependent variable is measured at a nominal level.[36]

Chapter Four

Results, Discussion, Conclusion

Description of Sample

The survey opened February 10, 2020 via email, sent to 300 qualified participants, including the informed consent letter and link to the survey at SurveyMonkey© for the opportunity to participate in the study. Five were returned due to email kickback, bringing the total possible responses to 295. A reminder email was sent February 17, 2020 and another February 19, 2020. The survey closed February 24, 2020. Research anticipated 67.7% response rate (N=200), however, the current study had a 7.8% response rate (N=23). Respondents were permitted to skip items; therefore, the sample size varied per item. All variations in this study were due to unanswered questions.

Demographic data of the study are displayed in Figures 1 through 4. A total of 23/295 school-based nurses completed the survey. Most of the respondents have held a nursing license for less than ten years (N=11; 47.8%) (Figure 1). Most school-based nurses in this survey worked in a school-based setting for less than ten years (N=19; 82.6%) (Figure 2).

There were respondents from most schools located in urban areas (N=13, 56.5%) (Figure 3). Fifty two percent (N=12) School based nurses responded with 81% - 100% of children on free or reduced lunch at their school (Figure 4). The demographic data was not statistically analyzed due to the limited response rate.

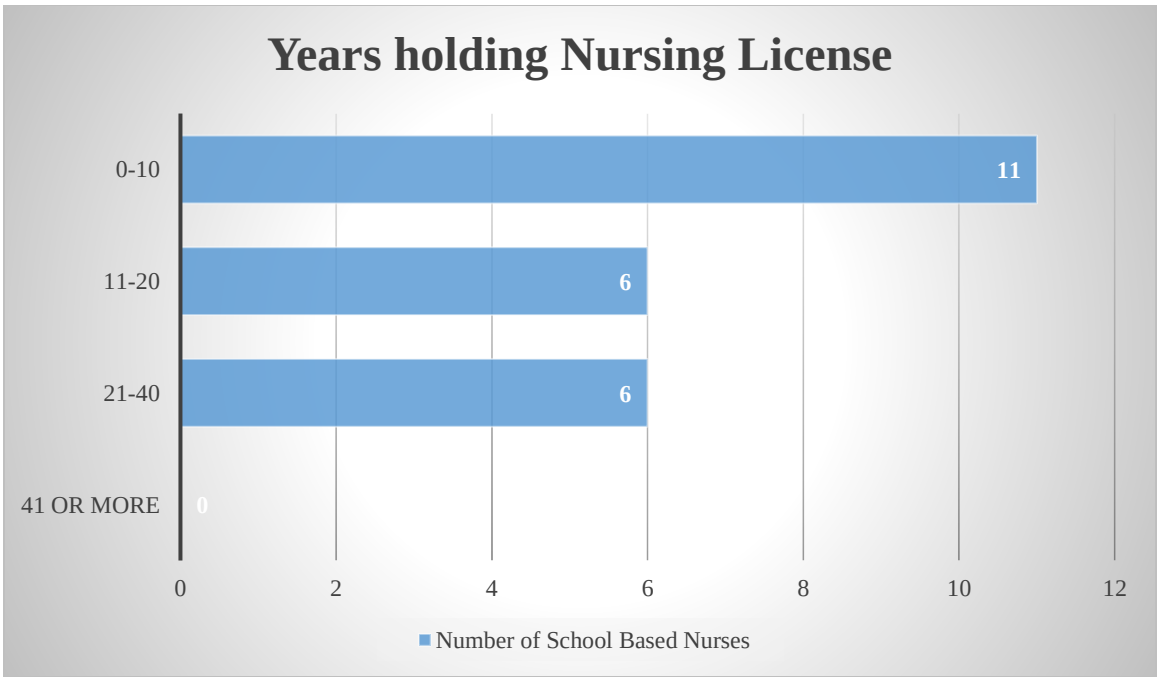

Figure 1. Years Holding Nursing License

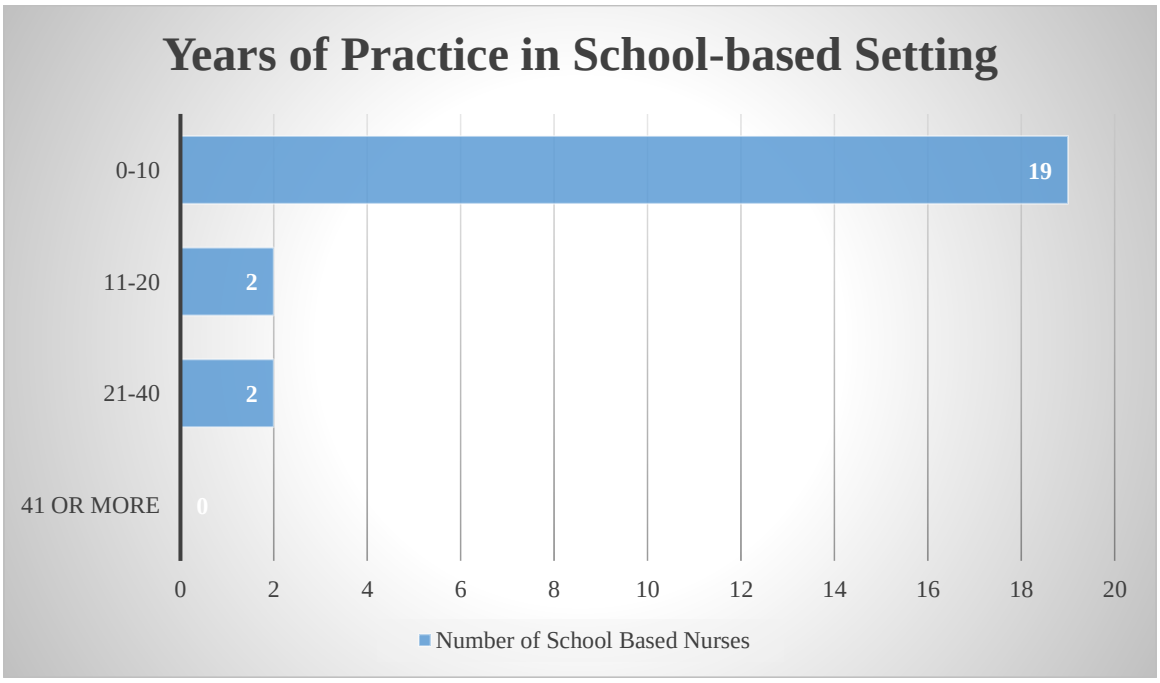

Figure 2. Years of Practice in School-based Setting

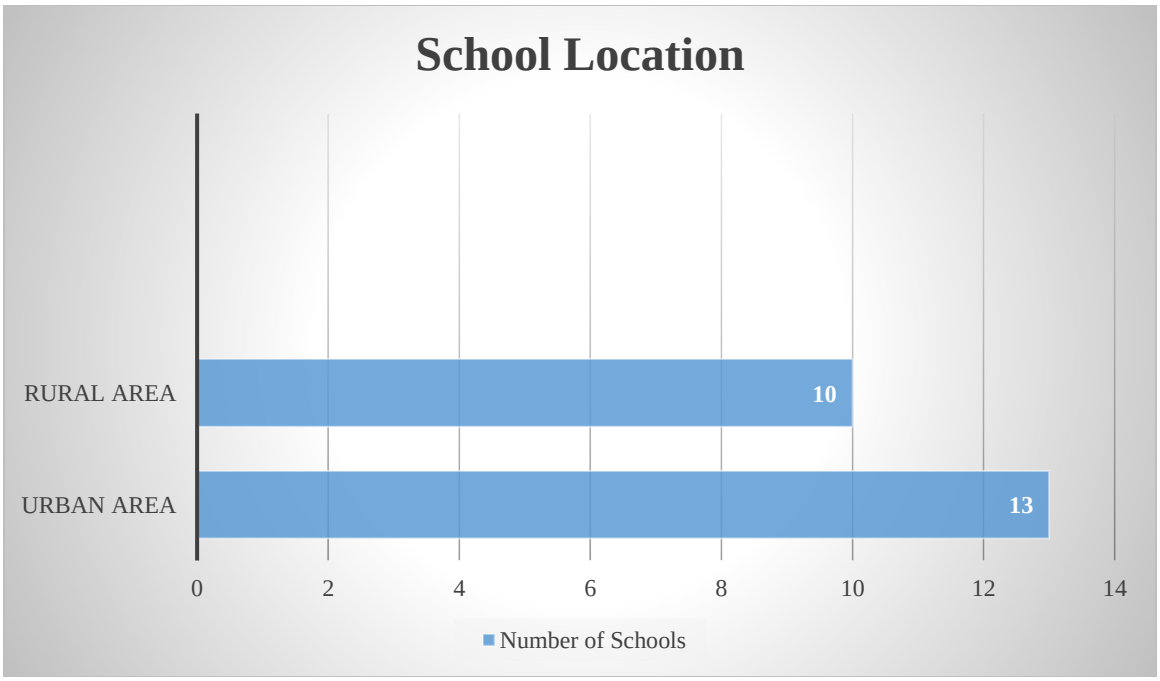

Figure 3. School Location

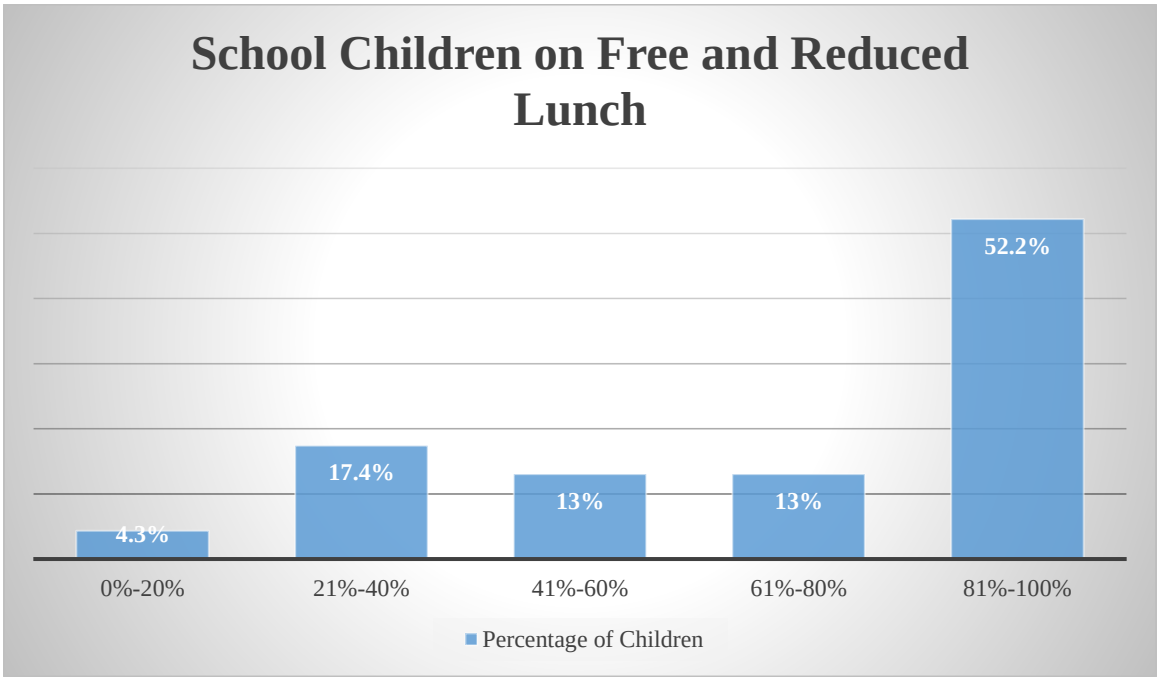

Figure 4. School Children on Free and Reduced Lunch

Statistical Analysis

Survey Question One (SQ1). "Does your school have a school-based oral health program? (e.g. Sealant, fluoride, dental treatment programs)" The descriptive data responses

by the school-based nurses indicate the majority do not have a school-based oral health program (N=15, 65.2%) (Figure 5).

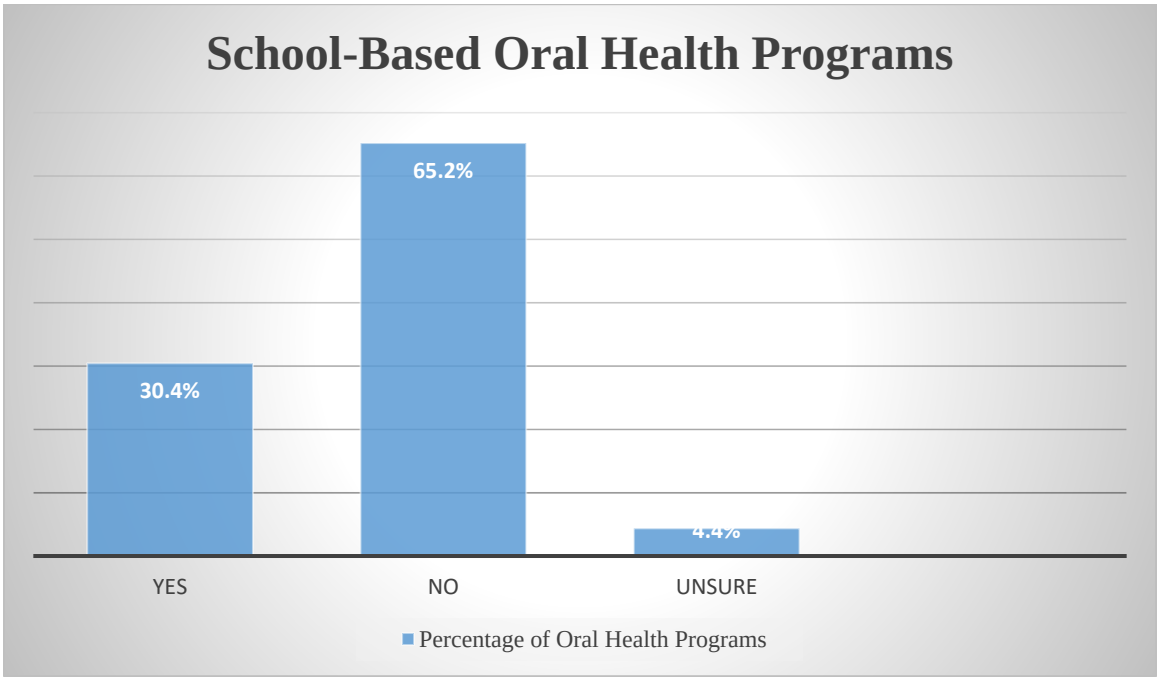

Figure 5. School-based oral health programs

Survey Question Two (SQ2) "Percentage of children with noted oral health problems during annual health screenings?" Frequency and percentage summaries of the survey responses were obtained to address SQ2 and are displayed in Table 1. The majority of respondents where equal between a low percentage (0%-20%) and a median percentage (41%-60%) of children with noted oral health problems during the annual health screening.

Table 1. Frequency and Percentage Summaries of Survey Question 2

	Frequency	Percent
0% - 20%	7	36.8%
21% - 40%	3	15.8%
41% - 60%	7	36.8%
61% - 80%	2	10.5%
81% - 100%	0	0%

Note: Total respondents N=19

SQ2 is supported by Survey Question Four (SQ4). “Has it been reported that students have missed school due to oral pain?” Table 2 represents the majority of respondents (N=16, 76.2%) answered yes in regard to students missing school due to oral pain.

Table 2. Frequency and Percentage Summaries of Survey Question 4

	Frequency	Percent
Yes	16	76.2%
No	5	23.8%

Note: Total Responses N=21

Descriptive data summaries show a correlation between oral health problems noted during the annual health screening and the percentage of students who have missed school due to oral pain.

Survey Question Three (SQ3) “Percentage of tooth related visits to the school clinic?” did not support the descriptive data summary of SQ2. Table 3 represents the majority of respondents (N=17, 73.9%) indicated a lower percentage (0%-20%) of tooth related visits to the school clinic.

Table 3. Frequency and Percentage Summaries of Survey Question 3

	Frequency	Percent
0% - 20%	17	73.9%
21% - 40%	4	17.4%
41% - 60%	1	4.4%
61% - 80%	1	4.4%
81% - 100%	0	0

Note: Total respondents N=23

Survey Question Five (SQ5) “Are you familiar with the dental therapy position?” Descriptive data indicates that more school-based nurses have never heard of dental therapy (N= 18, 78.3%) (Figure 6).

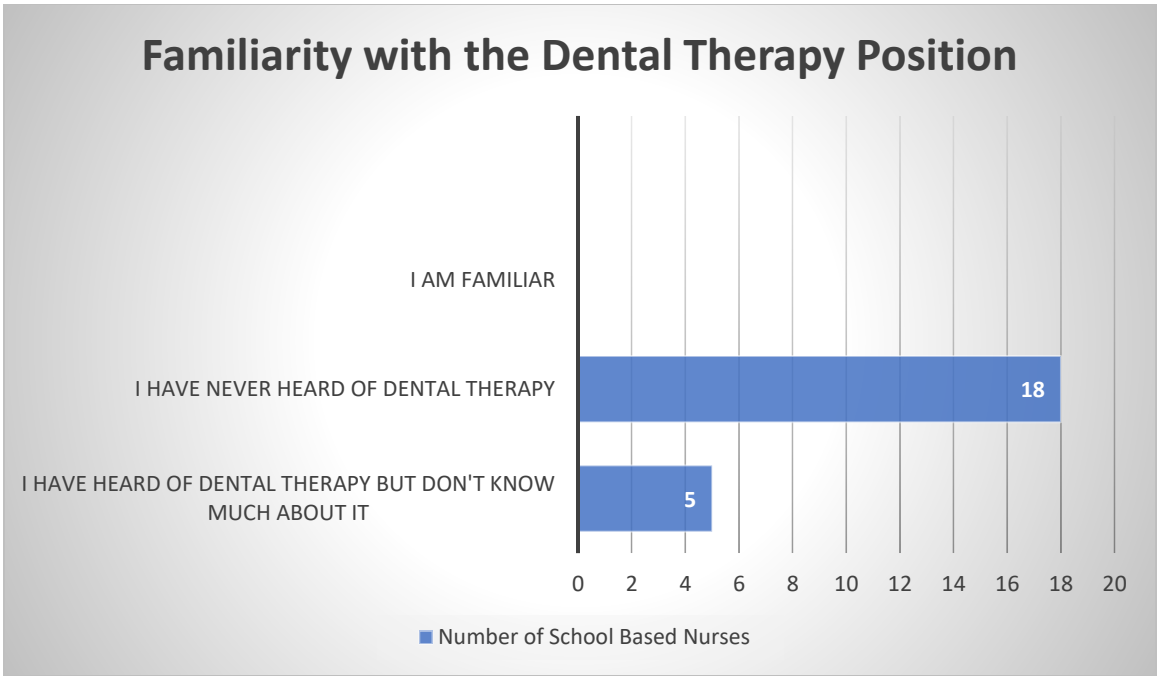

Figure 6. Familiarity with Dental Therapy Position

Survey Question Six (SQ6) "The dental therapy position can bridge the gap in access to oral health care for children in the state of Florida?" Frequency and percentage summaries of the survey responses were obtained to address SQ6 and are displayed in Table 4. The majority of school-based nurses were unsure in their response (N=10, 43.5%).

Table 4. Frequency and Percentage Summaries of Survey Question 6

	Frequency	Percentage
Strongly Agree	7	30.4%
Agree	6	26.1%
Disagree	0	0%
Strongly Disagree	0	0%
Unsure	10	43.5%

Note: Total Respondents N=23

Survey Question Seven (SQ7) "The dental therapy position can provide a positive impact on the oral health of your schools' students?" Frequency and percentage summaries of the survey responses were obtained to address SQ7 and are displayed in Table 5. School-based nurses responded with a majority response, unsure (N=9, 39.1%).

Table 5. Frequency and Percentage Summaries of Survey Question 7

	Frequency	Percentage
Strongly Agree	8	34.8%
Agree	5	21.7%
Disagree	1	4.4%
Strongly Disagree	0	0%
Unsure	9	39.1%

Note: Total Respondents N=23

Open-ended question. "Do you have concerns with the dental therapy position and the proposed care to children in the state of Florida?" Frequency and percentage summaries of the survey responses were obtained to address the open-ended questions and are displayed in Table 6. The two comments mentioned were related to school-based programs continuously changing and not knowing enough about the dental therapy position to state concerns. There was a significant majority of respondents (N=20, 90.9%) that answered no to the open-ended question.

Table 6. Do you have concerns with the dental therapy position and the proposed care to children in the state of Florida?

	Frequency	Percent
No	20	90.9%
Yes, please identify those concerns: *Our program is always changing, and the children are the ones who end up missing out.* *I don't know enough about the dental therapy position to state if I have concerns.*	2	9.1%

Note: Total respondents N=22

Discussion

The quantitative and qualitative, descriptive research study utilized a framework developed to understand the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida. School-based nurses provide the viewpoint of a healthcare professional that is faced with the challenges of oral health care for children in the school-based setting. School nurses can best provide insight with regard to oral health concerns that they see within their schools. With the majority of respondents, 47.8% of the school-based nurses have held a nursing license for less than ten years. This also applied with working in a school-based setting, with the most respondents of 82.6%. This raises the question if the responses are reliable when the school-based nurses have not worked in a school-based setting for a long period of time. The responses of school-based nurses reveal most schools are located in urban areas (N=13, 56.5%). Fifty two percent school based nurses also responded with an 81-100 percentage of children on free or reduced lunch at their school. The demographics of the school location and household income status do support the access to oral health care needs which are displayed in a side by side comparison in Figure 7.

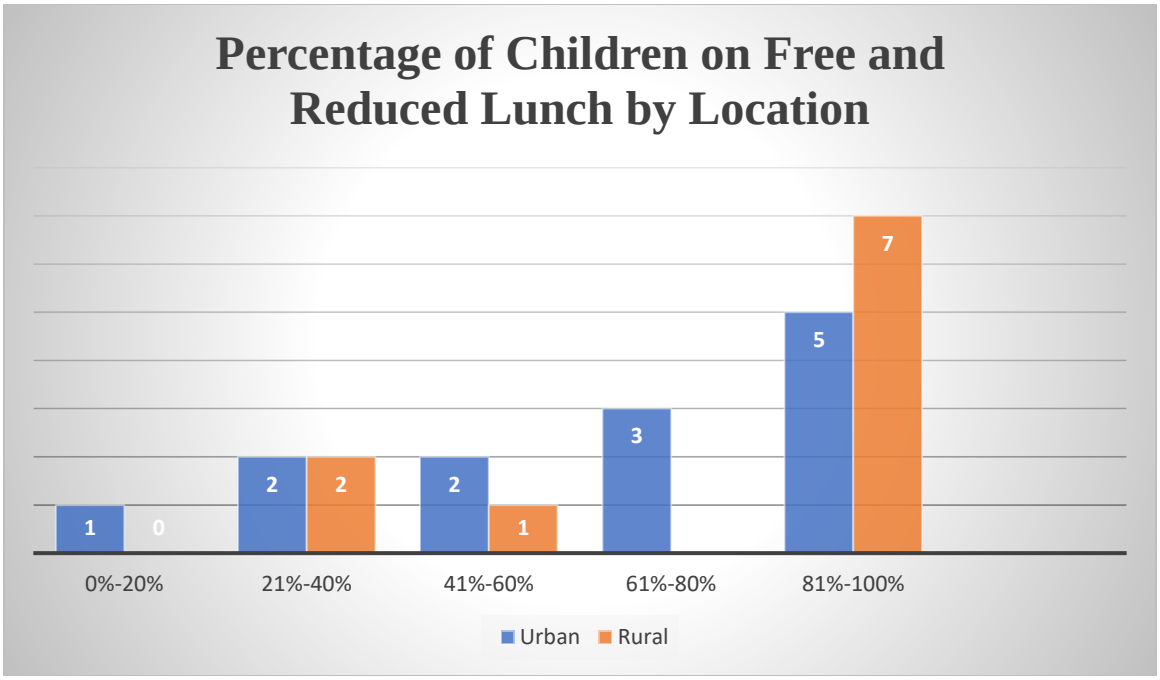

Figure 7. Percentage of Children on Free and Reduced Lunch by Location

When comparing the descriptive data responses, it provides an understanding of the oral health related issues Florida children face during the school year. Of the responses from the respondents, school-based nurses in rural locations (50%) had school-based oral health programs compared to their counter parts in urban locations (15%). School-based nurses in rural locations had a noticeable difference in responses with regards to noted oral health problems during annual health screenings (50%), tooth related visits to the school clinic (20%), and reports that students have missed school due to oral pain (80%). Compared to that of school-based nurses in urban locations responding with oral health problems during annual health screenings (20%), tooth related visits to the school clinic (20%), and reports that students have missed school due to oral pain (72%). This data displayed in Figure 8 seemingly correlates to previous studies that support the notion that children in rural areas are more likely to have dental decay and lack of access to oral health care.

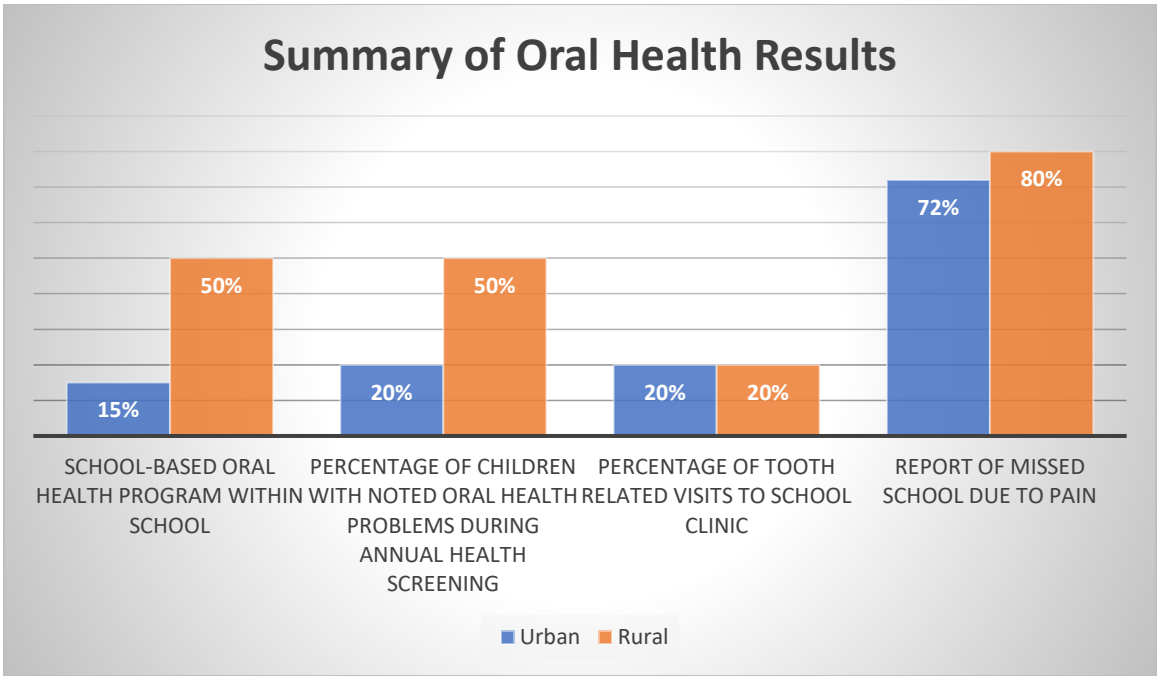

Figure 8. Summary of Oral Health Results

The responses from school-based nurses in regard to their attitudes toward the dental therapy position were impacted by the lack of knowledge about the proposed dental therapy position in Florida. Seventy-three percent of respondents have never heard of the dental therapy position which affected the responses in SQ6, in regard to the dental therapy position bridging the gap in access to oral health care for children in the state of Florida; and SQ7 the school-based nurses attitudes on the dental therapy position providing a positive impact on the oral health of the schools' students. The lack of knowledge about the dental therapy position allowed for the majority of school-based nurses unsure responses with each survey question (43.8% - 39.1%). With the responses provided from school-based nurses a correlation cannot be established due to the lack of knowledge with the dental therapy position.

Conclusion

The respondent limitations present in this descriptive study could have impacted the results, and interpretations. The low 7.8% response rate of 23/295 school-based nurses is too small a sample to provide a statistically valid or reliable study. Due to the low response rate statistical tests could not be performed, therefore only data summaries were assessed for a correlation in demographic data and survey questions responses. A higher response rate would have provided results that accurately reflect the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida. This lack of knowledge with the dental therapy position among school-based nurses in Florida significantly altered the response rate for the survey in totality. This study did provide a correlation between demographic location and low-income status among children in Florida. This study also provided a correlation supporting the hypothesis that children in rural areas are more likely to have dental decay and lack of access to care. Further studies are needed to evaluate the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the oral health access issues in Florida.

Chapter Five

Article for Submission

Journal of Dental Hygiene

Dental Therapists Providing Access to Oral Health Care to Children in Florida

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Keywords: Dental Therapy, Dental Therapist, Access to Oral Health Care

Abstract

Purpose: The state of Florida has proposed the establishment of the dental therapy mid-level provider to alleviate the lack of access to oral health care of the underserved population in Florida. Despite the success in other states within the United States and internationally, some groups oppose this workforce model. The purpose of this research is to evaluate the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida.

Methods: A randomized survey instrument was utilized to ascertain the need for the dental therapy position to alleviate the barrier to access to oral health care among children in the state of Florida. 300 Florida school-based nurses were surveyed. Descriptive statistics was utilized to analyze the demographic data and attitudes towards access to care needs from the respondents. Descriptive data summaries were used to analyze the school-based nurses' attitudes to dental therapy. No tests were performed during the study.

Results: A total of 23 school-based nurses responded. Respondents were permitted to skip items; therefore, all variations in this study were due to unanswered questions. 82.6% school-based nurses worked in a school-based setting for less than ten years. 56.5% respondents' schools were located in urban areas.

Conclusion: The demographic data summaries of the school location and household income status support the access to oral health care needs of children in Florida. Descriptive data summary results support the hypotheses that children in rural areas are more likely to have dental decay and lack of access to care. A correlation cannot be established by descriptive data summaries from the school-based nurses' attitudes with the dental therapy position due to the limited response rate.

Introduction

A healthy mouth and teeth are essential component of a child's well-being, since the mouth serves as the gateway to their body. There is a strong correlation between poor oral health status and other systemic diseases, such as diabetes, heart disease, stroke, and preterm and low-weight births.[1] Tooth decay, is the number one chronic childhood illness in America. Childhood tooth decay can have devastating consequences on a child's health and wellness. Left untreated, severe tooth decay can lead to malnourishment, anemia, emergency surgery, life-threatening secondary infections and death.[2] The effects of tooth decay can impact a child's self-esteem, employment prospects, social development, and overall quality of life. Over 40% of children have dental cavities by the time they reach kindergarten and with one in five U.S. children going without dental care.[2] The percentage of children and adolescents aged 5 to 19 years with untreated tooth decay is twice as high for those from low-income families (25%) compared with children from higher-income households (11%).[3] Dental decay is also associated with poor performance in schools and absenteeism. Children with poor oral health are three times more likely to miss school as a result of dental pain.[2] Parents average 2.5 absent days from work per year due to their children's dental problems.[1]

Access to dental care is a critical and multifaceted problem in United States and remains one of the most unmet need of children.[4] Dental caries is almost completely preventable, but access to preventative care is out of reach for many families.[5] More than 18 million low-income children went without dental care, including routine exams, in 2014.[6] Untreated oral disease, such as caries, worsens with time and eventually requires more serious and expensive treatment.[5] When children lack dental care, untreated decay and dental infection can result in preventable emergency room visits or more complicated and expensive

dental and medical interventions later in life.[6] More than 212,000 U.S. children had dental emergency visits in 2012, more than two-thirds of which were covered by Medicaid.[4] In 2012, the U.S. health care system spent $1.6 billion on dental related visits with an average cost of $745 per visit.[5] Lack of access to a dental provider and the high costs of dental services are a major cause of these dental problems.[7] Access to dental services for children through early and periodic screening, and treatment programs will eliminate the costs associated with children visits to the emergency room. As Bersell reveals, in 2011, the Pew Children's Dental Campaign assessed the level of care for children in the United States and graded all 50 states based on eight benchmarks related to sealants, fluoridation, Medicaid, and expanded care delivery models. While no state accomplished all eight goals, Maryland led the nation, meeting seven of the eight benchmarks. Hawaii accomplished only one of the benchmarks, reflecting the lowest performance. Florida, Hawaii, and New Jersey received two consecutive "F" grades.[8]

Florida is among one of the disproportionally states lacking in access to care for children. The 2017 Medicaid annual report shows that 40% of children in Florida with Medicaid were seen by a dentist over a 12-month period compared to the national average of 48%.[9] Therefore 60% of children in Florida with Medicaid were not seen by a dentist in 2017. There is a significant proportional difference between children with Medicaid who have access to care from children with private dental care coverage. The percentage of dentists participating in Medicaid for child dental services in 2014 was 30% within the state of Florida compared to the national U.S. average of 42%.[9] The Healthy People 2020 oral health goal for children with untreated dental decay in their primary or permanent teeth (6–9 years) is to be at 25.9%.[7] With lack of access to care for children in Florida this goal will not

be meet. The 2014-2015 Florida Healthy survey conducted from 2008-2015 reveals that Florida ranked third lowest for percent of Head Start children (ages 3-5) with caries experience among the nine participating states in the U.S., with 32.1% of Head Start children having a caries experience.[1] A number of factors contribute to the lower levels of preventive care that children in low-income, minority, and rural households receive, including barriers to transportation, a scarcity of dental providers in many communities, and cost.[6] Dentists have a disproportionate presence in suburbs whereas those who are most in need of care are concentrated in inner cities and rural communities.[7] Rural children are less likely to have dental insurance than their urban counterparts and more likely to seek care for preventable dental problems in overburdened emergency rooms.[4] In 2010, the Government Accountability Office reported that the most frequent barrier children enrolled in Medicaid faced in obtaining dental care was finding a dentist who would accept Medicaid payment.[10] The Health Resources and Services Administration (HRSA) estimates it would take a net increase of nearly 9,500 providers to address the unmet need today.[7] Fortunately, two policy solutions proved to increase access to dental care for children are gaining ground across the country: School-based sealant programs have been shown to reduce decay by an average of 60% over five years, and adding midlevel providers; often called dental therapists, to the dental team can help vulnerable populations get the preventive and routine restorative treatment they need.[4] A dental therapist has been a proposed solution to bridge the gap between children in Florida whom need access to oral health care and Medicaid providers.

Dental Therapists in the United States

In 2005 the dental health aide therapist model was introduced in Alaska, providing access to oral health care to remote rural areas of the state. Dental therapists are now

providing quality, routine dental care in Alaska to more than 40,000 children and families that had otherwise, gone without.[14] In 2009, Minnesota became the first state with an authorizing environment to create dental therapist graduate educational programs to help address oral care issues.[14] As of December 2018, there are 92 dental therapists in Minnesota that work in public clinics and private practices to treat more of the states' underserved population. Private practices are using dental therapists to serve more patients on Medicaid. Public health centers are utilizing dental therapists as a cost-effective way to increase capacity to serve more patients on Medicaid and offer free or low-cost care to more low-income uninsured patients. According to a 2014 report from the Minnesota Department of Health and Board of Dentistry to the state legislature evaluating the impacts of dental therapists in Minnesota, dental therapists served 6,338 new patients over a 13-month period, 84% of whom were public program enrollees or from underserved communities.[5] Additionally, the report found that benefits attributable to dental therapists in Minnesota included direct costs savings (estimated between $35,000 and $62,000) and a reduction in wait time for patients, which made it possible for clinics to see more underserved patient's.[5] The development of dental therapists is supported by many US public health and philanthropic organizations, including the American Association of Public Health Dentistry and the American Public Health Association but opposed by the American Dental Association, most constituent state dental associations, the American Academy of Pediatric Dentistry, and other dental specialty organizations.[11] With the growing practice environment and evolving health care delivery system 10 states including, Arizona, Connecticut, Idaho, Maine, Michigan, New Mexico, Nevada, Oregon, Vermont, and Washington, have also authorized the position of the dental therapist following the Minnesota model in a variety of

ways. There are several states that are pursuing dental therapist providers to improve access to care including Kansas, Massachusetts, North Dakota, Washington, Wisconsin, and the state of Florida.

Methods and Materials

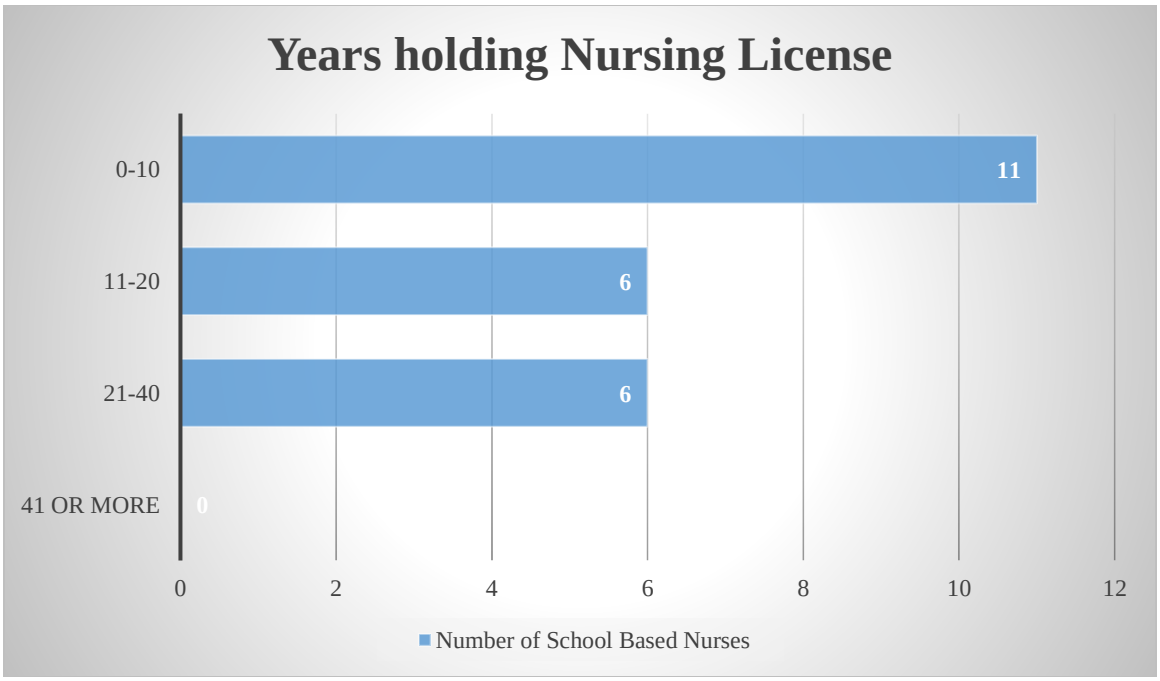
A descriptive survey was designed for this study to evaluate the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida. Participants were given two weeks to complete the survey.

The survey included eleven questions: four questions on access to oral health care, four questions on the dental therapy position, and three demographic questions. Descriptive statistics were utilized to analyze the demographic data and attitudes towards access to care from the respondents. Descriptive data summaries were used to analyze the school-based nurses' attitudes to dental therapy. No tests were performed during the study.

Results

A total of 23/295 school-based nurses completed the survey. Demographic data of the study is displayed in Figure 1 through 4. Most of the respondents have held a nursing license for less than ten years (N=11; 47.8%) (Figure 1). Most school-based nurses in this survey worked in a school-based setting for less than ten years (N=19; 82.6%) (Figure 2).

There were respondents from most schools located in urban areas (N=13, 56.5%) (Figure 3). School based nurses responded with a percentage of children on free or reduced lunch at their school of 52.2% (N=12) (Figure 4). The demographic data was utilized within the statistical analysis.



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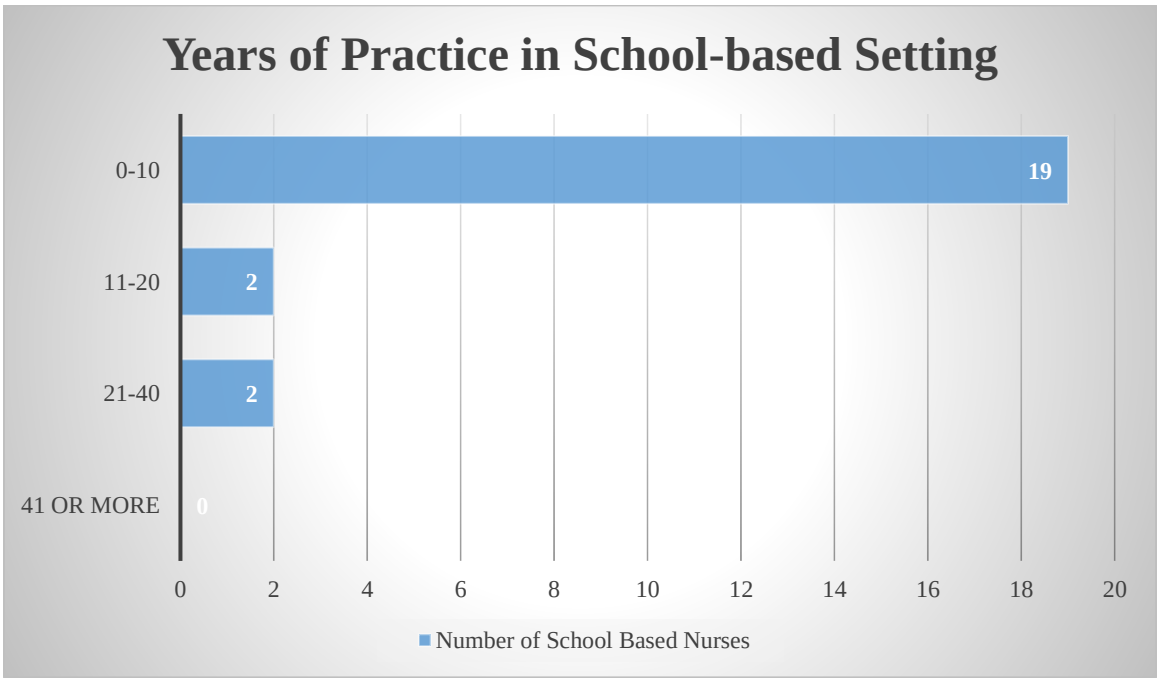

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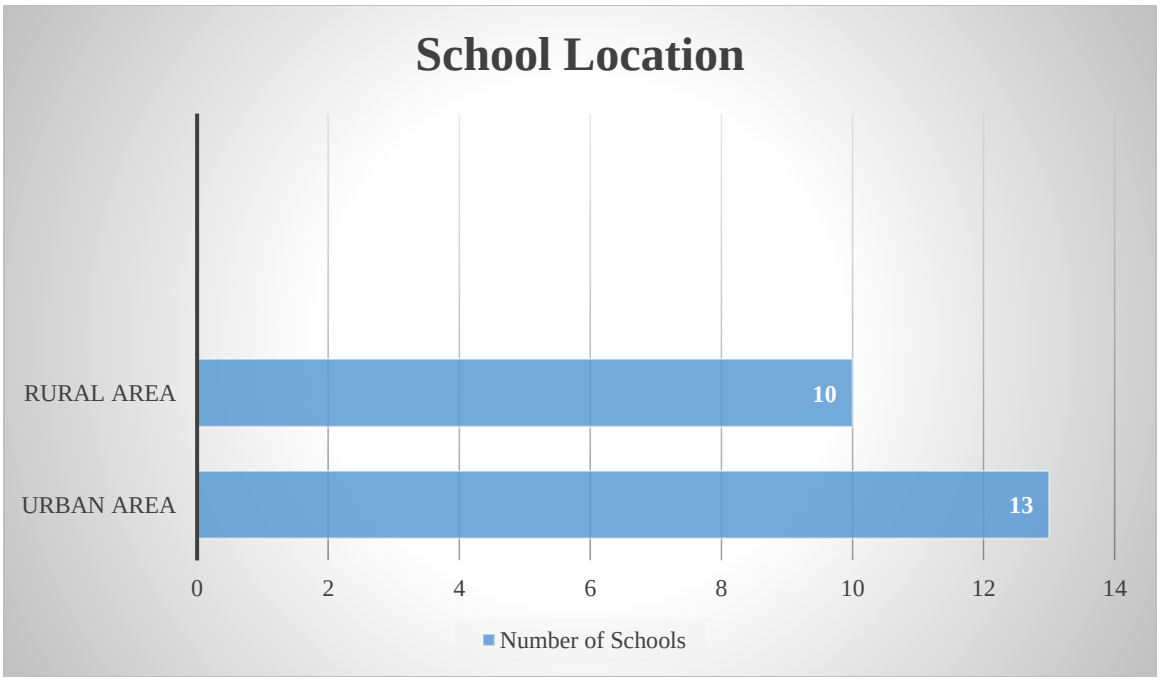

Figure 3. School Location

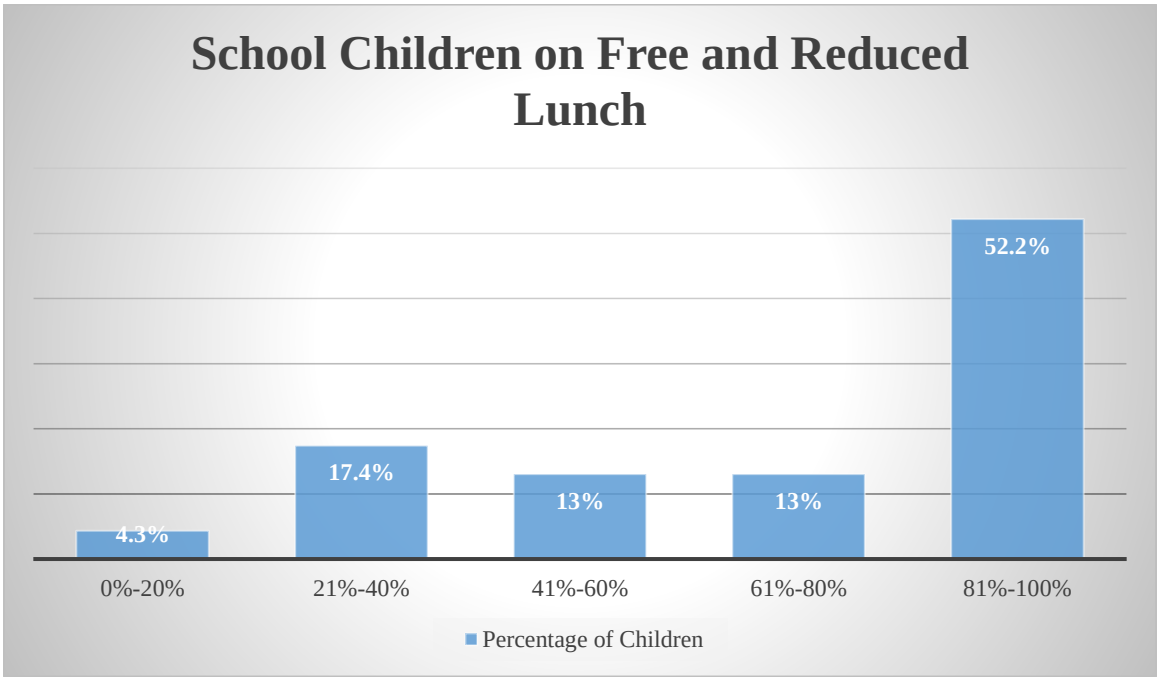

Figure 4. School Children on Free and Reduced Lunch

Survey Question One (SQ1). “Does your school have a school-based oral health program? (e.g. Sealant, fluoride, dental treatment programs)” The descriptive data responses

by the school-based nurses indicate the majority do not have a school-based oral health program (N=15, 65.2%) (Figure 5).

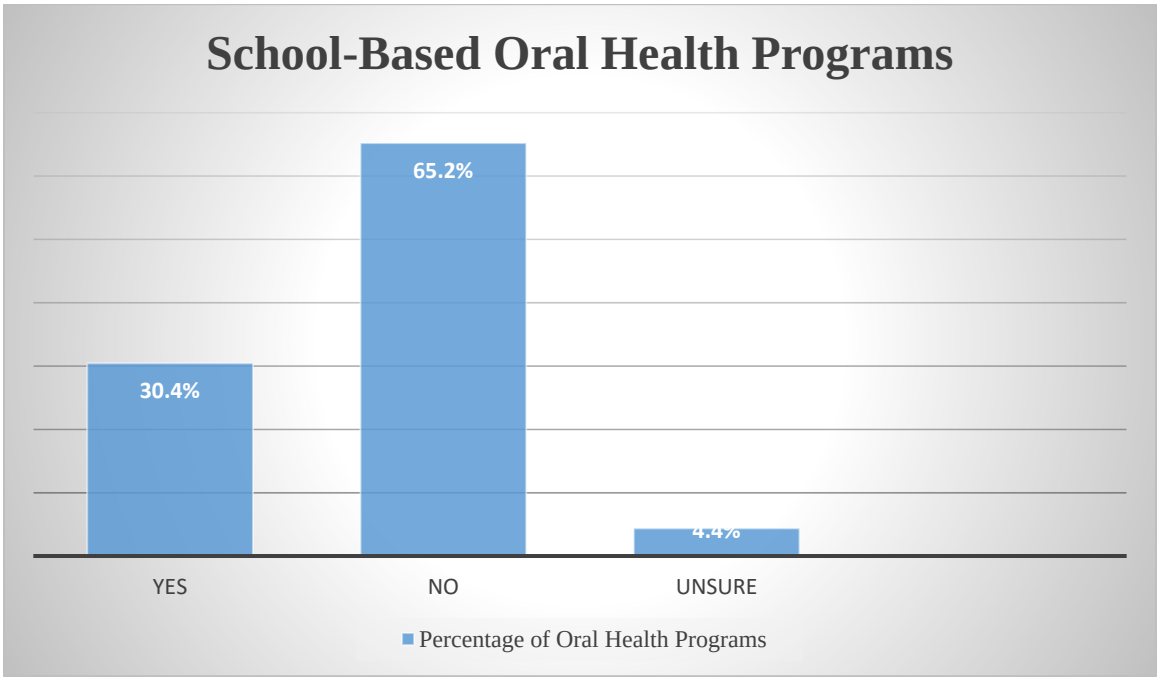

Figure 5. School-based oral health programs

Survey Question Two (SQ2) "Percentage of children with noted oral health problems during annual health screenings?" Frequency and percentage summaries of the survey responses were obtained to address SQ2 and are displayed in Table 1. The majority of respondents where equal between a low percentage (0%-20%) and a median percentage (41%-60%) of children with noted oral health problems during the annual health screening.

Table 1. Frequency and Percentage Summaries of Survey Question 2

	Frequency	Percent
0% - 20%	7	36.8%
21% - 40%	3	15.8%
41% - 60%	7	36.8%
61% - 80%	2	10.5%
81% - 100%	0	0%

Note: Total respondents N=19

SQ2 is supported by Survey Question Four (SQ4). “Has it been reported that students have missed school due to oral pain?” Table 2 represents the majority of respondents (N=16, 76.2%) answered yes in regard to students missing school due to oral pain. (Table 2)

Table 2. Frequency and Percentage Summaries of Survey Question 4

	Frequency	Percent
Yes	16	76.2%
No	5	23.8%

Note: Total Responses N=21

Descriptive data summaries show a correlation between oral health problems noted during the annual health screening and the percentage of students who have missed school due to oral pain.

Survey Question Three (SQ3) “Percentage of tooth related visits to the school clinic?” did not support the descriptive data summary of SQ2. Table 3 represents the majority of respondents (N=17, 73.9%) indicated a lower percentage (0%-20%) of tooth related visits to the school clinic.

Table 3. Frequency and Percentage Summaries of Survey Question 3

	Frequency	Percent
0% - 20%	17	73.9%
21% - 40%	4	17.4%
41% - 60%	1	4.4%
61% - 80%	1	4.4%
81% - 100%	0	0

Note: Total respondents N=23

Survey Question Five (SQ5) “Are you familiar with the dental therapy position?” Descriptive data indicates that more school-based nurses have never heard of dental therapy (N= 18, 78.3) (Figure 6).

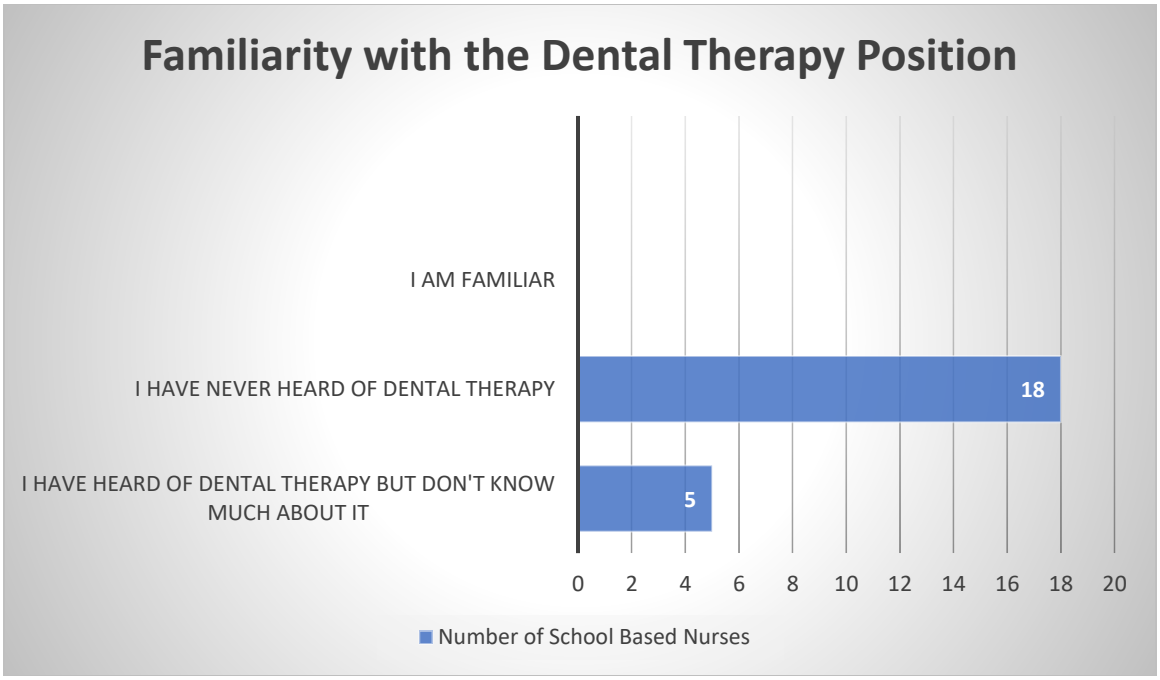

Figure 6. Familiarity with Dental Therapy Position

Survey Question Six (SQ6) "The dental therapy position can bridge the gap in access to oral health care for children in the state of Florida?" Frequency and percentage summaries of the survey responses were obtained to address SQ6 and are displayed in Table 4. The majority of school-based nurses were unsure in their response (N=10, 43.5%).

Table 4. Frequency and Percentage Summaries of Survey Question 6

	Frequency	Percentage
Strongly Agree	7	30.4%
Agree	6	26.1%
Disagree	0	0%
Strongly Disagree	0	0%
Unsure	10	43.5%

Note: Total Respondents N=23

Survey Question Seven (SQ7) "The dental therapy position can provide a positive impact on the oral health of your schools' students?" Frequency and percentage summaries of the survey responses were obtained to address SQ7 and are displayed in Table 5. School-based nurses responded with a majority response, unsure (N=9, 39.1%).

Table 5. Frequency and Percentage Summaries of Survey Question 7

	Frequency	Percentage
Strongly Agree	8	34.8%
Agree	5	21.7%
Disagree	1	4.4%
Strongly Disagree	0	0%
Unsure	9	39.1%

Note: Total Respondents N=23

Open-ended question. "Do you have concerns with the dental therapy position and the proposed care to children in the state of Florida?" Frequency and percentage summaries of the survey responses were obtained to address the open-ended questions and are displayed in Table 6. The two comments mentioned were related to school-based programs continuously changing and not knowing enough about the dental therapy position to state concerns. There was a significant majority of respondents (N=20, 90.9%) that answered no to the open-ended question.

Table 6. Do you have concerns with the dental therapy position and the proposed care to children in the state of Florida?

	Frequency	Percent
No	20	90.9%
Yes, please identify those concerns: *Our program is always changing, and the children are the ones who end up missing out.* *I don't know enough about the dental therapy position to state if I have concerns.*	2	9.1%

Note: Total respondents N=22

Discussion

The quantitative and qualitative, descriptive research study utilized a framework developed to understand the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida. School-based nurses provide the viewpoint of a healthcare professional that is faced with the challenges of oral health care for children in the school-based setting. School nurses can best provide insight with regard to oral health concerns that they see within their schools. With the majority of respondents, 47.8% of the school-based nurses have held a nursing license for less than ten years. This also applied with working in a school-based setting, with the most respondents of 82.6%. This raises the question if the responses are reliable when the school-based nurses have not worked in a school-based setting for a long period of time. The responses of school-based nurses reveal most schools are located in urban areas (N=13, 56.5%). School based nurses also responded with a percentage of children on free or reduced lunch at their school of 52.2% (N=12). The demographics of the school location and household income status do support the access to oral health care needs which are displayed in Figure 7.

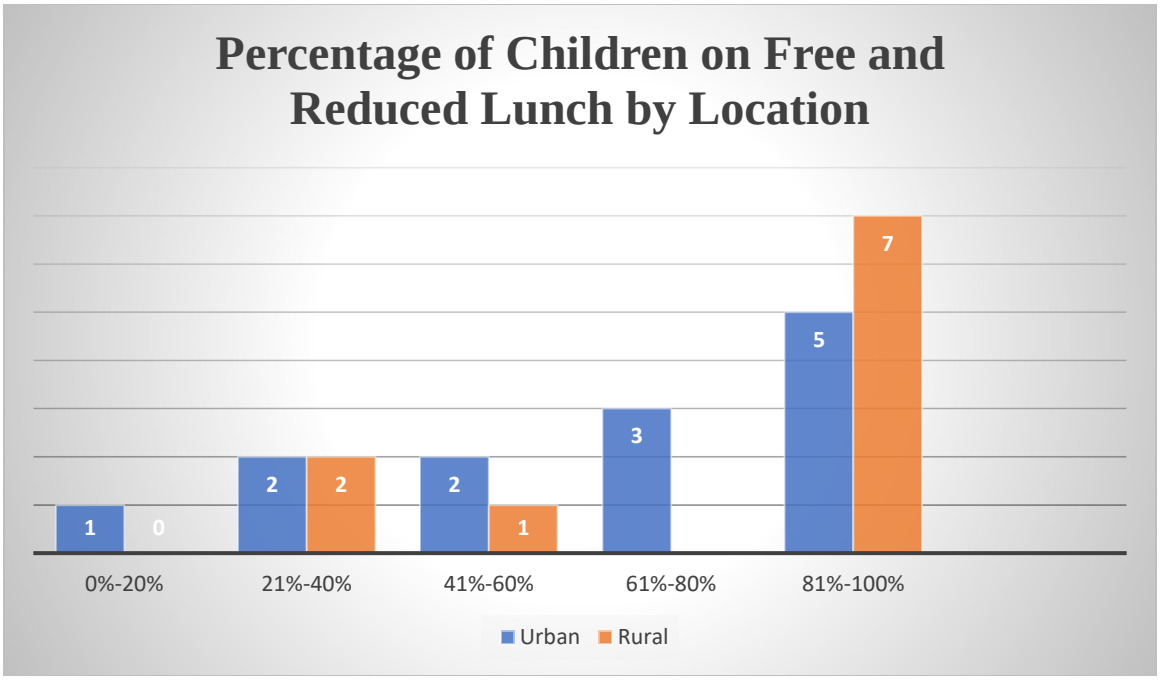

Figure 7. Percentage of Children on Free and Reduced Lunch by Location

When comparing the descriptive data responses, it provides an understanding of the oral health related issues Florida children face during the school year. Of the responses from the respondents, school-based nurses in rural locations (50%) had school-based oral health programs compared to their counter parts in urban locations (15%). School-based nurses in rural locations had a noticeable difference in responses with regards to noted oral health problems during annual health screenings (50%), tooth related visits to the school clinic (20%), and reports that students have missed school due to oral pain (80%). Compared to that of school-based nurses in urban locations responding with oral health problems during annual health screenings (20%), tooth related visits to the school clinic (20%), and reports that students have missed school due to oral pain (72%). This data displayed in Figure 8 seemingly correlates to previous studies that support the notion that children in rural areas are more likely to have dental decay and lack of access to care.

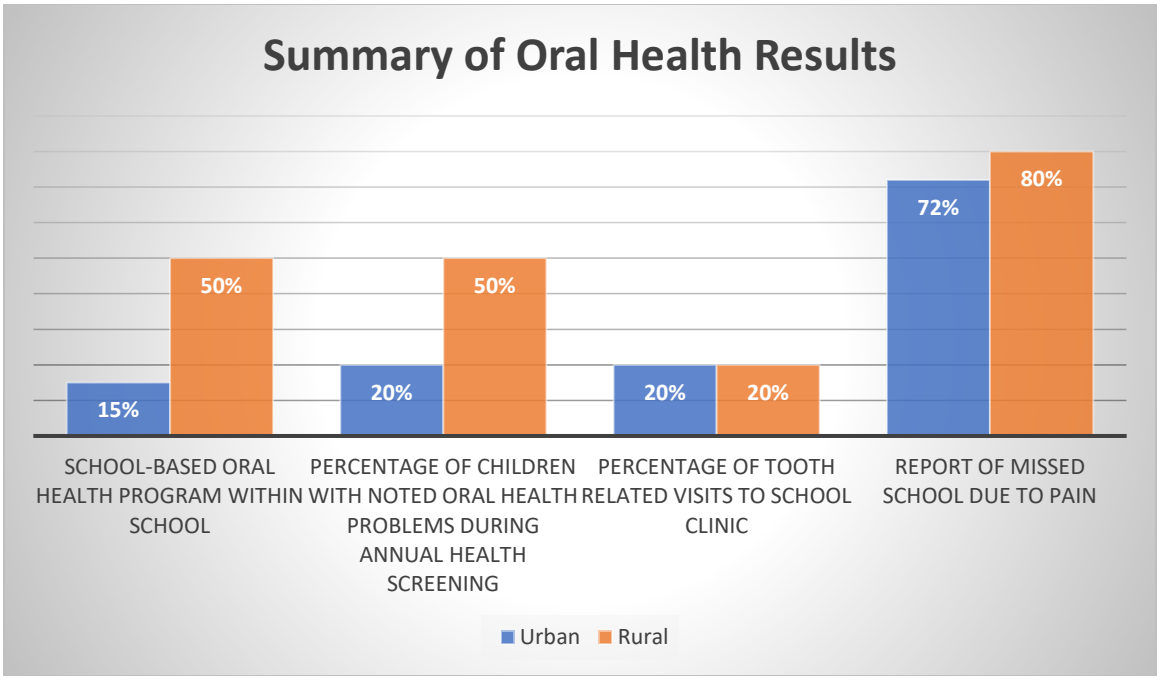

Figure 8. Summary of Oral Health Results

The responses from school-based nurses in regard to their attitudes toward the dental therapy position were impacted by the lack of knowledge about the proposed dental therapy position in Florida. 73.3% of respondents have never heard of the dental therapy position which affected the responses in SQ6, in regard to the dental therapy position bridging the gap in access to oral health care for children in the state of Florida; and SQ7 the school-based nurses attitudes on the dental therapy position providing a positive impact on the oral health of the schools' students. The lack of knowledge about the dental therapy position allowed for the majority of school-based nurses unsure responses with each survey question (43.8% - 39.1%). With the responses provided from school-based nurses a correlation cannot be established due to the lack of knowledge with the dental therapy position.

The respondent limitations present in this descriptive study could have impacted the results, and interpretations. The low 7.8% response rate of 23/295 school-based nurses is too small a sample to provide a statistically valid or reliable study. Due to the low response rate

tests could not be performed, therefore only data summaries were assessed for a correlation in demographic data and survey questions responses. A higher response rate would have provided results that accurately reflect the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida. This lack of knowledge with the dental therapy position among school-based nurses in Florida significantly altered the response rate for the survey in totality. This study did provide a correlation between demographic location and low-income status among children in Florida. This study also provided a correlation supporting the hypothesis that children in rural areas are more likely to have dental decay and lack of access to care. Further studies are needed to evaluate the attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the oral health access issues in Florida.

Conclusion

Disparities in oral health disease rates and access to care persist despite growing national attention. A shortage of providers in thousands of U.S. communities and for those who are publicly insured is well documented.[19] Inadequate access to oral health care for America's children has also been documented, with consequent disparities in oral health among children.[13] Children suffer disproportionately and most severely from dental diseases. Despite the barriers, the dental community has the social and moral obligation to address the problem of access to care, particularly for children. Children should receive priority preference; therefore, the most effective and economical utilization would be of dental therapists providing access to oral health care. The care provided by dental therapists has been documented to be equivalent in quality to that of dentists and is more economical.[26]

Dental therapy is not a limited solution to providing access to care to children in Florida. Training a group of dental professionals that are members of, and share the language and culture of, the community that they will serve greatly improves communication, trust, patient satisfaction, and adherence to advice and treatment.[5] A dental therapist can increase access to care for all populations, especially children who are most affected by barriers to oral health services.

Appendices

Appendix A

HRPO Approval Letter

Human Research Protections Program

February 3, 2020

Diana Aboytes
DAboytes@salud.unm.edu

Dear Diana Aboytes:

On 1/31/2020, the HRRC reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Attitudes of school-based health nurses regarding Dental Therapists providing access to oral health care to children in Florida.
Investigator:	Diana Aboytes
Study ID:	20-022
Submission ID:	20-022
IND, IDE, or HDE:	None
Submission Summary:	Initial Study
Documents Approved:	• Informed consent • Recruitment email • HRP-583 - Exempt Category 2 Protocol_revised.pdf • Survey questions
Review Category:	EXEMPTION: Categories (2)(ii) Tests, surveys, interviews, or observation (low risk)
Determinations/Waivers:	Provisions for Consent are adequate. HIPAA Authorization Addendum Not Applicable
Submission Approval Date:	1/31/2020
Approval End Date:	None
Effective Date:	1/31/2020

The HRRC approved the study from 1/31/2020 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 1/31/2020 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 by the HRRC. The approved consents are available for your retrieval in the "Documents" tab of the parent study.

Appendix B

Recruitment Letter

Hello school-based health nurses,

Graduate student, Shankisha Sizemore, RDH, along with her PI, Diana Aboytes, RDH, MS from the University of New Mexico's Department of Dental Medicine, are conducting a descriptive research study using a short (~10 min.) 12 question survey.

The purpose of the research study is to assess how school-based health nurses in Florida feel toward the integration of a dental therapist to address the access to oral health issue. Participation is voluntary and all responses will remain anonymous. In order to participate, click on attached link.

Any questions you may contact Shankisha Sizemore, RDH, MSDH Candidate at (941) 524-2700, the PI Diana Aboytes, RDH, MS, Associate Professor, Dental Hygiene 505-272-4513. DAboytes@salud.unm.edu or the HRPO office at 272-1129.

Thank you.

Appendix C

Survey Consent

The University of New Mexico Health Sciences Center
Consent and Authorization to Participate in a Research Study

Dear Prospective Participant,
Researchers at the University of New Mexico are inviting you to take part in a survey about the views of Florida school-based nurses regarding the development of the dental therapist position as a solution to the oral health access issues in Florida. School-based nurses see first-hand the needs of children within their communities. The study will ascertain the demand for the dental therapy position to alleviate the barrier to access to oral health care among children in the state of Florida.

Although you may not get personal benefit from taking part in this research study, your responses may help us understand more about the access to oral health needs for children in the state of Florida. Which will allow the dental community and legislators to make an informed decision on the development of the dental therapist position.

The survey/questionnaire will take about 10 minutes to complete.

There are no known risks to participating in this study. Although we have tried to minimize this, some questions may make you upset or feel uncomfortable and you may choose not to answer them.

Your response to the survey is anonymous which means no names will appear or be used on research documents or be used in presentations or publications. The research team will not know that any information you provided came from you, nor even whether you participated in the study. Your response to the survey will be kept confidential to the extent allowed by law. When we write about the study and its results you will not be identified.

Your information collected for this study will NOT be used or shared for future research studies, even if we remove the identifiable information like your name, clinical record number, or date of birth. All data will be kept for 3 years in a locked file in Diana Aboytes's office and then destroyed.

We hope to receive completed questionnaires from about 200 Florida School-based nurses, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

Please be aware, while we make every effort to safeguard your data once received from the online survey company, given the nature of online surveys, as with anything involving the Internet, we can never guarantee the confidentiality of the data while still on the survey company's servers, or during transmission to either them or us. It is also possible the raw data collected for research purposes will be used for marketing or reporting purposes by the survey/data gathering company after the research is concluded, depending on the company's Terms of Service and Privacy policies.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129.

Thank you in advance for your assistance with this important project. To ensure your responses/opinions will be included, please complete survey/questionnaire by February 20, 2020 clicking on the link below, you will be agreeing to participate in the above described research study.

Sincerely,

Shankisha Sizemore, RDH, MSDH Candidate
Diana Aboytes, RDH, MS Principal Investigator
Dental Medicine/Dental Hygiene, University of New Mexico Health Sciences
PHONE: 505-272-4513
E-MAIL: Sdsizemore@salud.unm.edu or DAboytes@salud.unm.edu

Appendix D

Survey

Attitudes of Florida school-based nurses regarding the development of the dental therapist position as a solution to the dental health access issues in Florida.

Survey questions

1. Does your school have a school-based oral health program? (e.g. Sealant, fluoride, dental treatment programs)
    a. Yes
    b. No
    c. Unsure

2. Percentage of children with noted oral health problems during annual health screenings?
    a. 0%-20%
    b. 21%-40%
    c. 41%-60%
    d. 61%-80%
    e. 81%-100%

3. Percentage of tooth related visits to the school clinic?
    a. 0%-20%
    b. 21%-40%
    c. 41%-60%
    d. 61%-80%
    e. 81%-100%

4. Has it been reported that students have missed school due to oral pain?
    a. Yes
    b. No

The questions regarding school-based nurses' attitudes toward the dental therapy position will provide the viewpoint of a healthcare professional that is faced with the challenges of oral health care for children in the school-based setting.

5. Are you familiar with the dental therapy position?
    a. I am familiar
    b. I have never heard of dental therapy
    c. I have heard of dental therapy but don't know much about it

6. The dental therapy position can bridge the gap in access to oral health care for children in the state of Florida?
    a. Strongly agree
    b. Agree
    c. Disagree
    d. Strongly disagree
    e. Unsure

7. The dental therapy position can provide a positive impact on the oral health of your schools' students?
    a. Strongly agree
    b. Agree
    c. Disagree
    d. Strongly disagree
    e. Unsure

8. Do you have concerns with the dental therapy position and the proposed care to children in the state of Florida?
    a. Yes
    b. No
    If yes, please identify those concerns _____

The demographic questions will provide information that will confirm how long the school-based nurse have been faced with the oral health care challenges in the school settings.

9. Is your school located in an urban or rural area?
    a. Urban
    b. Rural

10. Percentage of children on free or reduced lunch at your school?
    a. 0%-20%
    b. 21%-40%
    c. 41%-60%
    d. 61%-80%
    e. 81%-100%

11. How many years have you held a nursing license?
    a. 0-10
    b. 11-20
    c. 21-40
    d. 40 or more

12. How many years of practice have you worked in a school-based setting?
    a. 0-10
    b. 11-20
    c. 21-40
    d. 40 or more

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