FACTORS AFFECTING NORTH CAROLINA DENTAL HYGIENISTS' CONFIDENCE IN PROVIDING OBESITY EDUCATION AND COUNSELING

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A thesis submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Dental Hygiene Education in the Department of Dental Ecology, School of Dentistry

Chapel Hill
2009

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ABSTRACT

Cherri L. Kading: Factors Affecting North Carolina Dental Hygienists' Confidence in Providing Obesity Education and Counseling
(Under the direction of Ms. Rebecca S. Wilder)

The purpose of this study was to investigate whether dental hygienists in North Carolina are confident to counsel patients who are obese or at-risk for obesity. A questionnaire was used to survey 246 dental hygienists attending a continuing education course. It investigated self-reported confidence in providing obesity counseling, educational preparation, outcome expectations, and self-efficacy. The primary outcome was confidence in providing weight loss counseling. Mantel Haenszel statistics were used to compare group of interest. Of the dental hygienists surveyed, 95% felt that they have a role in helping patients improve nutrition. Over half (65%) expressed confidence in discussing obesity-related health risks. On average, the confidence in getting patients to follow weight loss advice was significantly different (p=.02) for those with a 2 year and those with a 4+ year degree. The findings indicate that many North Carolina dental hygienists are willing to discuss obesity with patients.

ACKNOWLEDGEMENTS

I would like to thank my committee members Ms. Rebecca Wilder, Dr. Alice Curran, and Dr. William Vann, Jr. for their knowledge, encouragement, and hours of undivided attention. I also wish to thank Dr. Ceib Phillips and Debbie Price for their statistical expertise. I give a heartfelt thank you to my classmates Ashley, Lattice, Robbyne, Jonathan, Katie, Aubree and Mary. Without their support, this journey would not have been near as much fun. And to my children Jennifer, Sam and Jason…thank you for listening to my woes as a non-traditional student and for telling me I can do it. Most of all, I want to give a very special thank you to my husband, Steve. His patience, love and support got me through countless ups and downs and without him none of this would matter.

Supported by the American Dental Hygienists Institute for Oral Health...ADHA RDRC #08-01

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF ABBREVIATIONS

BP	Blood Pressure
BMI	Body Mass Index
CE	Continuing Education
DH	Dental Hygienist(s)
IRB	Institutional Review Board
NC	North Carolina
UNC-CH	University of North Carolina-Chapel Hill
US	United States

INTRODUCTION

Obesity is a major public health problem in the United States (US). Between 1980 and 2004, the prevalence of obesity increased in adults from 15% to 33% and in children from more that 6% to 19%.[1] While these increases have been known for some time, obesity is proving to be a difficult problem to address. Part of the difficulty is due to the multifactorial etiology of the condition. Due to the magnitude of this public health problem and its many contributing factors, it will necessitate an interprofessional effort to obtain a solution. Primary among the issues needing to be addressed is dietary intervention.[2]

Currently, dentists and dental hygienists (DH) are educated in nutrition, dietary counseling and behavior modification. Dental offices routinely offer nutritional counseling to their patients who are at risk for dental caries. Previous studies have reported that 80% of North Carolina (NC) dentists are interested in offering nutritional counseling to help patients with weight loss;[3] however, they feel that lack of trained personnel is a barrier in offering obesity intervention to their patients.[3,4] DH may be the ideal personnel to deliver obesity education to their patients.

While DH routinely discuss the importance of a balanced diet in relation to a healthy mouth, and use basic behavior modification skills to influence good oral health practices, it is not known if they are ready, willing or able to adapt their expertise to include specific dietary and behavioral counseling for obesity. Nor do we know if DH are adequately trained in the area of obesity. One study of senior DH students reported that they received less than five hours of obesity education; [5] however, questions still remain about the potential barriers to

incorporating obesity intervention and education in dental practice. Further, the literature lacks studies investigating the confidence of DH advising overweight adults or children on weight-related issues. In order for dentistry and DH to be effective partners in obesity prevention and management, real and perceived barriers must be assessed.

The DH is the ideal oral healthcare professional to provide direct nutritional and lifestyle counseling services. Therefore, it is crucial to understand the factors that might influence their interest and involvement. The aim of this study is to determine if DH are confident in their ability to use their dietary counseling and behavior modification skills to assist in the prevention and management of patients who are at-risk for obesity. This study will contribute to the National Dental Hygiene Research Agenda by showing concern about health maintenance and prevention of disease. The study is also designed to improve the quality of health care and reduce its cost. Lastly, this study addresses the dental hygiene process of care.

LITERATURE REVIEW

Health Concerns with Obesity in the United States

Obesity has become a major health concern in the United States (US) and is increasing at an astonishing rate. It is considered the second leading cause of preventable death in adults.[6-8] Between 1980 and 2004 the prevalence of obesity increased from 15 to 33% among adults and the prevalence of overweight in children increased from more than 6 to 19%. [6,9-11] Since the 1970's, the prevalence of obesity has more than doubled for preschool children ages 2-5 years and adolescents 12-19 years, and has more than tripled for children 6-11 years.[12] Because of this increasing number of obese children and adolescents, this issue is a critical health threat.[13] In 2007, adult obesity rates rose in 31 states making these rates exceed 25% in 19 states.[14] No state experienced a decrease.[14]

Impact of Obesity in North Carolina

NC is no an exception to the problem of obesity. The rate of overweight and obesity in adults has increased from 46 % in 1990[15] to approximately 63% in 2005.[16] From the years 2000 to 2005, the obesity rates for adults, ages 55-64, increased nearly 14%.[16] By contrast, the rate of obesity among 18-34 year olds decreased about 3% during this same period.[16] However, in Wake County alone about 42% of adults are overweight, giving them the highest rate of any single county in this state.[16]

Children and adolescents of this state do not escape this serious health issue. NC has the fifth highest rate of overweight adolescents (ages 10-17) at more than 19%.[17] It has been shown that 14% of rural children in NC have three early risk factors for diabetes and heart disease, obesity being among them.[18]

Definition of Obesity in Adults and Health Related Issues

Obesity is generally defined as excess body weight and measured by body mass index (BMI). A BMI is calculated as weight in kilograms divided by height in meters squared. This is used to express weight adjusted for height.[19,20] The U.S. Dietary Guidelines defines healthy weight as a BMI of 18.5-24.9, overweight as a BMI of 25-29.9, and obesity as a BMI of 30 or greater. [21]

There are many adult health problems related to obesity. Approximately 112,000 deaths per year are attributed to overweight and obesity.[22] Studies have shown that individuals who are obese have a 10-50% increased risk of death from all causes, compared to healthy weight individuals.[23] Illnesses related to obesity include gallbladder disease, breast, endometrial and colon cancer.[24] Other comorbidities commonly associated with obesity include diabetes mellitus,[25] cerebrovascular disease,[26] heart disease,[27] hypertension,[28] depression,[29] osteoarthritis,[30] asthma,[31] and obstructive sleep apnea.[32] Obesity itself is not related to increased rates of oral cancer, but it is associated with an increased incidence of other cancers, many of which have been shown to metastasize to the jaws.[33] All of these conditions can cause significant disability[34] and shorten life expectancy.[35]

Defining Obesity in Children

With children, the BMI number is calculated the same as adults; however, it is also calculated using age and sex specific percentiles and can be referred to as BMI-for-age.[36] Most authorities consider a BMI for age and sex of the 85th-95th percentiles as at risk of overweight.[36] Overweight is defined as a BMI for age and sex equal to or greater than the 95th percentile.[12,36]

As with adults, overweight children and adolescents are at risk for obesity-associated chronic disease. It has been found that overweight children, ages 5-10, have at least one associated cardiovascular disease risk factor.[37] These risk factors include hyperlipidemia, elevated blood pressure, and hyperinsulinemia.[37] These same children have been found to

have two or more adverse cardiovascular disease risk factors.[37] Type II diabetes, once considered an adult-onset disease, has dramatically increased among youth.[38] The need to address obesity in childhood is partially defined by the fact that obese children commonly become obese adults.[39]

Economic Consequences of Obesity

Not only are the health issues related to obesity of concern, but so are the economic consequences. Recent studies have documented the impact that obesity has on annual medical expenditures among adults in the US. When comparing adults (ages 18-65) of normal weight with those that are obese, Sturm found that obese adults have a 36% higher average of annual medical expenditures.[40] Finkelstein and colleagues discovered that collective medical expenditures that are attributable to obesity account for 5.3% of adult medical expenditures in the United States and that approximately 50% of these expenditures are financed by Medicare and Medicaid.[35]

Recently, the direct and indirect medical costs of obesity in the US have been estimated at more than $122 billion.[34] Direct healthcare costs include preventive, diagnostic, and treatment services related to overweight and obesity. Indirect costs refer to lost wages due to illness as well as the value of future earnings lost by an early death.[24]

Obesity associated hospital costs for children have also increased. Over the past 20 years the costs have more than tripled, rising from $35 million between 1979-1981 to $127 million between 1997-1999.[12] Figures show that the medical costs for obesity, when calculated over a lifetime, create a “substantial drain on the already scarce health-care resources.”[41] Left unaddressed, the escalating rates of obesity in the US will place a severe burden on the nation’s health and its health care system. Because of the many health issues involved and the cost to the American public, it appears to be extremely important that all health care professionals assume a role appropriate for their training in addressing this major epidemic.

Dental Hygienists' Role in Health Promotion and Disease Prevention

DH have a history of providing care to their patients that falls outside primary dental hygiene care. While reports on obesity intervention involving DH are few, several studies report their attitudes toward offering other intervention services such as blood pressure (BP) monitoring,[42] tobacco cessation,[43,44] alcohol screening,[44] and nutritional counseling.[45] These studies help to create an understanding of the evolving role of dental hygienists and they also demonstrate how dental hygiene practice is shifting to meet the changing needs of their patients.

In December 2003, the National High Blood Pressure Education Program released the 7th Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC).[46] This report reiterated the need for all healthcare providers—including dental professionals—to identify high blood pressure and then to discuss treatment and control. Because 50% of the population visits their dentist in any given year,[47] the dental setting is an ideal place to screen, educate, and refer patients who may be at risk for hypertension. The report indicated that just fewer than 50% of the dental hygienists studied take BP readings routinely for their patients.[47]

Along with BP screenings, alcohol assessments and oral cancer screenings are crucial parts of dental hygiene care. In a study of NC DH, it was discovered that patient education and oral cancer awareness are the two most important contributions a dental hygienist can make to oral cancer control.[43] Alcohol use is a risk factor for oral/pharyngeal cancer. Thus, screening patients for this type of cancer and counseling them about alcohol use is encouraged.[48,49]

Because tobacco use is a cause of oral cancer, tobacco cessation intervention has become a critical part of dental hygiene care. More than half of all smokers visit their oral healthcare provider at least once a year, so it is extremely important for dental hygienists to provide tobacco cessation counseling to their patients.[5]

The one assessment that falls more in line with the primary care of the DH is the assessment of diet and nutrition. In 1989, The Department of Health Committee on Medical Aspects of Food Policy (COMA) produced a report called *Dietary Sugars and Human Disease.* In this report they recommended that dietary advice should be given by dental practitioners to their patients.[51] Up to this point in time, most DH performed dietary counseling specifically for reducing the risk of dental erosion and dental caries.[52] One study done with a group of Oregon DH reported that 52% of those in the study provided dietary counseling for their patients.[53]

Because oral health care is going to a multidisciplinary approach and the role of the dental hygienist is growing to fit the needs of their patients, the next step for the DH may be to incorporate dietary counseling and behavior modification with another part of health promotion, that being obesity counseling and intervention. One study including a group of 77 DH reported that 96% believed that it is important for oral health professionals to assess a patient's dietary habits. Ninety two percent of those same students reported they had received five or less hours of obesity education in their dental hygiene programs. It was also reported that nearly one third of the students admitted feeling a negative reaction toward the appearance of obese people, felt that overweight people were lazier than those who were not, and were uncomfortable in exploring the dietary habits of obese patients.[5]

With the prevalence of obesity rising so dramatically in the US, and because the causes of obesity are multifactorial, a wide range of approaches to manage obesity are needed. DH who already have training in behavior modification and dietary counseling may be willing to use their expertise in partnership with other health care providers to address this issue. The behavior modification and dietary counseling skills the DH already possess may help in establishing overweight/obesity counseling and intervention, but it is unknown if they are prepared for this challenge.

Barriers Dental Hygienists Experience when Providing Services outside Primary Dental Hygiene Care

Many perceived barriers exist for DH when providing services that fall outside primary dental hygiene care. Barriers reported to screening for high BP included too little time in the appointment, procedure not valued by patient, procedure not valued by dentist/employer, dental hygienist uncomfortable with their skills, and equipment not available.[42] Examples of barriers to providing alcohol assessments and oral cancer screenings include lack of time, a lack of training and knowledge, fear of offending and alienating patients, and lack of supporting materials.[43,54,55] Barriers also exist when providing tobacco cessation counseling. DH involved in a focus group regarding views on oral cancer control efforts expressed the following barriers: lack of patient interest, lack of patient education materials and resources, smoking parents of adolescents, personality issues, and provider-patient diversity in age, gender, ethnicity, and culture.[43] When putting tobacco cessation into practice, dentists had similar barriers including patient resistance, amount of time, lack of reimbursement, concerns about effectiveness, lack of educational materials, lack of referral services and resistance by staff.[56]

Healthcare Providers' Views towards Obesity

Other healthcare providers that deal with the challenge of obesity and have been studied regarding this issue include orthodontists, pediatricians and school nurses. A survey among orthodontists stated that about 90% of those surveyed performed nutritional counseling with children and families but the youth that were found to be overweight were infrequently referred to a dietician or pediatrician.[57]

The majority of pediatricians studied believed physicians are obligated to counsel parents of obese children regarding the health risks of obesity and that normal weight is important to the health of children. However, they believe designing programs and counseling children about weight loss is difficult, few feel competent in prescribing weight

loss programs for children, and very few feel that counseling children and parents on weight loss is professionally gratifying.[58] More training increases competence and comfort but few physicians reported receiving training. Comfort is correlated with severity of weight of the patient so mildly overweight patients are not counseled as frequently, leaving mild obesity undertreated.[59] Physicians are less likely to treat obesity unless there is an associated medical problem.[59,60]

Perceptions of school nurses regarding childhood obesity was studied by Moyers et al. [61]They found counseling for obesity is difficult, parental support is lacking, and competence in providing counseling is low. These perceptions prevent school nurses from taking a more active role in the prevention and treatment of childhood obesity. Others have found that among school nurses, less than a quarter feel competent to prescribe weight loss programs for children or find counseling about weight loss professionally gratifying.[62]

Barriers to Providing Obesity Counseling in Primary Health Care by Medical Staff

Although it is unknown what barriers exist to providing obesity counseling in dental hygiene care, studies do report what barriers exist to providing obesity counseling in primary health care. There is a need to reduce barriers and move forward in addressing overweight and obesity in a positive and proactive fashion.[63] It has been reported that the specific barriers vary across preventive interventions and there is a need for tailored practice interventions.[64] Two types of barriers are identified when incorporating an obesity intervention into practice. Among the first type are Systems Barriers that include lack of time, lack of referral resources, insufficient training, lack of reimbursement and inadequate support staff. Treatment-Related Barriers include patient self-esteem, risk of developing an eating disorder and risk of negative growth effects.[63]

When addressing obesity, a minority of pediatricians think that they are competent, and fewer feel comfortable discussing weight issues with patients. Most feel they would benefit from additional training and education regarding safe and efficacious intervention

strategies for pediatric obesity and to effectively integrate the discussion of weight issues into the primary care setting. Pediatricians spend on average 26.6 minutes per day in discussion on weight issues and about 35% have access to a dietician for referral purposes.[63]

Physicians identify lack of time and insurance reimbursement as additional barriers to treatment in the primary care setting.[65,66] Reimbursement is a major barrier that needs to be addressed because providers have no incentive to treat the overweight/obese patient.[66] A hospital-based pediatric weight management program reported a median reimbursement rate of 11% for obesity treatment.[39] The majority of physicians would spend more time on obesity intervention if they were reimbursed appropriately.[67]

The most frequent barriers reported by physicians were lack of parent involvement, lack of patient motivation, and lack of support services, clinician time, reimbursement, clinician knowledge, treatment skills, support services, treatment futility, and eating disorders.[67] Lack of time and lack of patient interest were generally considered to be important barriers by 41% and 44% of physicians, respectively, but the importance of these two barriers tended to be specifically higher for counseling-based interventions. Lack of training was most notably a barrier to counseling about alcohol and nutrition. The relative importance of specific barriers varies across preventive interventions.

Measuring Self-Confidence in Medical/Dental Providers

According to the report, *The Surgeon General's Call To Action To Prevent and Decrease Overweight and Obesity* regarding nutritional and dietary counseling and behavior modification, DH are already trained in this area but it is unknown if they have the confidence to use this training when dealing with obesity with their patients.[63] No studies could be found that specifically address DH confidence in providing obesity counseling and education. Similar research was found, however, concerning confidence in other areas of health promotion and disease prevention involving DH such as dietary counseling,[53] oral

cancer screenings,[43] tobacco cessation[68-70]and health promotion in general.[71] In these studies it was found that self-confidence was related to the amount of knowledge and skills[53,68,70]the DH felt they had. In regard to tobacco cessation counseling, one study showed DH were least confident in engaging staff members in developing smoking cessation plans, and assessing nicotine dependence and making the appropriate referral; but, were confident in counseling a patient when it pertained to the reason for the patient's visit.[68] Mullen, et al.[71] discovered that DH had the highest self-efficacy in regard to counseling patients about blood pressure and smoking.

Research has been found on confidence in obesity education and counseling in other healthcare professions. One study involving practice nurses showed they have limited confidence in their training and ability to stimulate changes in diet and physical activity. Almost half of the nurses felt they were properly trained to give lifestyle counseling advice. Over 25% felt it was difficult to counsel patients about an alternative lifestyle. Half of the practice nurses felt they could offer their patients a great deal in the way of lifestyle counseling. Almost 75% said that the identification of obesity is a very important part of their day-to-day work.[72]

Defining the Likert Scale

In many studies, the terms self-confidence and self-efficacy are used interchangeably. Bandura defines self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives."[73] His theory regarding self-efficacy is the basis for this study and for many others.

One way to measure self-confidence is by using a Likert Scale. This scale, developed by Rensis Likert, is a direct measure of psychological attitudes.[74] It adds up responses to statements representative of a particular attitude. This multi-item scale can be used in questionnaires where respondents can choose their level of agreement or

disagreement to a specific statement. A typical format of a five-level Likert item is: 1) Strongly disagree, 2) Disagree, 3) Neither agree nor disagree, 4) Agree, 5) Strongly Agree. This scale is used a lot in survey research and proves to have both advantages and disadvantages.[75]

A disadvantage of using the Likert Scale is bias.[75] Respondents may avoid the extreme categories such as “strongly agree” or “strongly disagree” which would demonstrate central tendency bias. Or, the respondents may attempt to show themselves in a more positive light, demonstrating social desirability bias. The scale could also show acquiescence bias by the respondents agreeing with statements as presented. Acquiescence bias can be solved by having an equal number of positive and negative statements, but central tendency bias and social desirability bias can be harder to avoid. Advantages of this scale of measurement may include ease of construction, administration and scoring.[75]

INTRODUCTION AND LITERATURE REVIEW

Obesity is a major public health problem in the United States (US) and is considered to be the second leading cause of preventable death in adults.[6-8] Approximately 112,000 deaths per year are attributed to overweight and obesity.[22] Between 1980 and 2004, the prevalence of obesity increased in adults from 15% to 33% and in children from more that 6% to 19%.[1] According to the CDC, in 2007 North Carolina (NC) ranked 11th in obesity among adults with 28.0% of the adult population considered obese (BMI.$\geq$ 30).[76]

Obesity is a well-established risk factor for diabetes mellitus.[25] Diabetes is a well-known risk factor for periodontal disease; accordingly, this is an indirect but plausible link between obesity and oral health. In line with current dental health care trends that seek to include screening for systemic conditions that may impact oral health, there recently has been interest in including an assessment for obesity risk factors at the dental appointment. Dental practice-based prevention and intervention strategies have been studied by Tavares and colleagues[77] who reported that employing dental hygienists in a community-based public health clinic to provide obesity screening to children is effective and well-accepted.

Often the dental hygienist is the oral healthcare professional who provides prevention and intervention services. This ever-evolving role of the dental hygienist may someday include addressing obesity to improve general health as well as oral health. With the growing prevalence of obesity in the US, dental hygienists are ideally suited to provide Obesity counseling services to their patients. Before this can happen, we must first assess practicing dental hygienists' general preparedness, attitudes, and confidence. Currently, it is unknown whether dental hygienists in private practice have an interest in providing additional education for obesity or in offering interventions for this serious health problem

Because obesity is not generally known to have a direct effect on oral health, many dental hygienists may not even be aware of their potential role. Neither their confidence nor their skills to apply current knowledge have been explored. Additionally, it is not known whether dental hygiene education is preparing dental hygienists of the future for this task.

The purpose of this cross-section survey was to determine factors that affect dental hygienists' confidence in their ability to modify their current dietary counseling and behavior modification skills to assist their patients in the prevention and management of obesity. Methods to prepare dental hygienists for this role also were explored.

Oral and Systemic Health Issues Related to Obesity

Overweight and obesity are generally defined as excess body weight and measured by body mass index (BMI). A BMI for adults is calculated as weight in kilograms divided by height in meters squared. This is used to express weight adjusted for height.[19,20] The U.S. Dietary Guidelines defines healthy weight as a BMI of 18.5-24.9, overweight as a BMI of 25-29.9, and obesity as a BMI of 30 or greater.[21] With children, the BMI number is calculated the same as adults; however, it is also calculated using age and sex specific percentiles and can be referred to as BMI-for-age.[36]

Many health problems are related to overweight and obesity.[24-32,78] Obesity can cause significant disability[79] and shorten life expectancy.[35,78] Studies have shown that obese individuals have a 10-50% increased risk of death from all causes, compared to healthy weight individuals.[23]

Because obesity is a well-establish risk factor for diabetes, it is no surprise that the incidence of diabetes has increased with the rise in obesity.[25] There is a well-established relationship between diabetes and periodontal disease.[80,81] Therefore, this indirect relationship between obesity and periodontal disease is of great importance to the dental team and may provide a link between obesity and oral health that will serve as the foundation for the role of the oral health team in addressing obesity.

The question regarding a link between childhood obesity and an increase in dental caries has also been examined. Macek and colleagues[82] reported that there is no significant association between BMI for age and the prevalence of dental caries. However, another study gives evidence that there may be an association. Hilgers and colleagues[83] reported that the mean number of smooth surface lesions on permanent molars significantly increased with a higher BMI. In short, the relationship between childhood obesity and dental caries is proving to be complex and are equivocal.

The Role of the Dental Hygienist in Obesity Counseling

One of the responsibilities of the dental hygienist is to routinely offer nutritional counseling to their patients who are at risk for dental caries.[84] It is not known to what degree this service can be modified to address obesity and obesity risk factors. Previous studies have reported that 80% of NC dentists are interested in offering nutritional counseling to help patients with weight loss; however, they feel that lack of trained personnel is a barrier in offering obesity intervention to their patients.[3,4] This lack of training may be a negative influence on dental hygienists' confidence despite the fact that dental hygienists may be the ideal personnel to deliver obesity education to their patients. They have a history of providing care to their patients that falls outside primary dental hygiene care. However, there is a paucity of reported evidence on the confidence of dental hygienists to advise overweight/obese adults or children on weight-related issues. For dentists and dental hygienists to be effective partners in obesity prevention and management, factors affecting dental hygienists' confidence as well as level of training must be assessed.

Measuring Self-Confidence in Dental / Medical Providers

In attempting to assess confidence of health care providers in general, there is a dearth of published data regarding confidence levels in obesity education and counseling. Steptoe et al. reported on student nurses' limited confidence in their training and ability to motivate changes in diet and physical activity. Less than half of the student nurses felt they

were properly trained to give lifestyle counseling advice. While 25% felt it was difficult to counsel patients about an alternative lifestyle, half of the student nurses felt they could offer their patients lifestyle counseling. Almost 75% said that the identification of obesity is a very important part of their day-to-day work.[72]

It is unknown whether dental hygienists have the ***confidence*** to adapt their dietary counseling and behavior modification skills to address healthy weight issues; moreover, no studies could be found that specifically address dental hygienists' confidence in providing obesity counseling and education. However, previous studies of confidence among dental hygienists have been investigated in other areas of health promotion and disease prevention including dietary counseling,[53] oral cancer screenings,[43] tobacco cessation,[68-70] and health promotion in general.[71] In these studies, self-confidence was related to self-perceived knowledge and skill level of[53,68,70]the dental hygienist. Edwards et al.[68] reported that dental hygienists were least confident in engaging staff members in developing smoking cessation plans assessing nicotine dependence, and making the appropriate referral, but were confident in counseling a patient when it pertained to the reason for the patient's visit. Mullen, et al.[71] reported that dental hygienists had the highest self-efficacy in counseling patients about blood pressure and smoking.

The purpose of this study is to determine if dental hygienists are confident in their ability to use their dietary counseling and behavior modification skills to assist in the prevention and management of obesity.

MATERIALS AND METHODS

This study relied upon a cross-sectional survey design to assess the confidence of NC dental hygienists in the prevention and management of obesity. In addition, it assessed their attitudes and opinions and their educational preparedness to counsel patients who are obese and those who are at-risk for obesity about health concerns associated with this serious issue. The survey was approved by the University of North Carolina Biomedical Institutional Review Board (IRB). The “Dental Hygienists’ Role in Addressing Obesity“ survey research instrument was developed specifically for this study. Content validity was assessed by a panel of four UNC School of Dentistry dental educators who have experience in survey methodology and obesity. No other measures of the instrument’s validity or reliability were conducted.

The participants for the survey were recruited from participants (n=345) attending a continuing education course for dental hygienists on prevention-related issues that was sponsored by the UNC-Chapel Hill School of Dentistry. Dental hygiene students, dentists, dental assistants and members of the general public who attended the course were excluded. The non-coded, anonymous, questionnaire, along with a cover letter describing the study and the Confidentiality Statement, was included in the registrants’ packets. As an incentive to participate, respondents who deposited their name and phone number in a separate bin were eligible for a cash drawing.

Questionnaires were produced using Teleform, an optically scannable format that simplifies data entry. The main outcome variable was the level of confidence that dental hygienists felt while advising obese patients on achieving their weight goals. To determine

the level of confidence, domains were constructed based on the face content of the questions. Following is a listing of the domains along with the items from the questionnaire that made up each domain:

Domains
A. Planning -Help develop an office-wide plan to address obesity for patients -Help an individual patient develop a weight loss plan
B. Inquiry -Respond with accurate information to a patient's inquiry about weight loss
C. Initiation -Initiate a conversation with a patient about weight-related health issues -Discuss with a patient the specific health risks associated with obesity and the importance of weight loss
D. Direction -Be successful in getting patients/parents to follow your weight loss advice -Refer patients/parents to a specialist who will help with weight loss

Descriptive Statistics were generated for all study variables and domains. The Mantel-Haenszel row mean score statistic was used to compare the domain scores between dental hygienists in general versus specialty practice; between those with a 2-year versus 4-year degree; between dental hygienists who self-reported as under/normal weight versus overweight/obese; and among cohorts based on year of graduation. Associations between the domain scores of confidence, and education and training were assessed using the Spearman correlation. General linear models were used to quantify the association between the outcome and the independent variables. The alpha level was set at .05 for all analyses

RESULTS

Personal and Practice Demographics

Of the 345 dental hygienists that attended the CE course, 246 responded to the questionnaire, a response rate of 71.3%. The demographic characteristics of the study sample are illustrated in Table 1 and the practice characteristics of the study sample are illustrated in Table 2. The majority of participants were Caucasian non-Hispanic females with a 2-year degree who worked in suburban general practices that do not accept Medicaid. Ages and years in practice were equally distributed.

Attitudes and Opinions

Attitudes and opinions of 240 participants (97.5%) are found in Table 3. Eighty two percent of the respondents agreed they would be more likely to offer advice on weight loss if specific oral health problems are found to be associated with obesity. The majority of respondents (95%) agreed that dental hygienists have a role in helping patients improve nutrition but only 36% felt that dental hygienists have a role in helping patients achieve weight loss goals. Ninety four percent expressed a desire to have a greater influence on their patients' overall health; however, only 12% expressed a willingness to discuss weight issues without the patient initiating the conversation.

The attitudes and opinions on perceived roles were statistically different when comparing the year of graduation. Those who earned their degree between the years of 1958 and 1984 disagreed most often with the statement that dental hygienists have a role in discussing weight loss issues with their patients ($p=.02$).

Confidence

Table 4 illustrates confidence in the ability to provide counseling for overweight and obese patients in a variety of areas. The respondents were most confident in discussing with their patients specific health risks associated with obesity and the importance of weight loss. They appeared to be least confident in getting their patients to follow their weight loss advice.

The average score for confidence in planning an obesity intervention was statistically different between those respondents in general practices versus specialty practices, with those in specialty practices reporting more confidence ($p=.04$). On average, those in specialty practices were more confident in initiating conversations about obesity. ($p=.002$). Confidence in directing patients to a weight loss specialist and influencing patients to follow their weight loss advice among dental hygienists with a 4-year degree was statistically different than respondents with a 2-year degree ($p=.02$).

Education and Training

Table 5 shows a range in previous training of skills that are needed in obesity counseling. Most (90%) reported they were taught nutritional counseling but far fewer were trained to obtain height and weight measurements (13-14%) or to interpret a BMI score (25%). Over one-third knew how to apply their behavior modifications skills learned in school to weight loss issues (37%) and some (29%) knew how to identify risk factors for obesity, but fewer (18%) knew how to refer a patient to a specialist.

Dental hygienists with a 4-year degree reported receiving more education and training about obesity than those with a 2-year degree ($p=0.03$). Those who earned their degree between the years of 2001-2008 received more training in nutritional counseling, more on topics of obesity as a health issue, and more behavior modification skills that could be applied to weight loss issues when compared to the graduates of earlier years ($p\leq0.001$).

A multivariate analysis was undertaken between the domains of confidence, and education and training (Table 6). The Spearman correlation was used to examine the strength of this relationship. There was a statistical significant correlation between most of the domains in confidence and the perception of education and training received but the associations were weak. Education and training explains only between 5 and 10% of the variability in the confidence domains. These data reveal that the more education and training dental hygienists perceived they had, the more confident they appeared to be.

DISCUSSION

In 2007, adult obesity rates rose in 31 states. In 19 states, 25% of the adult population is obese.[14] North Carolina (NC) is no exception. The rate of overweight and obesity in adults in NC has increased from 46% in 1990[15] to approximately 63% in 2005, giving the state the 17th highest prevalence rate of adult overweight and obesity in the US.[16] In 2007, NC ranked 11th in obesity, with 28% of the adult population considered as obese.[76]

The purpose of this study is to determine if dental hygienists are confident in their ability to use their dietary counseling and behavior modification skills to assist in the prevention and management of obesity. It was hypothesized that dental hygienists would have a positive attitude toward promoting the health of these patients but they would lack the confidence to carry out obesity counseling. Results showed that most dental hygienists would like to have a greater impact on their patient's overall health but they felt they lack the requisite training to address obesity-specific topics with their patients. This lack of training may be contributing to lack of confidence in specific tasks.

Many respondents reported that they would not consider providing obesity- related counseling unless a link between obesity and oral health were to be established. Research on a direct relationship between obesity and oral health is lacking. However, there is an association between obesity and diabetes and with diabetes and inflammation.[85,86] This occurs when the fat cells, adipocytes, secrete proinflammatory cytokines into the plasma. These cytokines can lead to insulin resistance and then on to diabetes mellitus.[85]

Some researchers have associated this hyperinflammatory state with exacerbation of periodontal infections because of the exaggerated response caused by the infecting organisms.[85] This evidence-based information may help provide a point of discussion for

dental hygienists when they are counseling patients with diabetes. By becoming more knowledgeable about such associations, the dental hygienists may learn of more direct associations between obesity and periodontal health as they are discovered.

In the US, obesity carries some degree of social stigma. For dental hygienists to overcome the effects of this stigma, a non-judgmental attitude is needed. Our study showed that 17% of dental hygienists thought that overweight people lack will power compared to normal weight people and 17% thought that most overweight problems are inherited. Comparisons of attitudes and opinions were made between dental hygienists and the year of graduation from dental hygiene school. It was shown that many who graduated prior to 1984 believed that dental hygienists have a role in obesity education and counseling. This same group perceived an increase in the number of overweight patients and felt that overweight people lack will power when compared to normal weight people. Negative attitudes such as this are not uncommon and have been documented to exist with other health professionals.[87,88] Because of the attitudes expressed in this study, the investigators recommend increased education to inform dental hygienists about the issue of obesity and how to better manage patients suffering with this serious health problem.

Changes in dental hygiene education programs will be needed to include an evaluation of the extent to which current dental hygiene curricula prepare dental hygienists to meet the needs of patients affected by obesity. Because obesity is a multifactorial health problem, a variety of skills will be needed to work with individuals who are obese. This study sought to determine whether dental hygienists' education and training in nutrition, dietary counseling, and behavior modification has created a confidence level that is adequate for addressing obesity in adults. This study made an assumption that dental hygienists already possess the training and expertise to expand into the area of obesity education for their patients but we found that a large percentage of NC dental hygienists had not received education or did not recall having received training on the how-to's in managing obesity.

High quality CE courses taught by experts in the field could focus on obesity as a health issue. These courses should include topics such as: obtaining weight; obtaining height measurements; interpreting a BMI scores; and identifying a person at-risk for obesity; all of which could add to increasing confidence levels of dental hygienists.

There was a statistical significant correlation between many of the domains in confidence and the perception of education and training received (Table 6) but, the associations were weak. Education and training explained 5-10% of the variability in the confidence domains. It should be noted, however, that the figures underscore that the more education and training dental hygienists have, the more confident they become.

This study aimed to determine how attitudes and opinions, as well as education and training, affect NC dental hygienists' confidence in providing obesity education and counseling. It was hypothesized that dental hygienists would feel confident in providing this service to their patients. This study revealed that many NC dental hygienists do feel confident in many aspects of obesity counseling. Forty three percent responded that they were confident in planning obesity programs, 70% were confident in answering patient inquiries regarding obesity, 60% were confident in initiating conversations about health risks associated with obesity, and 73% were confident in directing patients to a weight loss specialist.

When comparing dental hygienists who worked in general practices with those who worked in specialty practices, results showed that dental hygienists in specialty practices felt more confident in planning and initiating than those in general practices. This mirrors a study of US female physicians by Frank et al.[89] who found that specialty physicians such as obstetricians, gynecologists, and pediatricians were more likely to provide nutrition and weight counseling to their patients. The current study also found that dental hygienists in specialty practices were more confident in the area of obesity education and counseling. Perhaps this is due to the nature of care in many specialty practices since they tend to have

patients with more advanced needs for oral healthcare. Additional research on barriers to providing obesity counseling may shed some light on the difference between general and specialty practice.

Additional research in the area of obesity education and counseling should focus on the current dental hygiene curriculum content that teaches skills applicable to identifying patients who are at-risk for obesity, as well as, counseling patients on weight loss or maintenance. Research is needed on educational needs of dental hygienists who choose to be part of an obesity prevention team.

A national survey of dental hygienists is needed to investigate factors that affect their confidence in providing obesity education and counseling to their patients and how those concerns compare to the present study. For example, do dental hygienists in California or Colorado feel more confident about obesity counseling than dental hygienists in NC? Generally speaking, do dental hygienists who graduated from four year institutions feel more confident about obesity counseling than graduates from community colleges? This study found that dental hygienists in specialty practices are more confident than those who work in general practices. Further research of dental hygienists working in specialty practices may reveal why this group perceived themselves as more confident. A rationale could be determined about the specific factors that made them more confident and if those factors are transmissible to dental hygienists working in general practices. Also, these results only apply to obesity among adults. Future studies are needed to determine the attitudes and opinions of dental hygienists about addressing obesity among their pediatric patients.

There are several limitations to this study. Any one of the above factors may have posed threats to the internal and external validity of the study. This was a non-random, convenience sample limited to NC dental hygienists. This sample limits the ability to generalize the findings and conclusions to the general population of registered dental hygienists. However, because NC has the 11th highest rate for adult obesity[76] and the 5th

highest rate of overweight youths[17] the opinions of our respondents are relevant. It is assumed that these dental hygienists encounter a greater number of obese patients as well as patients who are at-risk for obesity and that they are generally more aware of obesity-related concerns than dental hygienists in states with lower rates of adult obesity.

The presence of non-responder bias had the ability to affect the results by skewing the data due to the missing data on many of the questions. However, the missing data was adjusted for by using the Mantel Haenszel Row Mean Score. Conversely, intentional deception on the part of the respondents, poor memory, and misunderstanding of the questions are other limitations that may have affected survey results but could not be adjusted for. While this survey had a relative high response rate (71%), factors such as inadequate explanation of the questionnaire or lack of interest in the subject may have contributed to the decision of 29% to not respond.

There is much work to be done before the incorporation of obesity education and counseling into the dental office becomes routine. Recent graduates and those with a baccalaureate degree have had more obesity education and more education on nutritional and obesity counseling than graduates before 2001. More continuing education may be needed to explain the important connections between obesity and oral health, as well as additional research into the nature of these links. Additional CE courses could also increase dental hygienists' confidence in developing weight loss plans for their patients by teaching them the how-to's for the development of these plans. Additional education will have a positive impact on their confidence in initiating conversations about weight-related health issues, developing office-wide plans to address obesity, and getting patients to follow their weight loss advice.

CONCLUSIONS

NC dental hygienists agreed about their role in patients' overall health and indicated that they may be willing to incorporate obesity counseling into their daily practice; however, 40% of the respondents expressed not advising patients on obesity until an oral-systemic link is found. This lack of a link may be undermining their confidence. Dental hygienists should continue to conduct and monitor research on possible links between obesity and oral health. As dental hygienists increase their knowledge about obesity, confidence may well increase. As confidence grows, obesity education and counseling may become a common dimension of the dental hygiene treatment plan.

Table 1. Demographics of study population (N=246)

Characteristic	N	Percent Distribution
Gender		
Female	236	97.9
Male	5	2.0
Age		
< / = 34	74	31
35-47	86	36
>47	79	33
Race		
Caucasian	222	92.9
Other	17	7.1
Ethnicity		
Hispanic	3	1.4
Non-Hispanic	209	96.6
Highest dental hygiene degree		
2 year degree	156	65
4+ year degree	84	35
Year Degree Earned		
1958-1984	69	29
1985-2000	85	36
2001-2008	85	36
Number of Years Employed		
< or = 7 years	85	35.6
8-21 years	79	33
>21 years	75	31
Self-Reported Weight		
Underweight/Normal	149	62
Overweight/Obese	92	38

Percentages may not add to 100 due to rounding

Table 2. Frequency of practice characteristics for study population (N=246)

Characteristic	N	Percent Distribution
Emphasis of Practice		
General / family dentistry	193	81
Pediatrics	7	3
Periodontics	18	7.6
Other	20	8.4
Practice Setting		
Urban	87	36.7
Suburban	109	45.9
Rural	41	17.3
Acceptance of Medicaid or Other Assistance		
Yes		
No	81	34.5
	154	65.5

Percentages may not add to 100 due to rounding

TABLE 3. Dental Hygienists' Attitudes and Opinions (N=240)	
INDICATE YOUR LEVEL OF AGREEMENT WITH EACH OF THE FOLLOWING STATEMENTS:	**RESPONDENTS REPORTING "STRONGLY AGREE OR AGREE" (PERCENTAGE)**
Dental hygienists have a role in helping patients improve their overall nutrition	95
I would like to do more to impact my patient's overall health	93
If specific oral health problems are found to be associated with obesity, dental hygienists will be more likely to give their patients advice on weight loss	82
I would not discuss weight issues with my patient unless the patient brings it up first	71
Most overweight problems are inherited	54
I am interested in helping to establish a plan to advise my obese patients on achieving their weight goals	46
I have noticed an increase in the number of overweight and obese patients in the offices in which I have been employed since I first started practicing	43
I will not be interested in advising my patients on obesity until a link between obesity and dental disease is found	40
Dental hygienists have a role in helping patients achieve their weight loss goals	36
I have noticed an increase in the number of overweight and obese patients in the office where I am currently employed	34
I observe more gingivitis and periodontal problems in overweight patients than in normal weight patients	24
Overweight people lack will power compared to normal weight people	17
I observe more caries in overweight patients than in normal weight patients	12

TABLE 4. Dental Hygienists' Perceived Confidence (N=244)	
HOW CONFIDENT ARE YOU IN YOUR ABILITY TO PERFORM THE FOLLOWING?	**RESPONDENTS REPORTING "HIGHLY CONFIDENT OR CONFIDENT" (PERCENTAGE)**
Discuss with a patient the specific health risks associated with obesity and the importance of weight loss	65
Direct patients to a specialist who will help with weight loss	60
Respond with accurate information to a patient's inquiry about weight loss	58
Initiate a conversation with a patient about weight-related health issues	37
Help an individual patient develop a weight loss plan	29
Help develop an office-wide plan to address obesity	28
Get patients/parents to follow your weight loss advice	18

TABLE 5. Dental Hygienists' Perceived Education and Training (N=244)	
IN MY DENTAL HYGIENE EDUCATION PROGRAM, I WAS TAUGHT:	**Yes (%)**
Nutritional counseling skills	90
Topics on obesity as a health issue	42
Behavior modification skills that can be applied to weight loss issues	37
How to identify a person at-risk for obesity	29
How to interpret a BMI score	25
How to direct a patient to a specialist to help with weight issues	18
How to obtain height measurement	14
How to weight patients	13

Table 6. Correlation between confidence domains and perception of education and training received (n=244)

EDUCATION		
CONFIDENCE	**SPEARMAN CORRELATION**	**P VALUE**
Planning	.15	.02*
Inquiry	.22	<.001*
Initiation	.10	.12
Direction	.17	.01*
TRAINING		
Planning	.22	<.0001*
Inquiry	.25	<.001*
Initiation	.14	.04*
Direction	.27	<.001*

*Statistically significant (p = <.05)

APPENDIX

Is there anything dental hygienists can do to help their patients who are overweight?

Obesity is becoming a major health concern in the United States.
North Carolina's obesity rate is among the top 15 in the country.
Researchers at UNC School of Dentistry are conducting a survey to determine if dental hygienists can assist in addressing the obesity epidemic by helping their overweight and obese patients achieve their normal weight goals.

We are interested in your expert opinion!

This survey takes about 15 minutes to complete.
There are no right or wrong responses.

Answering the questionnaire is completely voluntary. You may choose not to answer any question for any reason.

If you do not wish to participate, please place the unanswered questionnaire in the designated receptacle.

Thank You!

CONFIDENTIALITY NOTICE

The information you provide to us is confidential. Any information that permits identification of an individual will be held in strict confidence and will only be used for the purposes of this study. Your answers will be combined with those of other respondents and will be reported in group format only. All information will be protected from disclosure or use by any other persons or for any other purpose.

If you have any concerns about your rights as a subject in this survey, you may contact the UNC Institutional Review Board at Medical School Building 52, University of North Carolina-Chapel Hill, CB #7097, Chapel Hill, NC 27599, (919) 966-1344 with any questions about your consent to participate.
Study Number: 08-0325

Your return of the survey confirms your consent to participate.

Dental Hygienists' Role in Addressing Obesity ID: ☐☐☐

1. ATTITUDES AND OPINIONS

Please fill in the appropriate bubble to indicate your level of agreement with each of the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a. Dental hygienists have a role in helping patients improve their overall nutrition.	○	○	○	○	○
b. Dental hygienists have a role in helping patients achieve their weight loss goals.	○	○	○	○	○
c. Overweight people lack will power compared to normal weight people.	○	○	○	○	○
d. Most overweight problems are inherited.	○	○	○	○	○
e. If specific oral health problems are found to be associated with obesity, dental hygienists will be more likely to give their patients advice on weight loss.	○	○	○	○	○
f. I have noticed an increase in the number of overweight and obese patients in the offices in which I have been employed since I first started practicing.	○	○	○	○	○
g. I observe more caries in overweight patients than in normal weight patients.	○	○	○	○	○
h. I am interested in helping to establish a plan to advise my obese patients on achieving their weight goals.	○	○	○	○	○
i. I observe more gingivitis and periodontal problems in overweight patients than in normal weight patients.	○	○	○	○	○
j. I would like to do more to impact my patient's overall health.	○	○	○	○	○
k. I have noticed an increase in the number of overweight and obese patients in the office where I am currently employed.	○	○	○	○	○
l. I would not discuss weight issues with my patient unless the patient brings it up first.	○	○	○	○	○
m. I will not be interested in advising my patients on obesity until a link between obesity and dental disease is found.	○	○	○	○	○

Survey - Page 2 ID:

2. HOW CONFIDENT ARE YOU IN YOUR ABILITY TO PERFORM THE FOLLOWING?

	Highly Confident	Confident	Not sure	Slightly Confident	Not Confident
a. Help develop an office-wide plan to address obesity for our patients	○	○	○	○	○
b. Initiate a conversation with a patient about weight-related health issues	○	○	○	○	○
c. Respond with accurate information to a patient's inquiry about weight loss	○	○	○	○	○
d. Discuss with a patient the specific health risks associated with obesity and the importance of weight loss	○	○	○	○	○
e. Help an individual patient develop a weight loss plan.	○	○	○	○	○
f. Get patients/parents to follow your weight loss advice	○	○	○	○	○
g. Direct patients to a specialist who will help with weight loss	○	○	○	○	○

3. EDUCATION AND TRAINING IN MY DENTAL HYGIENE EDUCATION PROGRAM, I WAS TAUGHT:

	Yes	No	Do Not Recall
a. Nutritional counseling skills	○	○	○
b. Topics on obesity as a health issue	○	○	○
c. How to weigh patients	○	○	○
d. How to obtain height measurement	○	○	○
e. How to interpret a BMI score	○	○	○
f. How to identify a person at-risk for obesity	○	○	○
g. How to direct a patient to a specialist to help with weight issues	○	○	○
h. Behavior modification skills that can be applied to weight loss issues	○	○	○

Survey - Page 3 ID:

4. BELOW ARE POTENTIAL BARRIERS TO OFFERING OBESITY INTERVENTION TO YOUR PATIENTS. A *MAJOR BARRIER* COMPLETELY PREVENTS YOU FROM OFFERING THIS SERVICE AND IN YOUR OPINION IS NOT READILY OVERCOME. A *MINOR BARRIER* MAY PREVENT YOU FROM OFFERING THIS SERVICE BUT IN YOUR OPINION CAN BE READILY OVERCOME. PLEASE INDICATE THE DEGREE TO WHICH YOU PERCEIVE EACH AS A BARRIER TO OFFERING OBESITY COUNSELING IN YOUR OFFICE.

	Major Barrier	Minor Barrier	Not a Barrier
a. Lack of support from the dentist I work for	○	○	○
b. Not enough time in daily schedule	○	○	○
c. Fear of offending parent / patient	○	○	○
d. Fear of appearing judgmental	○	○	○
e. Lack of training about obesity	○	○	○
f. Lack of training in counseling skills for obesity	○	○	○
g. Lack of available patient education materials on obesity	○	○	○
h. Language barrier between patient and hygienist	○	○	○
i. My lack of interest in the subject	○	○	○
j. Lack of patient acceptance of this help from a dental hygienist	○	○	○
k. Lack of appropriate referral options in my community	○	○	○

l. Other barriers (list): _____

_____

Survey - Page 4 ID:

5. DO YOU TREAT CHILDREN ROUTINELY IN THE PRIMARY PRACTICE WHERE YOU ARE CURRENTLY EMPLOYED?

○ Yes ***If YES, continue with item a.*** ○ No ***If NO, skip to Question 6***

a. On average, approximately how many children do you personally treat per week? (Write number in box) ☐☐

Please indicate how often the following are performed by anyone in your office:

	Always	Sometimes	Never
b. New pediatric patients are weighed.	○	○	○
c. Pediatric patients are weighed at each recall visit.	○	○	○
d. Pediatric patients identified as overweight or obese are offered dietary counseling.	○	○	○

When an overweight or obese child presents for an *initial appointment*:

e. I bring it to the attention of the dentist.	○	○	○
f. I note this in the chart.	○	○	○
g. I talk to the child about diet and snack habits.	○	○	○
h. I talk to the parent about their child's eating habits.	○	○	○

If an *established* pediatric patient starts to show signs of overweight or obesity:

i. I bring it to the attention of the dentist.	○	○	○
j. I note this in the chart.	○	○	○
k. I talk to the child about diet and snack habits.	○	○	○
l. I talk to the parent about my observations.	○	○	○

6. WHICH OF THE FOLLOWING SERVICES ARE OFFERED TO PATIENTS IN THE OFFICE WHERE YOU PRACTICE THE MOST? (Mark all that apply)

○ Oral cancer screening
○ Tobacco cessation
○ Blood pressure monitoring
○ Caries-related dietary counseling
○ Weight-related dietary counseling
○ Advice on alcohol consumption
○ Referral for domestic violence counseling
○ Other _____

Survey - Page 5 ID:

7. PRACTICE INFORMATION: IF YOU WORK IN MORE THAN ONE OFFICE, PLEASE ANSWER THE FOLLOWING BASED ON YOUR *PRIMARY PRACTICE LOCATION*.

a. Which of the following describes the practice in which you are employed? (Mark only **ONE** choice.)

- ○ General private practice
- ○ Public health clinic (national, state, or local)
- ○ Department of Corrections
- ○ Dental school faculty practice
- ○ Dental hygiene school clinic faculty
- ○ Retired / no longer in practice
- ○ Other _____

b. Which of the following best describes the primary emphasis of your practice? (Mark only **ONE** choice.)

- ○ General / family dentistry
- ○ Cosmetics
- ○ Pediatrics
- ○ Periodontics
- ○ Orthodontics
- ○ Other _____

c. The state in which this practice is located: (Write 2-letter state abbreviation in box) ☐☐

d. In your opinion, which setting do you consider the location of this practice?

○ Urban ○ Suburban ○ Rural

e. Does this practice accept patients covered by Medicaid or other forms of medical assistance?

○ Yes ○ No

Survey - Page 6 ID:

8. PLEASE DESCRIBE YOURSELF:

a. What is your age? (Write in box) ☐☐ years

b. What is your gender? ○ Female ○ Male

c. What is your race? ○ African American ○ Asian ○ American Indian ○ Pacific Islander ○ White ○ Multi-Racial

d. What is your ethnicity? ○ Hispanic ○ Non-Hispanic

e. What is the highest ***dental hygiene*** degree you have earned? (Mark only **ONE** choice.)

- ○ Certificate
- ○ Associate
- ○ Bachelor's
- ○ Master's
- ○ No degree in dental hygiene, I am not a dental hygienist
- ○ No degree in dental hygiene yet, I am still a student

f. In what year did you earn this degree? (Write in box) ☐☐☐☐

g. What is the total number of years you have been actively employed as a dental hygienist? (Write in box) ☐☐ years

e. How would you classify your own weight?

○ Underweight ○ Normal ○ Overweight ○ Obese

Thank you for completing this questionnaire!

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