

Factors Affecting North Carolina Dental Hygienists' Confidence in Providing Obesity Education and Counseling

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Introduction

Obesity is a major public health problem in the United States, and is considered to be the second leading cause of preventable death in adults.¹⁻³ Approximately 112,000 deaths per year are attributed to obesity.⁴ Between 1980 and 2004, the prevalence of obesity increased in adults from 15 to 33%, and 6 to 19% in children.⁵ According to the CDC, in 2007 North Carolina ranked eleventh in obesity among adults, with 28% of the adult population considered obese (body mass index >30).⁶

Obesity is a well-established risk factor for diabetes mellitus.⁷ Diabetes is a well-known risk factor for periodontal disease – accordingly, there 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 has been a recent 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 colleagues⁸ who reported that employing dental hygienists in a community-based public health clinic to provide obesity screening to children is effective and well-accepted.

Abstract

Purpose: Obesity is a major public health issue in the United States. Dental hygienists influence their patients' oral health by providing dietary and behavioral recommendations that encourage good oral health practices. However, it is not known if they are ready to provide behavioral counseling strategies for weight loss. This study investigates whether dental hygienists in North Carolina are confident to counsel patients who are at-risk for obesity.

Methods: A questionnaire was used to survey 246 dental hygienists attending a continuing education (CE) 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.

Results: Of the dental hygienists surveyed, 43% perceived an increase of overweight patients in their practices. Nearly all (95%) felt that dental hygienists 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 ($p=0.02$) for those with a 2 year degree and those with a 4 year degree.

Conclusions: The findings indicate that many North Carolina dental hygienists are willing to discuss obesity with patients.

Key Words: dental hygienist, obesity, confidence, education and counseling

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Often, the dental hygienist is the oral health care professional who provides prevention and intervention services. This ever-evolving role 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 was also explored.

Review of the Literature

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.^{9,10} The US Dietary Guidelines defines healthy weight as a BMI of 18.5 to 24.9, overweight as 25 to 29.9 and obesity as 30 or greater.¹¹ 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.¹²

Many health problems are related to overweight and obesity.^{7,13-21} Obesity can cause significant disability and shorten life expectancy.^{13,22,23} Studies have shown that obese individuals have a 10 to 50% increased risk of death from all

causes, compared to healthy weight individuals.²⁴

Because obesity is a well-established risk factor for diabetes, it is no surprise that the incidence of diabetes has increased with the rise in obesity.⁷ There is a well-established relationship between diabetes and periodontal disease.^{25,26} 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 Mitola²⁷ 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 et al²⁸ 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 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.²⁹ 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 North Carolina dentists are interested in offering nutritional counseling to help patients with weight loss (A. Curran, DDS, MS, University of North Carolina-Chapel Hill School of Dentistry, oral communication, October 2007). However, they feel that lack of trained personnel is a barrier in offering obesity intervention to their patients.³⁰ This lack of training may be a negative influence on den-

tal 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 al³¹ 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 and almost 75% said the identification of obesity is a very important part of their day-to-day work.³¹

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,³² oral cancer screenings,³³ tobacco cessation³⁴⁻³⁶ and health promotion in general.³⁷ In these studies, self-

confidence was related to self-perceived knowledge and skill level of the dental hygienist.^{32,35,36} Edwards et al 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.³⁵ Mullen et al reported that dental hygienists had the highest self-efficacy in counseling patients about blood pressure and smoking.³⁷

The purpose of this study was 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.

Methodology

This study used a cross-sectional survey design to assess the confidence of North Carolina dental hygienists in the prevention and management of obesity. In addition, it assessed their attitudes, opinions and 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 (UNC) Biomedical Institutional Review Board. The "Dental Hygienists' Role in Addressing Obesity" survey research instrument was developed specifically for this study. Content validity was assessed by a panel of 4 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 (CE) course for dental hygienists on prevention-related issues that was sponsored by UNC-Chapel Hill School of Dentistry. Dental hygiene students, dentists,

Table I

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

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 scanned 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. Table I lists the domains together with the items from the questionnaire that made up each domain.

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 a 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 0.05 for all analyses.

Results

Personal and Practice Demographics

Of the 345 dental hygienists that attended the CE course, 246 (71.3%) responded to the questionnaire. The demographic characteristics of the study sample are illustrated in Table II and the practice characteristics of the study sample are illustrated in Table III. 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

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 agreed most often with the statement that dental hygienists have a role in discussing weight loss issues with their patients ($p=0.02$).

Confidence

Table IV 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 ($p=0.04$). On average, those in specialty practices were more confident in initiating conversations about obesity ($p=0.002$). 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 ($p=0.02$).

Education and Training

Most participants (90%) reported they were taught nutritional counseling, but far fewer were trained to obtain height and weight measurements (14%), or to interpret a BMI

Table II: 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

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 to 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 ($p<0.001$).

A multivariate analysis was undertaken between the domains of confidence and education and training (Table V). The Spearman correlation was used to examine the strength of this relationship. There was a statistically significant correlation between most of the domains in confidence and the perception of education and training received. However, the associations were weak. Education and training explains only 5 to 10% of the variability

ity 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.³⁸ North Carolina is no exception. The rate of overweight and obese adults in North Carolina has increased from 46% in 1990³⁹ to approximately 63% in 2005, giving the state the seventeenth highest prevalence rate of adult overweight/obesity in the United States.⁴⁰ In 2007, North Carolina ranked eleventh in obesity, with 28% of the adult population considered obese.⁶

The purpose of this study was 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 lacked 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 they would not consider providing obesity-related counseling unless a link between obesity and oral health were established. Research on a direct relationship between obesity and oral health is lacking. However, there is an association between obesity and diabetes and diabetes and inflammation.^{41,42} This occurs when the fat cells, adipocytes, secrete pro-inflammatory cytokines into the plasma. These cytokines can lead to insulin resistance and then to diabetes mellitus.⁴¹ Some

Table III: 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	81	34.5
No	154	65.5

Percentages may not add to 100 due to rounding

Table IV: 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

researchers have associated this hyper-inflammatory state with exacerbation of periodontal infections because of the exaggerated response caused by the infecting organisms. 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 United States, 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 overweight people lack will power compared to normal weight people, and 17%

thought 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 these are not uncommon, and have been documented to exist with other health professionals.^{43,44} 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 multi-factorial 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 North Carolina dental hygienists had not received education or did not recall having received training on how to manage 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 measure-

Table V: 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)

ments, interpreting a BMI score and identifying a person at-risk for obesity, all of which could add to increasing confidence levels of dental hygienists.

There was a statistically significant correlation between many of the domains in confidence and the perception of education and training received (Table V), but the associations were weak. Education and training explained 5 to 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 North Carolina 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 North Carolina 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 the domains of planning and initiating than those in general practices. This mirrors a study of United States female physicians by Frank et al,⁴⁵ 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 health care. 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 mainte-

nance. 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 North Carolina? Generally speaking, do dental hygienists who graduated from 4 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. This was a non-random, convenience sample limited to North Carolina dental hygienists. This sample limits the ability to generalize the findings and conclusions to the general population of registered dental hygienists. However, because North Carolina has the eleventh highest rate for adult obesity⁶ and the fifth highest rate of overweight youths,⁴⁶ 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 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 CE courses 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 dental hygienists how to develop 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.

Conclusion

North Carolina 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 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.

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