Research

Practicing Dental Hygienists' Attitudes toward the Proposed Advanced Dental Hygiene Practitioner: A Pilot Study

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Abstract

Purpose: The purpose of this pilot study was to assess the attitudes of active registered dental hygienists toward the proposed Advanced Dental Hygiene Practitioner (ADHP). Factors of support/interest in the ADHP concept, level of practice, and socio-demographics were examined.

Methods: In 2007, a self-administered questionnaire was mailed to 1,562 active registered dental hygienists in Colorado, Kentucky, and North Carolina, states with diverse practice acts. The quantitative analysis included descriptive statistics, Mantel Haenszel for Likert-scaled responses, and chi-square to compare nominal responses. All of the survey questions were qualitatively reviewed.

Results: The response rate was 29% (n = 442), with 45% (n=196) of respondents indicating they had not heard of the proposed ADHP prior to receiving this survey. Overall level of support for the proposed ADHP as indicated by both very supportive and somewhat supportive responses was 87% (n=129) in Colorado, 82% (n=64) in Kentucky, and 92% (n=196) in North Carolina. Overall level of interest for the proposed ADHP as indicated by both very interested and somewhat interested responses was 74% (n=109) in Colorado, 71% (n=55) in Kentucky, and 81% (n=170) in North Carolina. A significant difference was found among respondents interested in becoming an ADHP and those not interested ($p<0.05$).

Conclusions: Among the 3 states, a higher overall level of support for the proposed ADHP was indicated compared to the overall level of interest. Although the state practice acts vary, these findings suggest that the level of support/interest in the proposed ADHP does not differ among respondents.

Key Words: advanced dental hygiene practitioner, advanced mid-level oral health care providers, mid-level health professions, dental hygienists

Introduction

Oral Health in America: A Report of the Surgeon General, which described oral health disparities among certain populations, stressed the important relationship between oral health and the overall general health of all Americans. Although the majority of Americans have benefited from "the safe and effective means of maintaining oral health, many still experience needless pain and suffering, complications that devastate overall health and well-being, and financial and social costs that diminish the quality of life and burden American society."[1] The *Report* described "'a silent epidemic' of oral diseases that is affecting the most vulnerable citizens including poor children, the elderly, and many members of racial and ethnic minority groups," and suggested that many Americans are unable to achieve optimal oral health due to barriers including lack of access to care.[1] Following the *Report*, the *National Call to Action to Promote Oral Health (Call to Action)* described 5 principal actions and implementation strategies "to promote oral health and prevent disease, especially to reduce the health disparities that affect members of racial and ethnic groups, poor people, many who are geographically isolated, and others who are vulnerable because of special oral health care needs."[2] "The goals of the *Call to Action* reflected those of *Healthy People 2010* that included: to promote oral health, to improve quality of life, and to eliminate oral health disparities."[2]

To help address these disparities, the American Dental Hygienists' Association (ADHA) began an initiative in 2004 to develop a curriculum for an Advanced Dental Hygiene Practitioner (ADHP). Comparable to the nurse practitioner model, the ADHP was proposed as a cost-effective response to help address the

lack of access to dental care of many Americans. The proposed clinical responsibilities of an ADHP include advanced preventive therapies, diagnosis, restorative procedures, and referrals. Working in a variety of settings, this professional would be part of a multi-disciplinary team that would offer a well-rounded approach to oral health care service. The education of a practicing ADHP would be at the master's level following completion of a baccalaureate degree in dental hygiene or related field.

In creating a new allied health position, a significant part of the assessment involves identifying potential applicants who would be willing to obtain this new credential. Currently, no data exists that examines pre-admission characteristics and attitudes of potential candidates for the proposed ADHP.

After developing the questionnaire and initiating the study, a design limitation was discovered that precluded the authors from conducting a follow-up with non-respondents. Therefore, given the relatively low response rate and concern about possible non-response bias, the study was recharacterized as a pilot, and the specific aims and associated analyses were modified. The purpose of this pilot study was to assess the attitudes of a random sample of active registered dental hygienists toward the proposed ADHP, to determine the prevalence of support/interest of the ADHP model, and to examine factors associated with support/interest of the ADHP model including level of training, practice, and sociodemographic characteristics.

Review of the Literature

Advocacy Efforts to Address Oral Health Care Disparities

The ADHA started to advocate at the federal level to seek support for a pilot project for the ADHP. The United States Senate Appropriations Committee report in December 2005 indicated that new ways of bringing oral health care to rural and underserved populations were needed.[3] "The Committee encouraged the Human Resources and Service Administration (HRSA) to explore alternative methods of delivering preventive and restorative oral health services in rural America, specifically to explore development of an advanced dental hygiene practitioner."

The first state to consider legislation for creation of the ADHP was Minnesota in February 2008. An omnibus health care appropriations bill contained wording supporting an ADHP pilot project and changing the name of the ADHP to Oral Health Practitioner (OHP). Subsequently, in April 2008, "the Minnesota State Senate passed an amended Omnibus Higher Education Bill that contained a provision to put language in the statute that creates the OHP and convenes a workgroup to make recommendations and proposed legislation to define the scope, supervision, and education of the provider by January 2009."[4]

In 2004, the ADA House of Delegates created a task force to study relevant issues with access to oral health care and the dental workforce. Two years later, the ADA House of Delegates approved the task force report, which resulted in the creation of an Oral Preventive Assistant (OPA) and Community Dental Health Coordinator (CDHC).[5] The OPA model would include competencies similar to those of a dental assistant, but would add scaling for Periodontal Type 1 (gingivitis) patients. The competencies of the CDHC model parallel the current scope of practice of dental hygienists, but the CDHC would be trained under a new academic program. Under dentist supervision, a CDHC "would be employed by federally qualified community health centers, the Indian Health Service, state or county public health clinics, or private practitioners serving dentally underserved areas."[5]

The Proposed ADHP Curriculum

The ADHA Council on Education recommended a task force to develop the ADHP curriculum. Phase I consisted of a preliminary ADHP curriculum framework that was completed in June 2005. The curriculum included 10 course titles: Issues in Health Care Delivery; Professional Development and Leadership; Practice Management; Populations with Special Needs; Pain Management; Restorative and Uncomplicated Extractions; Advanced Diagnosis and Medicine; Research and Grantsmanship; Community Planning and Externships; and Health Promotion, Disease Prevention, and Epidemiology.[6] Examples of course content and objectives were outlined for each course title. One year later, Phase II of a revised curriculum draft described 5 general themes (domains) and specific behaviors (competencies). The 5 domains, representing general professional roles and skills, were Provision of Primary Oral Health Care, Health Care Policy and Advocacy, Management of Oral Care Delivery, Transitional Research, and Professionalism and Ethics.[7] Each domain was supported by several competencies that described expected knowledge and skills of an ADHP. An important aspect of Phase II involved the wording that this curriculum was designed for a master's level education. In June 2007, Phase III included a sample curriculum and course guidelines, listing didactic courses (21 credits) and advanced practice clinical courses (16 credits). The educational competencies for the ADHP were adopted by the ADHA Board of Trustees in March 2008.

Studies Examining Existing Midlevel Oral Health Care Practitioners

In a study by Ross and colleagues, the authors investigated the educational needs and employment

status of registered dental hygienists in Scotland.[8] The questionnaire was mailed to 381 dental hygienists resulting in a 76% response rate (n=290) after 2 mailings. The majority of respondents were female who had received 12-17 months of training. Approximately 70% of respondents completed their training over 10 years ago prior to the study. Regarding training for extended duties, the majority indicated they had received formal training in the administration of local anesthesia and many had completed training in the placement of temporary restorations. Over half of the respondents indicated they would be interested in additional training to become qualified as dental therapists. The authors concluded that additional training in dental therapy would allow these individuals "to join forces with dentists in addressing the unacceptable levels of oral disease in many parts of the U.K."

One of the educational recommendations stated in the 2005 ADHA report, *Dental Hygiene: Focus on Advancing the Profession*, was to implement the baccalaureate degree as the entry point for dental hygiene practice within 5 years.[9] Shortly after, a research study by Monson and Engeswick included a specific aim "to assess and analyze associate degree dental hygiene students' interest in baccalaureate degree completion."[10] A 55-item, self-administered questionnaire was distributed to first- and second-year dental hygiene students by faculty at 8 associate degree-granting institutions in Minnesota. Seven schools participated, yielding a 69% response rate (n=204): 94 first year students and 110 second year students. Sixty-six percent of students identified they were currently interested in completing a Bachelor of Science degree in dental hygiene. Of those interested, 58% intended to take 2 classes per semester, 27% intended to take 3-4 classes per semester and almost 40% were willing to commit as many years as needed to achieve their degree. Thirty two percent were willing to commit 2 years. Of the students interested in degree completion, 50% were very interested in evening classes held in off-site locations near their home communities, 36% were very interested in online-only coursework, 29% were very interested in a mixture of face-to-face and online coursework, and 13% were very interested in completing coursework during traditional daytime hours at Minnesota State University. The authors referenced a 2002 Canadian research study by Cobban and Clovis that listed the need for flexibility in scheduling, family, and work obligations as barriers for dental hygienists to complete their baccalaureate degree.[11] In conclusion, the authors suggested that degree-completion programs need to recognize these barriers and enable students to enroll part time.

The ADHP concept parallels other mid-level health professions

In nursing, certifications for nurse midwife, nurse practitioner, clinical nurse specialist, and registered nurse anesthetist have been established. In the mid 1990s, the apparent shortage of primary care physicians resulted in an increase of nurse practitioners (NP) and physician assistants (PA), which helped address access to care issues. This suggests that NPs and PAs are providing services (especially primary care) to populations that otherwise would be managed by a physician or would not receive services.[12]

Saint Louis University School of Nursing began an accelerated baccalaureate nursing (BSN) program in 1971. "The program's objective was to increase the supply of baccalaureate-prepared nurses by recruiting individuals with non-nursing baccalaureate or higher degrees into a nursing program requiring less time to complete than a traditional baccalaureate program."[13] Although many programs have started since 1971, Meyer and colleagues found little reported research on the students who enter these programs. They reported 3 published studies, Diers,[14] Feldman and Jordet,[15] and Wu and Connelly[16] that described the type of students who enrolled in accelerated BSN programs during the 1980s. These studies reported a mean age of 27-30 for students. Wu and Connelly reported that students returned to school within 3-7 years after earning their first college degree. Students' reasons for entering the accelerated BSN programs included employment opportunities, the length of the program, opportunity for upward mobility, and the desire to be part of a caring profession.

Methodology

A 23-item questionnaire was designed using 3 domains: support/interest in the ADHP, practice demographics, and socio-demographics and level of training. These questions were derived from the literature review and from pilot test suggestions using a convenience sample of registered dental hygienists in North Carolina. After several revisions, the final questionnaire contained 22 closed-ended questions using the formats of completion, Likert-scale, multiple choice, and 1 open-ended question. Upon the premise that unique differences in state dental laws, such as duty regulations and supervision levels, would be a predictor of support/interest, the states of Colorado (unsupervised practice permitted for most services in any setting), Kentucky (general and direct supervision), and North Carolina (direct supervision) were selected.[17]

Mailing lists were obtained from the dental boards of each state. A systematic sample yielded 555 from Colorado, 305 from Kentucky, and 702 from North Carolina. After approval from the University of North Carolina's Institutional Review

Board, the cover letter, questionnaire, and a postage-paid business reply envelope were mailed in June 2007. The participants were asked to return the completed surveys approximately 1 week after the survey was mailed.

The quantitative analysis to compare the responses from the three states included descriptive statistics, Mantel Haenszel for Likert-scaled responses, and chi-square to compare nominal responses. Level of significance was set at 0.05.

Results

The returned surveys yielded an overall 29% response rate (n=442). Although 7% (n=30) of respondents did not complete page 2 (questions #8-17), these surveys were included in the descriptive data. Over 96% of respondents in all 3 states were female. White non-Hispanics comprised 91% (n=135) in Colorado, 96% (n=77) in Kentucky, and 92% (n=196) in North Carolina (Table 1). The mean age in years of the respondents was 44 in Colorado, 41 in Kentucky, and 43 in North Carolina (Table 2). General practice was the most selected as the primary practice setting for each state; in contrast, hospital practice was the least. The distribution of respondents who indicated their highest degree as an associate degree in dental hygiene was 54% (n=80) in Colorado, 66% (n=53) in Kentucky, and 72% (n=155) in North Carolina (Table 3).

Forty-five percent (n=196) of respondents indicated they had not heard of the proposed ADHP prior to receiving this survey. Table 4 compares the level of support of the 5 general themes and overall opinion of the ADHP. The statistical analysis revealed no significant differences. For all 3 states, Theme V (Professionalism and Ethics) received the most support, whereas Theme I (Provision of Primary Oral Health Care) was least supported. Overall level of support for the proposed ADHP as indicated by both very supportive and somewhat supportive responses was 87% (n=129) in Colorado, 82% (n=64) in Kentucky, and 92% (n=196) in North Carolina.

Comparison by level of interest of the 5 general themes and overall opinion of the ADHP is shown in Table 5. Theme II (Health Care Policy and Advocacy) revealed the only significant difference (p=0.02) among the 3 states. Theme V (Professionalism and Ethics) received the most interest; in contrast, Themes I (Provision of Primary Oral Health Care) and III (Management of Oral Care Delivery) received the least interest. Overall level of interest for the proposed ADHP as indicated by both very interested and somewhat interested responses was 74% (n=109) in Colorado, 71% (n=55) in Kentucky, and 81% (n=170) in North Carolina.

Pursuit of the proposed ADHP degree with formal education indicated that 302 respondents were interested and 106 were not interested (Table 6). There was a significant differ-

Table 1. Frequency by state of gender, ethnicity, current primary practice setting, and geographic setting of primary practice

N = 442	Colorado		Kentucky		N. Carolina	
Variable	N	%	N	%	N	%
Gender						
• Female	130	96.30	78	98.73	193	97.47
• Male	5	3.70	1	1.27	5	2.53
Ethnicity						
• White, non-Hispanics	135	91.22	77	96.25	196	92.02
• Others	13	8.78	3	3.75	17	7.98
Practice Setting						
• General practice	112	82.96	61	77.22	145	73.23
• Specialty practice	8	5.93	10	12.66	18	9.09
• Hospital practice	0	0	0	0	3	1.52
• Public practice	3	2.22	3	3.80	12	6.06
• Education	2	1.48	1	1.27	6	3.03
• Other	10	7.41	4	5.06	14	7.07
Geographic Setting						
• Rural	17	12.59	29	37.18	47	23.98
• Suburban	75	55.56	26	33.33	74	37.76
• Urban	38	28.15	21	26.92	59	30.10
• Other	5	3.70	2	2.56	16	8.16

Frequency missing excludes the 30 respondents who did not complete questions 8-17: ethnicity (1), geographic setting (3)

Table 2. Comparison by state of years of active practice, hours/week in providing patient care, and age

N = 442	Years of Active Practice			Hours/week of work			Age		
State	N	Mean	SD	N	Mean	SD	N	Mean	SD
Colorado	147	16.72	10.12	130	27.94	9.90	135	43.84	10.19
Kentucky	80	16.48	10.87	77	27.62	10.44	79	41.33	10.15
N. Carolina	213	18.02	10.79	191	27.09	10.93	198	43.47	10.54

Frequency missing excludes the 30 respondents who did not complete page 2 (q #8-17): years of active practice (2), hours/week of work (14)

ence (p=0.04) among the interested respondents by state, with 80% in North Carolina, 70% in Colorado, and 68% in Kentucky. Of the 302 respondents, a majority indicated that they would be willing to spend 2 years or less of additional education to earn this degree (Table 5). The interested respondents suggested that they would be most willing to enroll as a part-time student and take courses online (Table 7). The most appealing teaching format was in class lectures supplemented with online material followed by online/internet with instructor available on campus (p=0.04). In comparison to respondents in Kentucky and North Carolina, 27% (n=25) of Colorado respondents indicated interest in the online/Internet with the instructor off campus format. The distribution of respondents selecting finances and family obligations as the main challenge in becoming an ADHP was fairly consistent among the 3 states except for finances among Kentucky respondents (22%). Thirty percent (n=26) of Colorado respondents chose interest in practicing in a suburban dental clinic, 32% (n=16) in Kentucky chose practicing in a rural dental clinic, and 31% (n=45) in North Carolina chose interest in a public health setting.

Discussion

Colorado, Kentucky, and North Carolina were chosen based on unique differences in the state practice acts and levels of supervision. It was proposed that these differences might be a factor in determining the overall level of support/interest of the ADHP. The low response rate (29%) was inadequate to support any significant differences among the 3 states and limited any generalizations of the population. However, the descriptive data yielded points of interest in comparing responses among these states.

The percentage of female respondents (over 96%) was proportionate to the total random sample and reflects the gender distribution of the profession. The majority of the respondents for all 3 states were white, non-Hispanic. The ethnicity distribution should be considered as ADHP programs are proposed. Recruitment measures should include strategies to increase student diversity. Action 4 of the *National Call to Action to Promote Oral Health* states that increased diversity in the oral health workforce would help meet the patient and community needs.[2] The recruitment process in dental hygiene has been described as self-recruiting and as recruitment by reputation. Recruitment for ADHP programs may be different. Trends in success rates when new advanced degrees were started in other health professions need to be evaluated with attention to gender and minorities.

The mean age in years (43) and the mean years of active practice (17) were similar among the 3 states. Studies have shown trends where individuals will work a number of years in their chosen profession and then decide to seek additional education. Rasmussen and colleagues conducted a pilot study on nurses' interest in the neonatal nurse practitioner (NNP) role. Their study revealed that 36% indicated interest in becoming an NNP and the mean time since graduation from a nursing program was 16 years for the entire sample.[18] Completion programs, or RN-to-BSN, have served as a solution to prepare more nurses with a baccalaureate degree. "The RNs who enroll in these programs are adult learners who also bring to the academic arena a repertoire of clinical knowledge and skills, a structured background of educational preparation, and employment experiences."[19] This experienced cohort is interested in seeking advanced degrees and should be part of the applicant pool as nontraditional students.

Sixty-five percent of respondents held an associate degree in dental hygiene, whereas 30% held a bachelors degree. These percentages varied from the 2001 workforce profile of dental hygienists in all states that reported 49% with a baccalaureate degree, 44% with an associate degree, and 7% with a certificate.[5] The respondents with an associate degree in dental hygiene who are interested in obtaining the proposed ADHP credential need to first com-

Table 3. Frequency by state of highest educational degree, year of graduation, and type of institution

N = 442	Colorado		Kentucky		N. Carolina	
Level of training	N	%	N	%	N	%
Highest educational degree						
• Associate in Dental Hygiene	80	54.05	53	66.25	155	72.43
• Certificate in Dental Hygiene	3	2.03	3	3.75	2	0.93
• Bachelors degree	61	41.22	21	26.25	52	24.30
• Master's degree and above; others	4	2.71	3	3.75	5	2.34
Year of graduation						
• 1958-1970	5	3.62	1	1.35	13	6.28
• 1971-1980	37	26.81	17	22.97	52	25.12
• 1981-1990	30	21.74	17	22.97	55	26.57
• 1991-2000	42	30.43	19	25.68	49	23.67
• 2001-2007	24	17.39	20	27.03	38	18.36
Type of Institution						
• Comm/tech college	81	54.73	30	37.50	159	74.30
• College/univ. without dental school	22	14.86	20	25.00	14	6.54
• College/univ. with dental school	45	30.41	30	37.50	41	19.16

Frequency missing: year of graduation (23)t

plete a Bachelors Degree. ADHA's 2007 report, Dental Hygiene: Focus on Advancing the Profession,[9] states the goal of advancing the baccalaureate degree as entry-level for dental hygiene in the next 5 years is to prepare graduates for alternative career opportunities in education, administration, public health, and research.[10] Pursuit of this goal would provide support for successful implementation of the ADHP with qualified applicants. As stated in the nursing literature, "the pipeline of future nurse practitioners is dependent primarily on graduates from baccalaureate nursing programs."[12] As supportive measures, community/technical colleges could increase opportunities for more graduates to pursue a baccalaureate degree. In addition, articulation agreements between community/technical colleges offering associate degrees in dental hygiene and universities offering degree completion programs could be revised. Dental hygiene degree completion programs need to modify their recruitment efforts to include recent graduates and non-traditional students. These programs could consider changes with course scheduling and online teaching methods to accommodate the various needs of students. In 2006, 56 dental hygiene degree completion programs existed with 7 programs offering 100% course content online.10 An increase in the number of programs offering online courses would correlate to possible increases in enrollment.

Table 4. Frequency by state of level of support of the five general themes describing the proposed professional responsibilities, knowledge, and skills of an ADHP and of the overall opinion of the ADHP

N = 442	Very Supportive		Somewhat Supportive		Neutral		Not Supportive		Strongly Against		p-value
Outcomes	N	%	N	%	N	%	N	%	N	%	
Theme I											
•Colorado	82	55.41	41	27.70	11	7.43	5	3.38	9	6.08	0.40
•Kentucky	43	54.43	13	16.46	10	12.66	7	8.86	6	7.59	
•N. Carolina	114	53.77	45	21.23	26	12.26	18	8.49	9	4.25	
Theme II											
•Colorado	102	68.92	30	20.27	14	9.46	1	0.68	1	0.68	0.46
•Kentucky	53	67.09	17	21.52	7	8.86	1	1.27	1	1.27	
•N. Carolina	160	75.47	32	15.09	16	7.55	2	0.94	2	0.94	
Theme III											
•Colorado	78	52.70	38	25.68	28	18.92	1	0.68	3	2.03	0.56
•Kentucky	46	58.23	15	18.99	12	15.19	4	5.06	2	2.53	
•N. Carolina	127	59.62	48	22.54	28	13.15	7	3.29	3	1.41	
Theme IV											
• Colorado	112	75.68	25	16.89	10	6.76	0	0.00	1	0.68	0.16
• Kentucky	53	66.25	16	20.00	8	10.00	2	2.50	1	1.25	
• N. Carolina	163	76.89	29	13.68	13	6.13	6	2.83	1	0.47	
Theme V											
• Colorado	124	83.78	15	10.14	8	5.41	0	0.00	1	0.68	0.27
• Kentucky	65	81.25	8	10.00	6	7.50	1	1.25	0	0.00	
• N. Carolina	189	88.73	16	7.51	6	2.82	0	0.00	2	0.94	
Overall Opinion											
• Colorado	97	65.54	32	21.62	12	8.11	3	2.03	4	2.70	0.26
• Kentucky	51	65.38	13	16.67	9	11.54	4	5.13	1	1.28	
• N. Carolina	147	69.34	49	23.11	10	4.72	1	0.47	5	2.36	

Theme I (Provision of primary oral health care), Theme II (Health care policy and advocacy), Theme III (Management of oral care delivery), Theme IV (Translational research), Theme V (Professionalism and ethics); Frequency missing < (4); Mantel-Haenszel (row mean scores differ)

Theme V (Professionalism and Ethics) received the highest level of support and interest among the 3 states. This was expected, as these behaviors are familiar principles to current dental hygienists. The least level of support was found for Theme I (Provision of Primary Oral Health Care). The percentages of combined "very supportive" and "somewhat supportive" responses were 83% in Colorado, 71% in Kentucky and 75% in North Carolina. In addition, Colorado showed the highest level of interest at 67%. This level could correlate to the duties currently allowed. Both Colorado and Kentucky shared similar expanded duties; however, Colorado is the only state with unsupervised practice permitted for most services. The least level of interest was revealed in Theme III (Management of Oral Care Delivery). Combined responses of "very interested" and "somewhat interested" were the lowest in Colorado (44%), followed by Kentucky (50%), and North Carolina (58%). Dental hygienists in Colorado may be more familiar with business management skills due to the unsupervised dental hygiene practice for most services and optional independent practice. The lower level of interest could reflect dislike for this part of dental hygiene practice. A significant difference was determined only for level of interest for Theme II (Health Care Policy and

Table 5. Frequency by state of level of interest of the five general themes describing the proposed professional responsibilities, knowledge, and skills of an ADHP and of the overall opinion of the ADHP

N = 442	Very Interested		Somewhat Interested		Neutral		Slightly Interested		Not Interested		p-value
Outcomes	N	%	N	%	N	%	N	%	N	%	
Theme I											
• Colorado	65	43.92	34	22.97	21	14.19	10	6.76	18	12.16	0.56
• Kentucky	31	38.75	17	21.25	15	18.75	5	6.25	12	15.00	
• N. Carolina	99	46.92	31	14.69	26	12.32	16	7.58	39	18.48	
Theme II											
• Colorado	61	41.22	34	22.97	29	19.59	12	8.11	12	8.11	0.02
• Kentucky	35	43.75	18	22.50	16	20.00	4	5.00	7	8.75	
• N. Carolina	117	55.45	39	18.48	36	17.06	8	3.79	11	5.21	
Theme III											
• Colorado	36	24.32	29	19.59	46	31.08	12	8.11	25	16.89	0.06
• Kentucky	24	30.00	16	20.00	18	22.50	10	12.50	12	15.00	
• N. Carolina	82	38.68	40	18.87	46	21.70	14	6.60	30	14.15	
Theme IV											
• Colorado	89	60.14	24	16.22	22	14.86	4	2.70	9	6.08	0.44
• Kentucky	43	53.75	13	16.25	13	16.25	5	6.25	6	7.50	
• N. Carolina	128	60.66	35	16.59	25	11.85	11	5.21	12	5.69	
Theme V											
• Colorado	103	69.59	21	14.19	14	9.46	3	2.03	7	4.73	0.31
• Kentucky	58	72.50	10	12.50	8	10.00	0	0.00	4	5.00	
• N. Carolina	165	77.83	25	11.79	11	5.19	2	0.94	9	4.25	
Overall Opinion											
• Colorado	72	48.65	37	25.00	22	14.86	5	3.38	12	8.11	0.56
• Kentucky	38	48.72	17	21.79	15	19.23	4	5.13	4	5.13	
• N. Carolina	116	54.98	54	25.59	16	7.58	8	3.79	17	8.06	

Theme I (Provision of primary oral health care), Theme II (Health care policy and advocacy), Theme III (Management of oral care delivery), Theme IV (Translational research), Theme V (Professionalism and ethics); Frequency missing < (5); Mantel-Haenszel (row mean scores differ)

Advocacy). North Carolina revealed the higher percentages of very supportive (75%) and very interested (55%) for this theme. Access to care and providing oral health care to the underserved are prominent issues in this state. Dental hygienists are restricted in many ways due to the current state practice acts. The combination of these conditions may explain the interests of dental hygienists to advocate for changes in health care policy and legislative changes in North Carolina. In addition, this could contribute to the respondents in North Carolina exhibiting the highest overall level of support and interest for the ADHP.

A significant difference was observed among the states interested in becoming an ADHP and those who were not interested. Of those interested, a majority of respondents (mean 56%) indicated they would be willing to spend 2 years or less to obtain the proposed ADHP credential. The length of a program has been an important factor suggested by students in accelerated BSN programs and master of physical therapy programs.[13,20] Respondents among the 3 states indicated the most interest in returning to school as a part-time student and taking courses online. A significant difference was found in preferred teaching formats with the selection of "in-class lectures supplemented with online/internet material" being the most favored. In contrast, very few respondents indicated an interest to relocate to an area where the college is offering the ADHP curriculum. Studies have shown that many students (nurse practitioner, accelerated BSN, and master of physical therapy) attend schools that are less than 50 miles from home.[13,20,21] Students earning a second degree may be less mobile due to family ties.[13] The main challenges in becoming an ADHP were age, finances, and family obligations. These challenges are consistent themes in that graduate students appear to be more influenced by spouse, family, and work considerations than undergraduates.[20] Despite these challenges, many dental hygienists have flexible schedules and "half of all dental hygienists work part-time (less than 35 hours per week)."[5] Furthermore, very few respondents indicated a reluctance to go back to school. The respondents also showed interest to practice as an ADHP in areas to address the oral health needs of the underserved. These results indicate favorable characteristics that describe a potential pool of interested students.

Assessment of this data could be beneficial to ADHP programs with regards to planning school locations, recruitment efforts, course scheduling, delivery methods, and teaching formats. ADHP programs will need to develop strategies to overcome challenges and best meet the needs of a varied applicant pool of recent

graduates and non-traditional students.

The ADHA House of Delegates adopted the development of the ADHP in June 2004; however, prior to receiving this survey, 45% percent (n=196) of respondents indicated they had not heard of the proposed ADHP. If this same percentage was applied to the total sample (1,562), then one could extrapolate that approximately 700 dental hygienists knew about the ADHP at the time of the survey. The lack of awareness of the ADHP could be a contributing factor to the low response rate and support possible non-response bias. ADHA could develop alternative strategies to improve the flow of communication from the association to all dental hygienists. In proportion to the number of dental hygienists in the United States, membership in ADHA remains low. ADHA could creatively market and promote the advantages of membership. Efforts are being made to encourage the transition of membership from SADHA to ADHA; however, postgraduates with years of practicing experience need to be contacted. Members would hopefully become more engaged in advocacy efforts and legislative issues. Printed and televised news of the recent legislative effort by the ADHA to establish the ADHP in Minnesota has probably increased the general knowledge.

Due to limitations in the study, it cannot be generalized to a larger population. The study was implemented in 2007 and much discussion has occurred about the ADHP since that time. If the study were conducted today, it is likely that more dental hygienists would be familiar with the ADHP proposal. In addition, only 3 states were surveyed, decreasing the ability to generalize results. Although this pilot study is limited with generalizations to the population, the information learned from the study population may be beneficial to future investigations and also to the progress of the ADHP.

Table 6: Frequency by state of interest in becoming an ADHP and additional years of education to obtain the proposed ADHP degree

N = 442	Colorado		Kentucky		N. Carolina		p-value
Variable	N	%	N	%	N	%	
Becoming an ADHP							
• Interested	94	69.93	52	67.53	156	79.59	0.04
• Not interested	41	30.37	25	32.47	40	20.41	
Education for ADHP							
• 2 years or less	76	56.30	41	53.25	117	59.69	
• 3 years	12	8.89	9	11.69	23	11.73	
• 4 years or more	6	4.44	2	2.60	16	8.16	

Frequency missing excludes the 30 respondents who did not complete questions 8-17

Table 7: Frequency by state of preferences to become an ADHP, most appealing teaching format, main challenge in becoming an ADHP, and most likely practice setting as an ADHP

	Colorado		Kentucky		N. Carolina		p-value
Characteristics	N	%	N	%	N	%	
*Willing to obtain ADHP (N = 306)							
• Relocate to area	11	11.58	2	3.70	18	11.46	0.23
• Take courses online	84	88.42	49	90.74	146	92.99	0.46
• Use student loans	43	45.26	20	37.04	70	44.59	0.57
• Full-time student	21	22.11	9	16.67	28	17.83	0.63
• Part-time student	67	70.53	41	75.93	124	78.98	0.32
+Teaching format (N = 304)							0.04
• In class lectures only	11	11.83	4	7.41	13	8.28	
• In class lectures with online	33	35.48	23	42.59	71	45.22	
• Online/instructor on campus	24	25.81	17	31.48	56	35.67	
• Online/instructor off campus	25	26.88	10	18.52	17	10.83	
+Main challenge (N = 280)							0.46
• Age	20	23.26	13	25.49	32	22.38	
• Finances	28	32.56	11	21.57	44	30.77	
• Family obligations	26	30.23	16	31.37	52	36.36	
• Reluctance return to school	12	13.95	11	21.57	15	10.49	
+Practice setting (N = 285)							0.21
• Hospital	14	16.09	8	15.69	20	13.61	
• Public Health	14	16.09	12	23.53	45	30.61	
• Rural dental clinic	23	26.44	16	31.37	43	29.25	
• Suburban dental clinic	26	29.89	8	15.69	26	17.69	
• Urban dental clinic	10	11.49	7	13.73	13	8.84	

Frequency missing excludes the 30 respondents who did not complete page 2 (q #8-17) and the 106 respondents who were not interested in becoming an ADHP: teaching format (2), main challenge (26), practice setting (21)

*Respondents could select more than one answer

+Responses were mutually exclusive

Conclusion

ADHA proposed the ADHP model as a cost-effective response to help address the lack of access to dental care of many Americans. Development of this model has paralleled features in the nursing profession, with its successful implementation of the nurse practitioner. Among the 3 states, a higher overall level of support for the proposed ADHP was indicated as compared to the overall level of interest. However, the 302 respondents interested in obtaining the proposed ADHP credential indicated specific preferences to support their interest. Utilization of this pilot study may help future researchers find additional trends and characteristics of potential students regarding the ADHP.

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References

1. U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
2. U.S. Department of Health and Human Services. National Call to Action to Promote Oral Health. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Dental and Craniofacial Research. NIH, 2003.
3. United States Senate. Report #109-103 Departments of Labor, Health and Human Services, and Education, and related agencies appropriation bill [H.R. 3010, P.L. 109-149], Washington, DC, 2006.
4. ADHP legislation in Minnesota – update. American Dental Hygienists' Association [Internet] 2008. [cited 2008 May 3]. Available from: www.adha.org/news/04212008-adhp.mn.htm.
5. McKinnon M, Luke G, Bresch J, Moss M, Valachovic RW. Emerging allied dental workforce models: considerations for academic dental institutions. J Dent Educ. 2007;71(11):1476-1491.
6. Preliminary ADHP curriculum framework. American Dental Hygienists' Association [Internet] 2005. [cited 2005 June 30]. Available from: www.adha.org.
7. American Dental Hygienists' Association. Advanced dental hygiene practitioner (ADHP) draft curriculum, June 2006. American Dental Hygienists' Association [Internet] 2006 [cited 2006 Jul 20]. Available from: www.adha.org/downloads/ ADHP_Draft_ Curriculum.pdf.
8. Ross MK, Ibbetson RJ, Rennie JS. Educational needs and employment status of Scottish dental hygienists. Br Dent J. 2004;198:105-109.
9. Dental hygiene: focus on advancing the profession. American Dental Hygienists' Association [Internet] 2005 [cited 2008 Mar 12]. Available from: http://www.adha.org/downloads/ADHA_Focus_Report.pdf.
10. Monson AL, Engeswick LM. ADHA's focus on advancing the profession: Minnesota's dental hygiene educators' response. J Dent Hyg. 2007;81(2):53 epub.
11. Cobban SJ, Clovis JB. Learning preferences of practicing dental hygienists for post-diploma baccalaureate education. Can Dent Hyg Assoc J Probe Scientific. 2002;36(3):83-90.
12. Hooker RS, Berlin LE. Trends in the supply of physician assistants and nurse practitioners in the United States. Health Aff. 2002;21.5:174-181.
13. Meyer GA, Hoover KG, Maposa S. A profile of accelerated BSN graduates, 2004. J Nurs Educ. 2006;45(8):324-327.
14. Diers D. When college grads choose nursing: excerpts from a paper. Am J of Nurs. 1987:1631-1637.
15. Feldman H, Jordet C. On the fast track. Nurs Health Care. 1989;10:491-493.
16. Wu C, Connelly CE. Profile of non-nurse college graduates enrolled in accelerated baccalaureate nursing programs. J Prof Nurs. 1992;8:35-40.
17. Dental hygiene practice act overview permitted functions and supervision levels by state. American Dental Hygienists' Association [Internet] 2006 [cited 2006 Feb 20]. Available from: www.adha.org.
18. Rasmussen LB, Vargo LE, Reavey DA, Hunter KS. Pilot survey of NICU nurses' interest in the neonatal nurse practitioner role. Adv Neonatal Care. 2005;(5)1:28-38.
19. Cangelosi PR. RN to BSN education: creating a context that uncovers new possibilities. J Nurs Educ. 2006;45.5:177-181.
20. 20. Johanson MA. Factors influencing professional master of physical therapy and doctor of physical therapy students' program selection. J Phys Ther Educ. 2004;18(2): 9-21.
21. Andrusyszyn M, Cragg CE, Humbert J. Nurse practitioner preferences for distance education methods related to learning style, course content, and achievement. J Nurs Educ. 2001;40.4:163-170.