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A Needs Assessment for a Distance Education Baccalaureate Degree Completion Program for Associate Degree Level Dental Hygienist

Joan Gugino Ellison
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**A NEEDS ASSESSMENT FOR A DISTANCE EDUCATION BACCALAUREATE
DEGREE COMPLETION PROGRAM FOR ASSOCIATE DEGREE LEVEL
DENTAL HYGIENISTS**

by

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A Thesis Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

**MASTER OF SCIENCE
IN
DENTAL HYGIENE**

**OLD DOMINION UNIVERSITY
MAY 1998**

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ABSTRACT

A NEEDS ASSESSMENT FOR A DISTANCE EDUCATION BACCALAUREATE DEGREE COMPLETION PROGRAM FOR ASSOCIATE DEGREE LEVEL DENTAL HYGIENISTS

Joan Gugino Ellison
Old Dominion University, 1998
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The purpose of this descriptive research was to determine the need for a distance education program for geographically dispersed dental hygienists to complete a baccalaureate degree program in dental hygiene. The sample consisted of randomly selected licensed dental hygienists in the Commonwealth of Virginia. A self-designed instrument, titled *The Distance Education for a Dental Hygiene Degree Completion Program Questionnaire*, was mailed to the study participants after establishing validity and reliability. The questionnaire asked participants to provide information concerning personal demographics, educational background, and interest in completing a dental hygiene baccalaureate degree via distance education. Frequencies, percentages, cross-tabulations, chi-square test of association, in conjunction with analysis of residuals and lambda were used for data analysis.

Results indicated that 29.8% of Virginia dental hygienists surveyed are pursuing education beyond their associate degree or certificate in dental hygiene. Of the dental hygienists surveyed, 27.2% have taken a distance education course, either as continuing education or college credit courses. Dental hygienists were asked to rate the importance of various program design factors considered when making a decision to pursue a

bachelor's of science degree in dental hygiene. Of these factors, those indicated as being "very important" to the majority of Virginia dental hygienists surveyed were: tuition costs, weekend/evening course availability, geographic location, the length of time to complete the program, part-time study availability and faculty/institution reputations. Study participants also rated as "very important" the following personal reasons for seeking an advanced degree in dental hygiene: to increase knowledge and skill, to better serve patients, and personal satisfaction. Gaining entrance into graduate school was rated as being "not important" by the majority of study participants. The value of the baccalaureate degree in dental hygiene was determined by the factors and reasons rated by dental hygienists when making a decision to pursue an advanced degree. Based on the responses, many dental hygienists value such a degree and 72.4% expressed an interest in pursuing an advanced degree if courses were conveniently located and flexible to accommodate family and employment schedules. The implementation of a dental hygiene degree completion program via distance education may provide opportunities for many dental hygienists in areas of Virginia that otherwise would not be available.

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TABLE OF CONTENTS

	PAGE
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
CHAPTER I.....	1
INTRODUCTION.....	1
STATEMENT OF THE PROBLEM.....	3
SIGNIFICANCE OF THE PROBLEM.....	4
DEFINITION OF TERMS.....	6
ASSUMPTIONS.....	8
LIMITATIONS.....	8
METHODOLOGY.....	9
CHAPTER II.....	11
REVIEW OF THE LITERATURE.....	11
ASSOCIATE AND BACCALAUREATE DENTAL HYGIENE EDUCATION.....	11
DENTAL HYGIENE BACCALAUREATE DEGREE COMPLETION PROGRAMS.....	21
THE USE OF DISTANCE EDUCATION IN THE EDUCATION OF HEALTH PROFESSIONALS.....	25
DISTANCE EDUCATION IN DENTAL EDUCATION.....	30
THE HISTORY OF TELETECHNET AT OLD DOMINION UNIVERSITY.....	34
CHAPTER III.....	40
METHODS AND MATERIALS.....	40

SAMPLE DESCRIPTION.....	40
METHODOLOGY.....	41
PROTECTION OF HUMAN SUBJECTS.....	44
INSTRUMENTATION.....	45
STATISTICAL ANALYSIS	46
CHAPTER IV.....	48
RESULTS AND DISCUSSION.....	48
RESULTS.....	49
DISCUSSION.....	79
CHAPTER V.....	93
SUMMARY AND CONCLUSIONS.....	93
CONCLUSIONS.....	98
BIBLIOGRAPHY.....	101
APPENDICES.....	105
A. QUESTIONNAIRE COVER LETTER.....	105
B. <i>DISTANCE EDUCATION FOR A DENTAL HYGIENE DEGREE COMPLETION PROGRAM QUESTIONNAIRE</i>	107
C. SECOND MAILING LETTER.....	113
D. COMMENTS BY QUESTIONNAIRE RESPONDENTS.....	115

LIST OF TABLES

TABLE	PAGE
1. Graduates of dental hygiene programs by age.....	21
2. Employment status of Virginia registered dental hygienists in sample.....	51
3. Employment setting of Virginia registered dental hygienists in sample.....	51
4. Highest dental hygiene degree held by Virginia dental hygienists sampled.....	51
5. Importance of various factors to Virginia dental hygienists when deciding to pursue a bachelor of science degree in dental hygiene.....	55
6. Importance of various reasons to Virginia dental hygienists for seeking an advanced degree in dental hygiene.....	56
7. Cross-tabulations with analysis of residuals between the likelihood of enrollment in a distance education degree completion program and demographic characteristics of Virginia dental hygienists surveyed.....	61
8. Results of chi-square and Lambda analysis when comparing demographic characteristics with the likelihood of enrollment.....	61
9. Cross-tabulation table with analysis of residuals of the importance of various factors when making a decision to pursue a bachelor's degree in dental hygiene compared to the possibility of enrollment in a distance education program by Virginia dental hygienists.....	64
10. Chi-square and lambda analysis results of various factors considered when making a decision to pursue a baccalaureate degree in dental hygiene and the likelihood of enrollment in a distance education dental hygiene degree completion program.....	66
11. Cross-tabulations and analysis of residuals comparing the likelihood of Virginia dental hygienists' enrollment in a distance education program with reasons for seeking an advanced degree in dental hygiene.....	73
12. Results of chi-square and lambda analysis of reasons for pursuing an advanced degree in dental hygiene with the likelihood of enrollment in a distance education dental hygiene degree completion program.....	75

LIST OF FIGURES

FIGURE	PAGE
1. Education requirements needed to enroll in dental hygiene programs.....	12
2. Geographic area of target population, TELETECHNET sites.....	42
3. Educational credentials held by Virginia dental hygienists <i>in addition to</i> dental hygiene credentials.....	52
4. Distance education course time choices of Virginia dental hygienists when asked to choose two.....	79

CHAPTER I

INTRODUCTION

Dental hygiene education has changed dramatically since Dr. Alfred Fones founded the first formal program of professional study in 1913. After one year of study, 27 graduates were granted diplomas on June 5, 1914 (Motley, 1983). The required length of study has gradually increased through the years with a movement in the late 1930's to encourage the evaluation of dental hygiene curricula and the extension of all schools to a minimum of two years (Tate, Schierling-Wilkes, & Frese, 1987). The implementation of accreditation standards in 1952 brought about a standardization to achieve and maintain quality dental hygiene education. Due to changes in accreditation standards in the last 10 to 20 years, many students enrolled in associate or certificate dental hygiene education programs earn college credits equaling three or more years of education (Mescher, 1984; Wayman, 1985). Ten percent of the accredited dental hygiene programs in the United States require some college courses as requirements to enroll while 34 % require 1-2 years of college courses (ADA, 1996). However, the earned credit hours for the dental hygiene certificate or associate degree often exceeds those for associate degrees in other disciplines.

The dental hygiene profession has called for the baccalaureate degree to be the entry level of education for licensed dental hygienists (Paarmann, Herzog, Christie, & Couns, 1990; ADHA, 1996). It is the opinion of many professionals that if dental hygiene is to emerge as a respected autonomous profession, then the baccalaureate degree as the entry-level credential for dental hygiene practice is the first step toward achieving that goal

(Walsh, Heckman, Kerner, & Ishida, 1988; Devore, 1993; Kraemer, 1985). In reality, there are 215 dental hygiene programs in the United States that are accredited by the Commission on Dental Accreditation. Of these institutions, 176 grant an associate degree and 14 grant a certificate; while only 25 grant a baccalaureate degree (ADA, 1996). The closing of eight baccalaureate degree programs in the United States since 1978 has limited the educational options for future dental hygienists as well as the opportunity for professional advancement (ADA, 1998). Consequently, many more licensed, practicing dental hygienists hold associate degrees or certificates in dental hygiene as compared to baccalaureate degrees.

Many associate/certificate level dental hygienists have expressed interest in completing a baccalaureate degree, but a far fewer number of hygienists have enrolled in dental hygiene degree completion programs (DeBiase, 1988; Newell, Stoltenberg, Osber, & Peterson, 1989; Tobian, 1989; Waring, 1991). Dental hygienists value the importance of a baccalaureate degree, but cite obstacles for making degree achievement a realistic educational goal (DeBiase, 1988).

The demographics of dental hygiene students continue to change. Students are no longer considered to be traditional, i.e., under 20 years old, unmarried, no children, and with few employment commitments. Many of today's students are over 27 years of age and possess family and employment responsibilities (Carr & Rubenstein, 1989; Waring, 1991). Consequently, associate/certificate level graduates must weigh competing commitments and responsibilities when making a decision to enroll in a dental hygiene

degree completion program. Moreover, educational choices may be limited if the dental hygienist does not reside within travel distance of a four year college or university.

Technology plays a major role in the education of health professionals. The use of distance education has been shown to be effective in meeting the demands of adult learners and reaching geographically dispersed students (Fulmer, Hazzard, Jones, & Keene, 1992; Shomaker, 1993; Dirksen, Hoeksel, & Holloway, 1993). New delivery systems have evolved to provide information to students in a cost-effective and timely manner. Electronic mail, the Internet, and distance education are examples of technology being utilized in dental hygiene education (Poindexter, 1996).

This study has attempted to assess the need for a distance education program for geographically dispersed dental hygienists in Virginia to complete a baccalaureate degree via Old Dominion University 's TELETECHNET distance education system. Demographic information of dental hygienists in the target population, as well as educational background and attitudes toward future education have been investigated.

Statement of the Problem

The purpose of this research was to answer the following questions concerning the need for a baccalaureate degree completion program via distance education among licensed dental hygienists in the Commonwealth of Virginia :

1. Is there a need for a distance education program designed for geographically dispersed dental hygienists to complete a baccalaureate degree program at locations away from a four year college or university?

- a. Are dental hygienists pursuing alternatives to traditional education such as distance education in order to achieve a baccalaureate degree in dental hygiene?
 - b. How likely are dental hygienists, who hold associate degrees or certificates, to complete a baccalaureate degree if courses leading to a baccalaureate degree were made available near their residence and/or place of work?
2. Do associate degree/certificate level dental hygienists value the benefits of completing a baccalaureate degree enough to enroll in a distance education program?
- a. Do dental hygienists value the baccalaureate degree in dental hygiene?
 - b. What factors are important to dental hygienists for seeking a baccalaureate degree via distance education?

Significance of the Problem

Minimal information exists in the professional literature concerning the use of distance education in dental hygiene degree completion programs. Considering that there has been much discussion within the dental hygiene profession about the need to move toward baccalaureate education, degree completion programs serve as one option for hygienists with less than a baccalaureate degree. Unfortunately, the closing of many baccalaureate degree programs has left individuals with limited choices concerning the educational level they will attain in dental hygiene. Community colleges granting certificates and associate degrees are much more plentiful than colleges and universities granting baccalaureate programs.

Hygienists who wish to continue their education via a degree completion program often are juggling coursework with family and employment responsibilities. Traveling

distances to the nearest degree completion program is a hindrance to many potential students (DeBiase, 1988). Therefore, an alternative method of completing a baccalaureate degree in dental hygiene that is flexible and convenient to many more students might be needed.

The results of this study benefit dental hygienists holding certificates or associate degrees by making them aware of the possible degree completion options available to them. The American Dental Hygienists' Association (ADHA) benefits from this study by learning the demographics of today's licensed dental hygienists and the value they place on a baccalaureate degree education. The School of Dental Hygiene at Old Dominion University gains information concerning the demand for a distance education degree completion program in dental hygiene in the Commonwealth of Virginia.

Currently, TELETECHNET, the distance education program at Old Dominion University serves students in over 30 sites throughout the Commonwealth of Virginia. A needs assessment done prior to the implementation of the TELETECHNET program in 1994 did not include dental hygiene as a course choice for survey respondents. Old Dominion University could easily implement many of the required courses through the existing TELETECHNET system. Other institutions of higher learning offering degree completion programs in dental hygiene also could begin to investigate the use of distance education as an option for their students.

For students who have financial constraints, distance education is cost effective. By being able to attend courses near their homes, students have less travel or relocation expenses. The use of distance education also allows students to continue working at their

present place of employment. Distance education makes it much easier for individuals to balance family, employment, and education responsibilities, than if they were enrolled in a traditional degree completion program.

If more dental hygienists earn a baccalaureate degree, they will be better equipped to meet the needs of today's healthcare consumer. With demographic changes occurring in our society, hygienists will need to meet the needs of a larger, older, and more culturally diverse and medically complex population. The emergence of preventive dentistry with the baby-boom generation has brought about increased interest in society for health promotion and disease prevention (Douglass, 1991). These services are vital components of the dental hygiene profession. A dental hygienist with a baccalaureate degree will have a broader educational background to meet the needs of our changing society.

Definition of terms

For the purpose of this study, the following terms are defined:

1. Associate degree program: a dental hygiene educational program within a community college or technical institution that awards the degree of Associate of Applied Science, Associate of Science Degree, or Certificate in Dental Hygiene
2. Baccalaureate degree program: a dental hygiene education program that is offered exclusively at the junior and senior levels of colleges or universities, includes upper division courses, and culminates in the awarding of the degree of Bachelor of Science in Dental Hygiene or its equivalent.

3. Baccalaureate degree completion program: an educational program especially designed for dental hygienists who have attained less than a baccalaureate degree, to earn a baccalaureate degree in dental hygiene.
4. Dental hygienist: a licensed professional of the healthcare team who integrates the roles of educator, consumer advocate, practitioner, manager, change agent, and researcher to support total health through the promotion of oral health and wellness (Darby & Walsh, 1995).
5. Distance education: planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements (Moore & Kearsley, 1996).
6. Distance learning modality: a mode of distance education consisting of courses being taught in one of many forms such as videotapes, televised classes, and computer generated courses or a combination of such learning forms.
7. Needs assessment: survey of a particular group of people in a defined area to ascertain the demand or need for a particular service, program or product.
8. Value: Worth in usefulness or importance to the possessor; utility or merit: the value of an education (American Heritage, 1992). The value of a dental hygiene degree completion program via distance education to dental hygienists was measured using *The Distance Education for a Dental Hygiene Degree Completion Program Questionnaire*.

Assumptions

The following assumptions were made for this study :

1. A random sample of registered dental hygienists from the target population adequately represents registered dental hygienists in the Commonwealth of Virginia.
2. The survey participants were truthful in answering the questions honestly and completely.
3. Participants understood the instructions provided for completing the questionnaire.

Limitations

The validity and reliability of the study is limited by the following factors:

1. A potential for a low response rate existed. Therefore, to insure participant confidentiality and increase the response rate, participant identification was optional. Questionnaires were coded to allow the researcher to know who had responded. A second mailing also was sent to all nonrespondents to increase the rate of response.
2. The self-designed questionnaire has no established validity and reliability coefficients. However, content validity was established via examination of the instrument by a panel of faculty members from the School of Dental Hygiene and the School of Education (experts in distance education). A test-retest procedure was conducted on a sample (n=20) from the same target population to establish clarity and reliability. These participants were not included in the final study sample.
3. Because the target population consisted of all registered dental hygienists from Virginia, many respondents already held a baccalaureate degree. Respondents with a baccalaureate degree were asked to complete demographic information only. Therefore,

the number of respondents was larger than the number of questionnaires actually analyzed since the population of interest included dental hygienists with certificates in dental hygiene or associated degrees. To obtain measurable data, the sample size was large enough to account for this limitation (N=589).

Methodology

A self-designed questionnaire was mailed to a random sample of 589 licensed dental hygienists in the Commonwealth of Virginia. The sample which consisted of 25 % of the population should have been representative of licensed dental hygienists in Virginia. Questionnaires surveyed respondents regarding their age, sex, marital status, educational level and other demographics for background information. Other questions addressed the participants' interest in a distance education degree completion program.

Respondents were asked to answer some questions with simple yes/no answers by checking an appropriate response. Other questions were answered using a three point Likert scale with the following responses: (1) not important, (2) somewhat important and (3) very important.

To establish content validity, the instrument was examined by an expert panel of dental hygiene faculty members as well as faculty members active in the development of the distance education program at Old Dominion University. Prior to administering the questionnaire to the sample population, a small group (n=20) of licensed dental hygienists in Virginia, were randomly selected and administered the questionnaire on two separate occasions. Responses were compared on an item-by-item analysis to determine test-retest

reliability. Subject identification was optional, and questionnaires were coded to inform the researcher of the completion of the questionnaire. Answers were confidential and are reported in group form only. Data were analyzed by frequency distributions, percentages, and the chi-square test of association in conjunction with analysis of residuals and lambda using the SPSS computer package.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this review is to examine literature pertaining to degree completion programs in dental hygiene via a distance education mode and related subject areas. Topics investigated include associate and baccalaureate degree dental hygiene education, dental hygiene baccalaureate degree completion programs, the use of distance education in the education of health professionals, the use of distance education in dental education, and history of the TELETECHNET distance education program at Old Dominion University.

Associate and Baccalaureate Dental Hygiene Education

There has been much discussion, particularly in the 1980's, concerning the minimum educational entry level for dental hygiene practice. In 1986, the American Dental Hygienists' Association (ADHA) adopted a resolution supporting the baccalaureate degree as the future minimum entry level for dental hygiene. However,

“the growth of programs at community college and junior college level, coupled with the decline in the number of programs offering the baccalaureate degree, send conflicting messages to the profession and the public” (Devore, 1993).

Devore reports that in 1963, almost equal numbers of graduates earned baccalaureate degrees, associate degrees, and diplomas, or certificates. As of 1992 only 17% of dental hygiene graduates from 1973 through 1992 earned a baccalaureate degree, while 70% earned an associate degree (ADA, 1996). The recent closure of several baccalaureate degree programs has further diminished the percentage of baccalaureate degree programs to 11.6% as of 1996 (ADA, 1996).

According to the American Dental Association's 1995/96 Survey of Allied Dental Education, the current minimum educational requirements needed to enter dental hygiene programs vary from having a high school diploma or GED to two years of college (See Figure 1). As accreditation standards have increased through the years, the length of time to earn a degree in dental hygiene also has increased.

Since the 1980's dental hygiene educators and researchers have investigated the need for mandatory three or four year dental hygiene education programs to encourage quality client care, professionalism, prestige and educational parity with other health professionals. As early as 1984, Mescher called for mandatory three year programs and the development of alliances between certificate/ associate degree programs with four-year institutions so that graduates could earn degrees proportionate with their years of education.

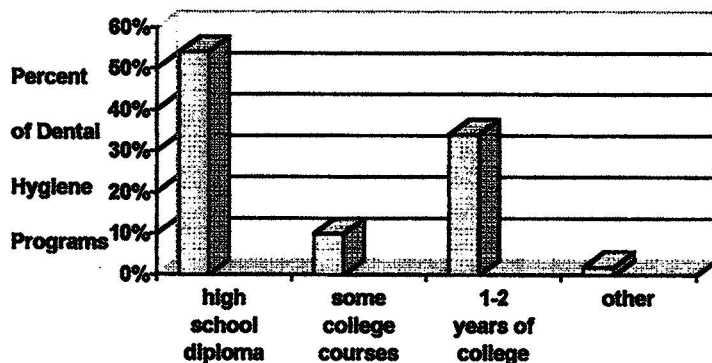


Figure 1
Educational requirements needed to enroll in dental hygiene programs (ADA, 1996)

The purpose of Mescher's study was to dispel the myth that dental hygienists are usually eligible for licensure examinations after two academic years of college education, and other myths that perpetuated this misconception. Data were presented regarding the educational level of beginning and graduating dental hygiene students, discrepancies between stated and actual student admissions policies, length of educational programs and discrepancies between number of years of education and degrees awarded. Mescher suggested that many students do not receive degrees commensurate with their level of education. Mescher's study found that only 17 % of the most recent graduates earned baccalaureate degrees and 40 % have at least four years of post high school education. She reported that from 1981-82, 64 of the 208 dental hygiene educational programs required at least three academic years for students to complete according to stated admissions requirements. She suggested that, by developing alliances between associate level dental hygiene programs and four year institutions, students could transfer credits earned at the community or technical college and earn a baccalaureate degree by taking additional courses at the four year institution.

Based on the data collected, Mescher (1984) concluded that dental hygienists may have a professional self-image that is equated with training rather than education. She also stated that the public may discern dental hygienists as auxiliaries who are employed by dentists to perform nonthinking tasks. Mescher (1984) identified other issues that she perceived as negative consequences if dental professionals continue to perpetuate these myths. State boards of dentistry may continue to impose restrictions on dental hygiene practice, based on limited educational background of dental hygienists. The perceptions

by dentists of dental hygienists as being “highly trained tooth cleaners who have limited capabilities in the recognition or treatment of oral disease” (Mescher, 1984) may continue.

A study by Parker and Fong (1987) investigated the prestige of dental hygienists as rated by healthcare providers. Forty-eight physical therapists, 56 occupational therapists, 71 registered nurses, and 95 physicians volunteered to participate in the study. A prestige scale developed by the authors was used to rate 13 allied health professions. They ranked dental hygienists 10th, 13th, 11th, and 10th respectively. Prestige scores of dental hygienists placed them among nonprofessionals in the occupational prestige literature (Parker and Fong, 1987). From the results of this study, one could conclude that dental hygienists are not viewed as professionals by other health professionals.

A commentary of the study by Allen (1987) states that the study supports previous literature concerning the need for the implementation of dental hygiene education culminating in the baccalaureate degree. As cited by Allen (1987), some reliability concerns of the prestige rating study include: the use of volunteers from hospital-based settings and the lack of information regarding the respondents’ knowledge of the rated professions. Research with a more varied sample would be needed to explore issues of this nature.

Some authors believed that the move toward a baccalaureate degree would equip the dental hygienist with more decision-making and critical thinking skills (Wayman, 1985; Paarmann et al, 1990). It is the opinion of Wayman (1985) and Paarmann et al (1990), that with a baccalaureate degree, today’s dental hygienist will be able to meet the challenge of being a multifaceted individual who must be prepared to adapt to change.

Paarmann et al (1990) cited an ADHA workshop whose participants defined six roles making up the total picture of the future dental hygienist: administrator/manager, change agent, health promoter/educator, clinician, consumer advocate and researcher. They proposed a four year integrated dental hygiene curriculum model, with students beginning dental hygiene theory courses in their freshmen year of college. The first year would also consist of the traditional core of general education and science courses. Each successive year would incorporate more dental hygiene theory and clinical courses along with students being able to incorporate electives and other required non-dental hygiene courses that would give the student a broad background in humanities and social sciences. The preclinical and clinical requirements would be spread out over three years, allowing more time for students to become competent in advanced clinical skills. Elective courses, particularly in the fourth year offer opportunities for students to pursue special interests and allow for dental hygienists to eventually branch out into alternative roles (Paarman et al, 1990).

Wayman (1985) noted the length of reported curriculum time for accredited dental hygiene programs and found a diversity in curriculum length. She found that 46 % of institutions offering a certificate or associate degree have added extra academic sessions beyond the traditional two years, and 21 % required a minimum of one year of college prior to admission. Wayman (1985) concluded that the scope and demands of comprehensive and current dental hygiene practice have outgrown the basic curriculum length of two years established in 1952. She also stated that preparation for current and comprehensive dental hygiene practice is beyond the scope and resources of two-year

lower division programs. Wayman's opinion included the recommendation that two levels of dental hygiene practice should be formalized, based on the two levels of undergraduate dental hygiene education that currently exist. However, this idea has been disputed by the dental hygiene profession. In ADHA's *Prospectus for Dental Hygiene* (1988), it is stated that

“to purposely prepare some hygienists to utilize all dental hygiene interventions and prepare others to treat only superficial and simple problems would be to disenfranchise the latter hygienist and, more importantly, the receivers of their care.”

The authors of the *Prospectus* (1988) also cited social, economic and technological changes that will create new demands on dental hygiene educators and practitioners. Dental hygienists will need to be adaptable to changes in oral disease patterns, the public's participation in oral healthcare, alterations in methods for monitoring and maintaining health, and the type of settings where services will be provided (ADHA, 1988). The authors also believe that to meet these new demands, the dental hygiene educational preparation will require the integration of general education with career education. They cited in particular, the inclusion of new knowledge and skills from other disciplinary fields, such as biologic, social and behavioral sciences (ADHA, 1988). To meet these educational demands, the authors suggest an extended period of study, to include a shift from the predominantly lower division specialized education to an integrated extended period of study with a broad general education base of both lower and upper division courses.

Walsh et al (1988) expressed the idea that establishing the bachelor's degree as the entry-level credential is a critical step toward the emergence of dental hygiene as a true profession. She stated that the baccalaureate level credential for dental hygiene practice "would provide increased opportunity for professional socialization so that dental hygienists will become a more functional group with clear collective values and goals." Recent innovations in dental hygiene practice, such as alternative practice settings, independent contracting and the 1986 legislation of independent practice in Colorado, were also cited as factors that would warrant further consideration of the baccalaureate degree as the minimum credential for entry into dental hygiene practice.

Several studies conducted in the late 1980's investigated the interest of dental hygienists in pursuing a baccalaureate degree. In 1988, DeBiase surveyed licensed dental hygienists holding certificates or associate degrees and students enrolled in certificate or associate degree programs. She mailed surveys to a random sample of 183 licensed dental hygienists holding certificate/associate degrees and 260 students enrolled in certificate/associate degree dental hygiene programs in West Virginia, Virginia, Ohio, Maryland, Pennsylvania, Kentucky, and the District of Columbia. The results of the survey indicated that 74.7 % of licensed dental hygienists and 77.1 % of students surveyed were interested in pursuing a baccalaureate degree in dental hygiene. Respondents who did not express interest in a baccalaureate dental hygiene degree did so for a variety of reasons. Many were not aware of the availability of baccalaureate dental hygiene programs. Others expressed concerns of financial limitations, inconvenient course scheduling, family

commitments, academic weakness, problems associated with transfer of credits, and the geographic distribution of programs (DeBiase, 1988).

Two limitations of DeBiase's study were the absence of any pre-examination of the questionnaire for content validity clarification and the absence of a pilot study to establish instrument reliability. Since this study was conducted in a specific geographic region, the findings are not generalizable to dental hygienists nationally.

Newell et al. (1989) surveyed certificate and associate degree hygienists concerning their interest in advanced education in the forms of baccalaureate degree completion and nondegree granting residency programs. This study was conducted with participants from vocational institutions, community colleges, and state and research university institutions in a five-state region in the upper Midwest. Nearly half of all respondents in the study were interested in a baccalaureate degree. She concluded that not all dental hygienists have the desire or the financial resources to pursue a baccalaureate degree. However, Newell et al (1989) state that they are seeking ways in which to expand their knowledge base and develop expertise in areas of interest beyond the typical continuing education course. She recommended further research on the dental hygienists' interest in non-degree granting residency programs. Because the vocational institutions were overrepresented in this study, the results may not be generalizable to other regions of the country.

A study by Tobian (1989) investigated the relationship between the educational level of dental hygienists and their perceptions regarding postcertificate / postassociate degree programs. A survey was mailed to a stratified (by state) random sample consisting

of 357 licensed dental hygienists in five states. The findings indicated a significant correlation between degree held and the perceptions of the hygienist concerning the need for postcertificate/postassociate dental hygiene programs. Results suggest that hygienists with a baccalaureate degree valued the need for postassociate/certificate degree programs.

Tobian (1989) also found correlations concerning other issues in dental hygiene education including the granting of academic credit for work experience and the provision of flexible attendance and scheduling options. This finding suggests that associate and certificate level hygienists may feel that barriers exist to enrollment in further dental hygiene education. There was no correlation between degree held and practitioner perceptions regarding a baccalaureate degree in another or related discipline offering more career options than a baccalaureate degree in dental hygiene. Dental hygienists with a baccalaureate degree or graduate degree perceived a greater need for postcertificate/postassociate dental hygiene education than certificate/associate practitioners. For those uninterested in obtaining a baccalaureate degree in dental hygiene, barriers to baccalaureate education included lack of funds and geographical distance to the nearest program. This study had a large sample size of 357 with a 70 % response rate in five states in the midwest.

Tobian (1989) had the questionnaire examined by a panel of registered dental hygienists to ensure content validity and clarity. She also conducted a test-retest procedure to establish reliability, prior to mailing the questionnaire. Eighty-seven percent of those participating in the test-retest procedure responded identically. For these reasons the instrument was determined to be valid and reliable. One limitation of Tobian's study

was sample representativeness. Forty percent of the respondents held baccalaureate degrees and 57.2 % held associate or certificate degrees. Compared to the current statistics concerning degrees held by registered dental hygienists, it would appear that the baccalaureate degree respondents were over represented. In a report on data from 1973 until 1992, associate degrees were held by 70 % of dental hygiene graduates and only 17 % held baccalaureate degrees (ADA, 1992).

Waring (1991) reported the results of a survey of 213 certificate and associate degree dental hygienists' in Tennessee who expressed an interest in a degree completion program. She explored factors affecting the likelihood of dental hygienist to participate in an external degree completion program. Geographic location, flexibility in scheduling, and accessibility to coursework were the program design factors most important to the survey respondents. Waring (1991) concluded that careful consideration of program design factors would be essential for most of these hygienists to participate in a baccalaureate degree completion program. One major limitation to this study was the fact that the study participants had already expressed an interest in a degree completion program and therefore, might not represent all dental hygienists in Tennessee holding an associated degree or certificate.

Recent data collected by the American Dental Association (ADA, 1996) reveals demographic information for the most recent graduates of dental hygiene programs. Although many students are 23 years or younger (43.2%), 64% are over the age viewed to be the age of the traditional student, i.e., 23 and under (See Table 1). The Survey of Allied Dental Education suggests that many dental hygiene graduates are in an age

bracket that would possibly include married women with children. These students are more than likely to have work and family responsibilities.

Table 1
Graduates of dental hygiene programs by age (ADA, 1996)

Age	Full-time	Part-time	Total	Percent
23 and under	1,513	52	1,565	36.1%
24-29	1,369	72	1,441	33.3%
30-34	584	30	614	14.2%
35-39	419	22	441	10.2%
40 and over	258	14	272	6.3%
Total graduates	4,143	190	4,333	100.0%

Dental Hygiene Baccalaureate Degree Completion Programs

Currently there are 56 colleges or universities in the United States offering either on-site courses leading to a baccalaureate degree or articulation agreements with other educational institutions offering courses to meet baccalaureate degree completion requirements (ADHA, 1997). These colleges or universities offer programs for dental hygienists to work towards a baccalaureate degree in dental hygiene or in a related area. Student enrollment rates in these programs varies greatly. In an informal survey carried out by the researcher, several schools reported no students currently enrolled, many reported seven or fewer students, while three institutions reported 20 or more students enrolled. Several institutions reported the use of distance education in one form or another (correspondence courses, Internet, telecommunications, etc.) as an option for at least some coursework towards a baccalaureate degree.

Of these 56 institutions of higher education offering a degree completion for dental hygienists, 40 grant a baccalaureate degree in dental hygiene while two grant a bachelor of science degree in arts and sciences. Nine institutions grant one of several types of a health science baccalaureate degree such as, dental health education, health administration, health education, public health, and health service organization and policy. The University of Alaska at Anchorage grants a baccalaureate degree in technology with options in education, business, and science and technology to dental hygienists seeking degree completion. Ferris State University in Big Rapids, Michigan lists a baccalaureate degree program with various options for degree completion program majors. Other degree completion programs grant a bachelor's degree in general studies or applied science with a major in allied health (ADHA, 1997).

A study by Cameron and Fales (1988) compared outcomes of traditional and degree completion baccalaureate dental hygiene graduates. A total of 87 dental hygiene graduates were surveyed concerning the educational and practice patterns. The specific outcomes that were assessed reflected both the goals of the traditional program as well the degree completion graduates' individual goals. The results of the study revealed that a greater proportion of degree completion graduates had completed advanced degrees, which provided a positive assessment of the individual goals of these graduates. The enrollment of traditional and degree completion graduates in academic degree programs were comparable at the time of the study as well as the intentions of both groups of programs to pursue further education. Concerning practice settings, these patterns fit closely with the goals of the traditional program, which were to produce competent dental

hygienists for private practice. The degree completion graduates were also true to their goals for expanding opportunities in alternative practice settings and increasing career options and mobility. The majority of these graduates reported experiences in three or more practice settings, while only one-sixth had limited their experience to general dental practice. A larger proportion of the degree completion graduates had been employed in education, which complemented their goals focusing on a career in dental hygiene education. The small sample size and modest response rates limits the generalization of this information (Cameron & Fales, 1989).

Discussion of dental hygiene baccalaureate degree completion includes the concept of articulation between certificate/associate level dental hygiene programs and four year institutions. Articulation involves an agreement, usually between a community college and a four year institution of higher education to work together to facilitate the transfer of students and their college credits earned from one college to another (Glick, 1989).

Although students may lose credits with some articulation agreements, careful planning by the certificate/associate level dental hygienist may allow completion of the baccalaureate degree in two to two and one half years of additional study at the four year institution (Glick, 1989).

Currently, dental hygienists are seeking baccalaureate degrees in less traditional settings (Emmerling, 1997). The health arts program at the College of St. Francis conducts classes in more than 120 locations in 18 states with sites being developed by student demand. The college generally applies 96 credits of dental hygiene course work and work experience towards the total of 128 credit hours required for a bachelor's

degree in health arts. The college reported that 81% of the graduates indicated they have benefited professionally from the degree, 29% have entered graduate school or earned a master's degree and 97% expressed personal satisfaction and growth as a result of earning the degree (Emmerling, 1997).

Other innovative degree completion programs include Syracuse University-Independent Study Degree Program. The one week residency requirement per semester enables students to meet with advisors, attend concentrated classes, receive assignments, and complete necessary research and reading. The rest of the semester is spent completing assignments independently. Students return to the campus at the end of the semester for exams and residency requirements for the upcoming semester. The college offers several baccalaureate programs with the most applicable for dental hygienists being the bachelor of arts in liberal studies. Students may transfer a maximum of 90 credits, 66 from a junior college. Thirty credits may be earned through testing or evaluation of extra-instructional or experiential learning. A minimum of 30 credits must be earned at Syracuse University (Emmerling, 1997).

Thomas A. Edison State College in Trenton, New Jersey is another nontraditional alternative to baccalaureate education. The college offers classroom instruction, has no residency requirements and no full-time faculty of its own. Students meet requirements by passing college equivalency examinations, assessment of college-level learning, the transfer of credits from other institutions, and /or completing a variety of independent study via audio, video or computer-facilitated learning. The college does not give courses

itself, but instead, evaluates and grants credit for work completed from other sources (Emmerling, 1997).

The Use of Distance Education in the Education of Health Professionals

Other health education disciplines along with dental hygiene share the roadblocks to baccalaureate education. Like dental hygienists, other health professions aspire to the baccalaureate degree as the minimum educational credential, but deal with geographic, financial, and family constraints. The nursing discipline in particular has had to respond to a national shortage of nurses and the growing demand for baccalaureate nurses (Dirksen, et al, 1993; Shomaker, 1993). Many areas of the country do not have baccalaureate programs easily accessible to the RN student (Harrington & Baldwin, 1993). Distance education has been one alternative for several institutions to provide baccalaureate nursing education (Fulmer, et al, 1992; Yeaworth, 1996; Harrington & Baldwin, 1993; Dirksen, et al, 1993).

In 1992, Fulmer et al reported on the distance education program at Western Kentucky University (WKU). The authors described WKU as being a pioneer in nursing distance education. In 1975, a request for courses leading to the bachelor of science in nursing degree was made by the nursing staff and administration of a county hospital in Owensboro, KY. The city of Owensboro is 70 miles from the Bowling Green campus. It is served by one associate degree nursing program and a need was expressed by area hospitals for more baccalaureate prepared nurses in the region. A survey in 1980 revealed a need for baccalaureate education and a desire by nurses in the area to pursue

baccalaureate education. In 1984, the WKU Department of Nursing admitted the first class into the Owensboro outreach program leading to the bachelor of science in nursing (Fulmer et al, 1992). The use of communication skills and teacher preparation for distance education learning were found to be vital to the success of the program. The authors also discussed the shortcomings of distance education, e.g., they felt that distance education can be impersonal and that students are not comfortable at first with the difference in class structure and equipment. After reviewing the program's progress for several years, it was concluded that interactive television is a cost-effective way to deliver courses.

The University of New Mexico also has responded to the growing demand for baccalaureate-degree nurses via distance education. As of 1993, 100 students had graduated from a distance education degree completion program. The program includes the broadcasting of 10 upper-division nursing courses via satellite to a number of registered nurse students at sites in New Mexico and southern Colorado (Shomaker, 1993). Shomaker also cites important aspects of distance education that may be a disadvantage and preclude the quality of the baccalaureate degree earned. Faculty can easily lose control of the classroom at the distance site especially if a one-way video system is being used. Nonverbal cues and being able to view student behavior are absent and instructors may not be able to determine if learning has taken place. Shomaker indicates that interactivity between the instructor and students at the distance site is essential for success.

Prior to the implementation of the programs at Western Kentucky University, the University of New Mexico, the University of Texas Health Science Center at Houston School of Nursing, and York College of Pennsylvania, surveys were conducted to assess the need for a distance education program. Harrington and Baldwin (1993), Sherwood et al (1994), and Fulmer et al (1992) agree that a needs assessment is essential to determine the demand for such a program. Harrington and Baldwin (1993) surveyed 902 healthcare workers from 20 acute care hospitals in a five county area of a large eastern state. More than 50 % of respondents expressed an interest in attending courses using telecommunications. Ninety percent of responding staff nurses and 85 % of nurse managers indicated they desired a baccalaureate degree in nursing.

Sherwood et al (1994) are faculty from two Texas university-based schools of nursing who started traditional (either drive or fly to each session) off-campus distance education programs primarily for rural registered nurses, then moved into use of satellite technology. They stated that their programs were built upon what the authors term “the 3 A’s of distance education: assessment, accessibility and accommodation.” Off-site community nursing leaders and representatives from local health care agencies conducted an extensive needs assessment before making requests for such a program. For many registered nurse participants of these programs, the only opportunity for educational improvement is distance education. The satellite one-way video and two-way audio technology capability produced the accessibility of nursing faculty and resources to nurses in underserved areas. Accommodating current nursing resources in the community has created collaboration models including, associate degree nursing faculty in off-campus

sites promoting professional development and the career advancements of registered nurses with advanced skills (Sherwood et al, 1994).

Distance education has been employed around the world for several years. The United Kingdom's Open University, along with programs in Australia were two of the first countries to develop distance education for those unable to attend programs and courses at educational institutions (Titchen, 1992). Titchen (1992) hoped to stimulate debate about the development of alternative curriculum designs to help overcome the problems of obtaining funding and study leave to attend post-basic and continuing education programs. Titchen's study investigated various allied health distance education programs in Australia and found that allied health professions had not been able to use available resources because their target groups were not large enough for the production of materials to be cost-effective. She found that various types of distance education are being used in Australia, such as audio-teleconferencing, computer conferencing, and computer-based learning. To become more cost-effective, she proposed that distance learning materials should be multidisciplinary in nature for post-basic degree and continuing education programs.

Computer mediated conferencing is another distance education modality utilized by nursing students at the University of Ottawa (Cragg, 1994). Nurses scattered throughout Canada with family and work obligations, are taking advantage of distance education modalities for continuing education and university credit programs. Through computer mediated conferencing, students participate in a continuous group learning experience via a mainframe computer during convenient hours. E-mail and

electronic bulletin boards share characteristics of computer mediated conferencing (Cragg, 1994). Participants have access to main conference files, administrative material, library facilities, as well as social interaction.

Ten students enrolled in the post-RN baccalaureate degree course on nursing the elderly in the community, via computer mediated conferencing. The main teaching strategy for the course was group discussion on assigned readings, student experiences, and a clinical assignment with an elderly person in the community (Cragg, 1994).

To assess the students perceptions of the computer mediated conferencing experience, seven students were interviewed. Students expressed problems initially with the technology. Despite an initial training session, students had problems with accessing the mainframe program and learning to upload and download material. Other problems associated with hardware and software incompatibilities with the mainframe created student frustration. Despite frequent reports of frustration and anger with the technology, the students had a very positive psychological response to the events in the conferences once they had achieved contact (Cragg, 1994). All of the students passed the course and reported that they had done as well and learned as much as they have in traditional face-to-face classes (Cragg, 1994). Because this study had a small number of respondents, the results cannot be generalized.

Distance Education in Dental Education

Although little literature exists concerning the use of distance education in dental education, several studies previously mentioned recommended the use of nontraditional means of completing a dental hygiene baccalaureate degree (Waring, 1991; Newell et al, 1989; Tobian, 1989). The use of distance education and flexible scheduling were two recommendations made to attract and accommodate more students in a degree completion program.

A study done by Carr and Rubenstein (1989) compared the changing characteristics of traditional dental hygiene baccalaureate degree and degree completion students from 1978 and 1987 admission records. Among degree completion students, the mean age increased 11.5 years and the length of time between graduation from a dental hygiene program and matriculation into the degree completion program increased by 10.2 years. Consequently, it was recommended that part-time curriculum options be made to meet the needs of students who have increased family or work responsibilities (Carr & Rubenstein, 1989).

A worldwide study on distance learning in dental education by Anneroth (1994) reported that of the 35 countries responding to the survey, only eight countries provided dental education using distance education. There was no mention of dental hygiene education specifically. The Japanese Dental Association reported spending the most money for developing and running distance education programs with weekly broadcasts to their members through television and short wave broadcasting programs.

Several advantages of distance education were cited by the respondents and were previously mentioned. Some of the disadvantages of the distance education programs cited were costs, lack of clinical training, lack of required support from properly trained technical teams, media limitations, the difficulty to assess improvement of learning from the participants, and shortage of teaching staff. The countries that assessed their programs reported that most of the courses were well received by course participants (Anneroth, 1994).

The Department of Dental Hygiene at Armstrong Atlantic State University began a collaborative effort with Coastal Georgia Community College in Brunswick, Georgia in the Fall of 1995 offering the innovative delivery of curriculum leading to the Associate in Science in Dental Hygiene degree through distance learning and on-campus courses (Tanenbaum, 1996). Five students living in the Brunswick area were selected for admission. Five non-laboratory courses were offered via distance learning. These courses contained basic information that serve as the foundation for future courses. Students take general core and science courses at Coastal Georgia Community College and then attend dental hygiene classes at the Armstrong Atlantic State University campus during their second and third years of study on a part-time basis. By offering this associate degree curriculum in a three year period, the Brunswick area students achieve flexibility in scheduling and minimize the commute required to attend a two-year traditional on-campus curriculum.

Continuing education courses for dental hygiene practitioners also are offered by Armstrong Atlantic State University, via distance education. Many students who could

not take time away from work, family or other commitments take advantage of this opportunity to complete mandatory continuing education credits for relicensure (Tanenbaum, 1996).

One form of a distance education degree completion program has been recently implemented at Pennsylvania College of Technology (Morr, 1996). In 1996, students enrolled in the program viewed seven one hour video tapes and attended three seven hour class sessions on Saturdays to complete requirements for a periodontics course. Faculty and students communicated through e-mail. Beginning in the spring 1997 semester, courses were taught through pic-tel, a two way video, two-way audio program. Presently the college offers a degree completion program at two distance education sites, Harcum College and Luzerne College as well as at the Williamsport, Pennsylvania campus site. The program is a combination of traditional "face-to-face, video-based, internet and pic-tel" (Morr, 1997). Courses purchased from the Public Broadcasting System or other organizations offering distance education courses are being used for general education requirements and electives (Morr, 1996). A total of 24 students are enrolled in this program at the two remote sites. According to Morr (1997), "the response has been very favorable from the students, and the blend of the different modes seems to be a good one for these students."

Waukesha County Technical College in Pewaukee, Wisconsin is currently offering another form of distance education (Kaz, 1996). Video-conferencing is utilized to reach dental hygiene students in remote areas surrounding Pewaukee. Each remote area contains a site with a dental hygiene facilitator. Students attend didactic, laboratory and clinical

courses at each site. Faculty calibration takes place via video-conferencing. Waukesha County Technical College has an articulation program for dental hygiene degree completion with Marquette University (Kaz, 1996).

Poindexter (1996) reported that several forms of distance education are being implemented throughout the country at various institutions of higher education. Most current distance education systems use several forms of technology, such as satellites, fiber optics, microwaves, cable, computer connections, computer-mediated instruction using CD-ROM, and instructional television fixed services. These technologies are all being used to connect students with instructors.

Poindexter (1996) quotes Becky Rajek, a dental hygiene instructor at Northcentral Technical College (NTC) in Wasau, Wisconsin, as saying the school uses "distance technology to deliver a shared dental hygiene program." She cites cost effectiveness as well as a need expressed by local dentists, as factors that led to the adoption of a distance education program. In the fall of 1993, Northcentral Technical College began the first accredited distance education-based dental hygiene program in the country using two-way video and audio connections between classroom lecture sites. Clinical and laboratory work is completed at each site, not via technology (Poindexter, 1996).

The American Dental Hygienists' Association held its first distance education continuing education course on November 16, 1996. The Interactive Satellite Symposium was broadcast to 52 sites throughout the nation, with over 1,900 participants. Four presenters pre-recorded lectures that were transmitted to the various sites along with live

discussion and question and answer sessions between participants and presenters. Evaluations completed by participants and site facilitators at the close of the event indicated a positive response to the symposium. The three survey items that scored the highest (composite mean) on facilitators' evaluation forms were "relevancy of the information," "usefulness of handouts," and "applicability of program to clinical practice". The lowest rating received was for "quality of sound". Eighty-five percent of the participants indicated that they would attend another ADHA satellite symposium (Lyons, 1997).

Dentistry and dental hygiene have begun to utilize educational opportunities available through the Internet, also a form of distance education. The use of listservers allows communication between people with a common interest. Several state dental and dental hygiene associations, The American Dental Association, The American Dental Hygienists' Association, along with dental and dental hygiene schools, have World Wide Web (WWW) sites to supply dentists and dental hygienists with information concerning continuing education, research, and client care (Zimmerman, 1996).

The History of TELETECHNET at Old Dominion University

TELETECHNET is a state-of-the-art distance learning network designed to deliver baccalaureate degree programs offered by Old Dominion University in partnership with the Virginia Community College System. This program which began in 1992, consists of a two-way audio, one-way video delivery system. Participating community colleges offer the first two years of instruction; Old Dominion University via TELETECHNET

provides the last two years. The university's objective is not to duplicate existing academic offerings, but to provide opportunities for programs where there is an unmet need in a particular region (Old Dominion University, 1995). Therefore, not all of the university's programs are offered at all locations.

Prior to the implementation of TELETECHNET, a statewide needs assessment was conducted by the university. Surveys were inserted into newspapers across the state and were distributed to currently enrolled community college students. Respondents were queried concerning their interest in course work beyond the community college level, baccalaureate degree preference, likelihood of enrollment, preference of class hours, and demographic issues. Over 5500 surveys were returned (Old Dominion University, 1993) and results revealed that most individuals indicating a strong interest in the program are older, employed adults with some college background. Of the sample, 21 % indicated that they had earned 60 or more college credits towards a degree. Therefore, a significant number of respondents would need to complete prerequisites at a community college prior to enrolling in a TELETECHNET program (Old Dominion University, 1993).

Presently 180 courses are being taught via TELETECHNET with 8,000 registered students (Phillips, 1996). By the year 2000, it is anticipated that 400 courses will be offered. In 1997 the Commonwealth of Virginia began construction of a new facility at Old Dominion University specifically for the broadcast of TELETECHNET courses.

During the developmental stage of the TELETECHNET program, agreements were developed between Old Dominion University and the community colleges. The community colleges agreed to provide the following to support the TELETECHNET

program: two or more receiving classrooms to accommodate at least 10 students each, administration space, a computer lab, equipment such as desks and computers, equipment for the site director, space for storing video tapes, necessary books in the library, and assistance for the site director. Old Dominion University agreed to provide the following: a site coordinator to support the program and students, funds to support faculty, technology, and community college staff, equipment such as television monitors, and fax machines, and the cost of transmission.

TELETECHNET has been used successfully in the nursing curriculum at Old Dominion University. Many registered nurses who received their associate degrees at community colleges can now obtain a baccalaureate degree from Old Dominion University via distance education at their community college. The School of Nursing is currently researching the effectiveness of the program versus a traditional on - campus baccalaureate degree completion program (Nichols, 1996).

TELETECHNET is very costly. It is estimated that satellite time expenses to broadcast are \$700.00 per hour. Equipment used to broadcast and receive the transmission also are very expensive. There is some disagreement among TELETECHNET authorities as to whether it will ever be cost effective for Old Dominion University to deliver courses in this manner. Phillips (1996) believes that as more students enroll, TELETECHNET will become more cost effective. Conversely, Allen (1996) believes that TELETECHNET will never be cost effective for the university. However, both Phillips (1996) and Allen (1996) agree that being able to deliver courses to many more students than would otherwise be possible via a traditional method, provides a

valuable service to these students. This service is in a sense cost effective for this population of people if not in a monetary sense for the university.

TELETECHNET has recently reached a milestone in distance education. Beginning in the fall 1997 semester, the first graduate level classes were broadcast to a deployed United States Navy aircraft carrier. Two business courses were taught to Navy personnel aboard the USS George Washington, currently deployed in the North Arabian Gulf. This pilot program enabled 33 students to complete core courses leading to a Master's in Business Administration. Exams were administered by an education officer on board the ship and sent to the professors for grading. The use of the two-way audio and video was another first for TELETECHNET. The professors' ability to see as well as hear their students gave them more insight into how well the students were grasping the subject matter. Despite a few minor satellite glitches and time-delayed movements producing a blurry picture, student response was favorable (Whalen, 1998).

Summary

The promotion of the baccalaureate degree as the entry level credential into dental hygiene practice continues to be a major issue among the dental hygiene profession. Many researchers are in agreement concerning the reasons a baccalaureate degree in dental hygiene is preferred; however, in reality, most hygienists are earning associate degrees or certificates in dental hygiene (Mescher, 1984; Wayman, 1985; Paarmann et al, 1990; Walsh et al, 1988). Researchers have found that in recent years graduates of associate or

certificate level programs earn college credits far above the degree granted to them upon graduation (Wayman, 1985; Mescher, 1984).

There is much research supporting the interest of associate/certificate level dental hygienists for dental hygiene degree completion programs (DeBiase, 1988; Newell, 1989; Tobian, 1989; Waring, 1991). However, this research also shows that few dental hygienists actually enroll in a degree completion program. Hygienists surveyed have cited factors influencing their willingness to enroll in a degree completion program such as geographic location of programs, flexibility in scheduling, family and work responsibilities, and financial considerations (DeBiase, 1988; Waring, 1991).

With the decreasing number of dental hygiene baccalaureate degree programs, dental hygienists are beginning to seek alternative methods to earning a baccalaureate degree (Emmerling, 1997). Universities and colleges that accept the majority of the dental hygienist's previous credit hours, offer flexibility in scheduling, and grant course credit for experience or continuing education are attracting dental hygienists throughout the country to complete their baccalaureate education.

Distance education has been shown to be a viable alternative to traditional higher education programs for many healthcare professions, especially nursing (Sherwood et al, 1994; Shomaker, 1993; Fulmer et al, 1992). Many researchers cited programs currently operating efficiently to provide needed baccalaureate education to registered nurses. These nurses, in many cases, live and work in remote areas, away from institutions of higher education. Distance education has filled a void for these nurses who are now able to

better serve their communities by completing baccalaureate education. Perhaps a similar program could be beneficial to both registered dental hygienists and their communities.

Little literature exists concerning the use of distance education in dental hygiene education, but programs are currently being developed. Several institutions are turning to distance education technology to meet the demands of today's dental hygiene students (Kaz, 1996; Tanenbaum, 1996; Morr, 1996; Poindexter, 1996). This study should provide information concerning the need for a distance education dental hygiene degree completion program at Old Dominion University. More research on distance education would be needed to develop the implementation phase of such a program.

The implementation of Old Dominion University's TELETECHNET program has brought the university to many students in remote areas who could not relocate to Norfolk. It has opened many doors towards higher education that would otherwise not be available to many students (Phillips, 1996; Allen, 1996). Although the cost effectiveness issue has been disputed among authorities in the field, the availability of these courses to students in many areas of the state becomes a benefit that far outweighs the monetary costs (Allen, 1996).

CHAPTER III

METHODS AND MATERIALS

A self designed questionnaire titled, *The Distance Education for a Dental Hygiene Degree Completion Program Questionnaire* was employed to obtain data concerning the interest of associate and certificate level licensed dental hygienists in enrolling in a dental hygiene degree completion program via distance education. The questionnaire also surveyed participants on demographics, educational background and previous experiences with distance education.

Sample Description

The random sample for this study was obtained from a list of all licensed dental hygienists in the Commonwealth of Virginia. Some respondents already hold a baccalaureate degree; therefore, data gathered from only those reporting an associate degree or certificate in dental hygiene were analyzed. For this study the Commonwealth of Virginia was chosen for examination because of the existence of three associate degree level programs in areas of the state a great distance from either of the two baccalaureate degree programs (See Figure 2). Also, the existence of TELETECHNET, a distance education program in other disciplines at Old Dominion University warranted a needs assessment for such a program in dental hygiene. All three dental hygiene associate degree programs are at community colleges currently participating in the TELETECHNET program.

The target population consisted of 2,356 registered dental hygienists residing in Virginia. Virginia registered hygienists residing in other states were not included in the

target population since they would not have access to the TELETECHNET system. As recommended by Issac and Michael (1981), to obtain a sample proportion within $\pm .05$ of the population proportion at a 95 percent level of confidence, the appropriate sample size for this population should be 327 people. To account for the fact that about 30-40% of the total population would hold a baccalaureate degree in dental hygiene, it was decided to 25% sample (589) was chosen. This sample was chosen randomly by initially choosing a number between one and four and systematically sampling by choosing every fourth name throughout the entire population.

Methodology

A descriptive research approach was used to investigate issues surrounding a distance education dental hygiene degree completion program in Virginia. *The Distance Education for a Dental Hygiene Degree Completion Program Questionnaire* consisted of 20 questions in two sections: Section 1, nine questions concerning demographics and educational background of the participant and Section 2, eleven questions pertaining to the participant's interest in a degree completion program and experience with distance education. Several questions were adapted from a previous study questionnaire entitled, *External Degree Completion Survey* used to measure factors affecting participation in external degree completion programs (Waring, 1991). The questionnaire for this study was examined and critiqued by a panel of faculty members from the Old Dominion University School of Dental Hygiene and faculty members from the University's Center for Learning Technology. Appropriate changes to the questionnaire were made, based on their suggestions.



Figure 2
Geographic area of target population, TELETECHNET sites

A list of registered dental hygienists from the Commonwealth of Virginia was obtained from the Virginia Board of Dentistry. From this list a 25% systematic random sample was chosen. Also from this list a separate systematic random sample of 20 registered dental hygienists was chosen, to complete the questionnaire on two separate occasions to establish test-retest reliability. In section 1, questions 1-9, test-retest analysis revealed a consistency of 85-92%. In section 2, questions 10 and 13-20, test-retest analysis revealed a consistency of 60-100%. The questionnaire items 11a-k and 12a -i which used a Likert scale, had a 40-80% consistency. The low levels of consistency observed in this section of the questionnaire were attributed to the Likert scale of measurement and the possibility of the instrument itself changing the attitude of subjects. As a result of the test-retest procedure, no changes were made to the questionnaire.

A cover letter and a self-designed data collection instrument were mailed to the selected samples (see Appendices A & B). The cover letter explained the purpose and importance of the survey, the approximate time needed to complete the questionnaire, instructions, and a return date. Participant identification was not requested to protect confidentiality. Questionnaires were coded to allow the researcher to know who had responded. Three weeks after the initial mailing, a second letter was mailed to nonrespondents in order to increase the response rate (See Appendix C). Participation was voluntary and consent was understood by participants upon return of the completed questionnaire. After the study was completed, lists containing respondents' names and addresses were destroyed by the principal investigator.

Protection of Human Subjects

In accordance with the Old Dominion University Committee on the Protection of Human Subjects, the following information was submitted to the committee and approval was received on February 10, 1997. Three comments were made by the committee and proper alterations were made to the study where appropriate.

1. The name and contact telephone number of the thesis committee chairperson must be in the cover letter along with a statement disclosing that this research is a thesis project.
2. The cover letter needs to state that there are no foreseeable risks to participants.
3. A statement must be included regarding the protection of subjects' names (i.e., after the follow-up letter, list will be destroyed).

Subject Population: Dental hygienists registered in Virginia will be asked to complete the data collection instrument.

Consent Procedures: Subject participation will be voluntary. Return of the questionnaire will demonstrate informed and voluntary consent.

Protection of Subject's Rights: Subjects will be informed in a cover letter that confidentiality will be preserved. The questionnaires will be coded to identify respondents and nonrespondents. Subjects will be informed that results will be reported in aggregate form only and will be available upon request. Respondents' names and addresses will be destroyed upon completion of the study.

Potential Risks: The descriptive procedure will not involve risks to the subjects. All responses will remain confidential and data will be reported in group form only.

Potential Benefits: Data from this study will provide information about the potential interest of dental hygienists in a distance education degree completion program and their likelihood of enrolling in such a program. The value dental hygienists place on baccalaureate education will be used to formulate recommendations for development of distance education programs in dental hygiene education.

Risk/Benefit Ratio: The results will be beneficial because no risks exist.

Instrumentation

The data collection instrument was a self-designed questionnaire titled, *Distance Education for A Dental Hygiene Degree Completion Program Questionnaire*. The instrument consisted of two sections. Section one gathered demographic and educational background information. Since the focus of this study was to investigate the need for a baccalaureate degree completion program for associate/certificate level dental hygienists, participants with at least a baccalaureate in dental hygiene were not invited to complete section two. Section two consisted of 11 questions concerning the participants' interest in baccalaureate education, factors and reasons affecting a decision to seek baccalaureate education, additional college credits earned beyond their dental hygiene education and their experiences with distance education.

Four questions concerning personal characteristics queried the participants on their age, gender, marital status, and whether they were responsible for elderly parents and children living at home. Three questions sought information concerning date of dental hygiene licensure and employment status. Two questions pertained to the type of dental hygiene credential earned and any additional college credential earned.

In section 2, three questions addressed the participant's likelihood of seeking a degree completion program. The importance of program design factors and personal reasons considered when making a decision to seek a degree completion program also were addressed in two questions. Two questions queried the participants about their interest in baccalaureate education. Two questions pertained to the participant's prior experience with distance education and the likelihood of enrolling in other distance education courses. The final two questions solicited information concerning convenient course scheduling times and additional comments regarding the need for a dental hygiene degree completion program via distance education. Six of the ten questions in section 2 were measured on a Likert scale, for example, (1) not important, (2) somewhat important and (3) very important. Other questions required yes/no answers or selecting from a list of appropriate responses.

Content validity of the questionnaire was established by a panel of faculty members from the School of Dental Hygiene as well as from the Center for Learning Technology at Old Dominion University.

Statistical Analysis

Collected data were a combination of nominal, ordinal and ratio measures. Descriptive statistical analyses included frequencies and percentages of responses. Demographic data on age, marital status, family responsibilities, and employment status were cross-tabulated to determine if there was an association with responses concerning the desire to complete a dental hygiene baccalaureate degree completion program. Cross-tabulations also were used to compare degree completion program design factors and

personal reasons considered when deciding to pursue an advanced degree in dental hygiene with the likelihood of enrollment in a distance education program. The chi-square test of association was used to determine significant relationships between dental hygienists' demographic variables, program design factors and personal reasons with subjects' desire for distance education. When the chi-square analysis showed no significant relationship between variables, it was stated that these variables were not associated or were independent of each other. Because the chi-square statistic does not indicate the source of significance, an analysis of residuals (the discrepancies between the observed and expected values) was conducted when the chi-square was significant. A positive residual means that there are more observed cases in a cross-tabulation cell than would be expected if the variables are independent of each other. A negative residual indicates that there were fewer observed cases than would be expected if the variables were independent of each other (Norusis, 1996). To determine if any of these variables were helpful in predicting the likelihood of enrollment, lambda scores were tabulated. Lambda, a proportional reduction in error measure (PRE), is measured on a scale of 0.0 to 1.0 with zero indicating that one variable is of no help in predicting another variable and 1.0 indicating that if one variable is known there will be no error in prediction of another variable. Data were analyzed utilizing the SPSS Graduate Pack computer program. All inferential analyses were made at the .05 level of significance.

CHAPTER IV

RESULTS AND DISCUSSION

A study was conducted to determine the need for a dental hygiene baccalaureate degree program via distance education for associate/certificate level dental hygienists within the Commonwealth of Virginia. A random sample of 589 registered dental hygienists residing in the Commonwealth was selected representing 25 % of the 2,356 currently registered dental hygienists. The survey instrument, *The Distance Education For A Dental Hygiene Degree Completion Program Questionnaire* was mailed to the random sample of dental hygienists to gather information on demographics, interest in a baccalaureate degree program as well as previous experience with distance education. Initially, from the 589 questionnaires mailed, 308 responses (52.30%) resulted. A second mailing to nonrespondents produced 98 additional responses (16.47%), resulting in an overall response rate of 68.93%.

Data were analyzed using frequencies, percentages, and the chi-square test of association. Cross-tabulations were used to compare demographic attributes of dental hygienists with their interest in baccalaureate degree completion. Cross-tabulations also were done to compare factors and reasons considered by dental hygienists when making a decision to enroll in a baccalaureate degree completion program and their likelihood of enrollment in such a program. The chi-square test of association was used to measure statistical significance between the cross-tabulated variables. When chi-square analysis revealed significant relationships, an analysis of residuals was conducted to determine which observed values were larger than might be expected by chance. Lambda also was

used in conjunction with the chi-square test to further determine if demographic characteristics, program design factors or personal reasons considered when deciding to seek further dental hygiene education would predict the likelihood of enrollment in a distance education program.

Results

Section one of the questionnaire asked respondents about their demographic background, employment status, and dental hygiene credentials. In situations where respondents failed to complete a particular questionnaire item or answered “not applicable” data are reported as “missing”. Data gathered from the initial sample (n=406) follow.

Questionnaire item one asked the respondent’s age. Of these respondents, 75 (18.5%) were between 20 and 30 years old, 165 (40.6%) were between 31 and 40 years old, 126 (31.0%) were between 41 and 50 years old, and 38 (9.4%) reported their age to be 50 years old or older with 2 (0.5%) not completing item one. The mode of this data fell within the group of those dental hygienists between the ages of 31 and 40.

Item two determined that 404 (99.5%) respondents to this question were female; 2 (0.5%) respondents did not complete the question. Regarding marital status, 83 (20.4%) reported to be single while 321 (79.1%) reported to be married with 2 (0.5%) not answering the question.

Questionnaire item four queried respondents on family responsibilities. Of the 406 respondents, 243 (59.9%) answered “yes” to having children or elderly parents living at home, while 159 (39.2%) answered “no” with 4 (1.0%) not completing the question.

Item five gathered information on when respondents first received their dental hygiene license. Ten (2.5%) reported to have been first licensed prior to 1960, 43 (10.6%) between 1961 and 1970, 122 (30.0%) between 1971 and 1980, 135 (33.7%) between 1981 and 1990, and 92 (22.9%) after 1990 . Four respondents (1.0%) did not complete the question.

Items six and seven asked respondents to report their employment status. In item six, 231 (56.9%) respondents reported to be employed full-time; 137 (33.7%) were employed part-time; 35 (8.6%) reported to be unemployed as a dental hygienist; 3 (0.7%) did not answer this question (see Table 2). Item seven queried the respondents about their place of employment. Of the 367 respondents reporting to be currently employed as dental hygienists, 349 (95.1%) were employed in a private practice setting, 2 (0.5%) in a public health setting, 5 (1.4%) in a hospital or clinical setting, 6 (1.6%) in an educational setting, and 5 (1.2%) answered “other” (see Table 3).

Items eight and nine gathered information concerning degrees held by the respondents. Item eight identified the respondent’s highest dental hygiene credential attained. Of the 406 respondents, 228 (56.2%) reported to have either an associate degree or certificate in dental hygiene, 167 (41.1%) a baccalaureate degree, and 8 (2.0%) a master’s degree in dental hygiene (see Table 4). Three (0.7%) respondents did not complete this item.

Table 2

Employment status of Virginia registered dental hygienists in sample (n=406).

EMPLOYMENT STATUS	FREQUENCY	PERCENTAGE
Full-time (32-40 hours per week)	231	56.9
Part-time (less than 32 hours per week)	137	33.7
Currently not employed as dental hygienist	35	8.6
Missing data	3	0.7
TOTALS	406	100

Table 3

Employment setting of Virginia registered dental hygienists in sample (n=406).

PLACE OF EMPLOYMENT	FREQUENCY	PERCENTAGE
Private practice	349	86
Public health	2	0.5
Hospital / clinic	5	1.4
Education	6	1.6
Other	5	1.2
Not applicable	36	8.9
Missing data	3	0.7
TOTALS	406	100

Table 4

Highest dental hygiene credential held by Virginia dental hygienists sampled (n=406).

DENTAL HYGIENE DEGREE	FREQUENCY	PERCENTAGE
Associate/certificate	228	56.2
Baccalaureate	167	41.1
Master's	8	2.0
Missing data	3	0.7
TOTALS	406	100

Item nine asked respondents to identify any other credential that they hold. Twenty-seven (6.7%) hold an additional associate degree or certificate, 34 (8.4%) have an additional baccalaureate degree, 9 (2.2%) hold a master's degree in another discipline, and 3 (0.7%) have a Ph.D. Three hundred twenty-three (79.6%) listed no additional degree besides their dental hygiene degree. Three respondents (0.7%) reported yes to having an additional degree, but did not specify what type of degree. Seven respondents (1.7%) did not complete the question (see Figure 3).

At this point in the questionnaire, respondents with an earned baccalaureate degree in dental hygiene were asked to return the incomplete questionnaire in the envelope provided. The remaining data are reported only on respondents with a certificate or associate degree in dental hygiene, the subset of the population that the researcher was interested in assessing.

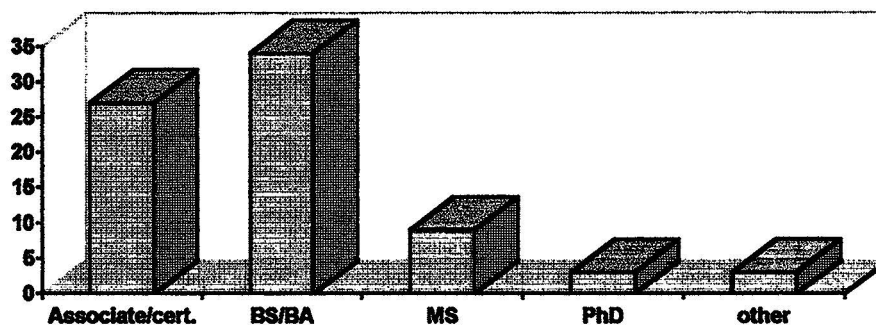


Figure 3

Educational credential held by Virginia dental hygienists *in addition to* dental hygiene credential (n = 76)

Research Question 1: Is there a need for a distance education program designed for geographically dispersed dental hygienists to complete a baccalaureate degree program at locations away from a four year college or university? Questionnaire item 10 asked, “How

interested are you in earning a bachelor's degree in dental hygiene?" Of the 228 respondents with an associate degree or certificate in dental hygiene, 64 (28.1%) responded "very interested", 83 (36.4%) responded "somewhat interested" and 78 (34.2%) responded "not interested". Three respondents (1.3%) did not complete this item.

Research Question 1a: Are dental hygienists pursuing alternatives to traditional education such as distance education in order to achieve a baccalaureate degree in dental hygiene?

Questionnaire item 17 asked participants if they had enrolled in college credit courses since graduating from their dental hygiene program. Sixty-eight (29.8%) answered yes, 148 (64.9%) responded no and 12 (5.3%) did not complete the item. When asked to describe these courses, 37 (16.2%) described them as "community college level courses", 10 (4.4%) said "university upper level course related to dental hygiene", 29 (12.7%) answered "university level course not related to dental hygiene", 4 (1.8%) reported to being "currently enrolled in a baccalaureate degree program in another discipline", 124 (54.4%) responded "not applicable", 1 (0.4%) answered "other" and 23 (10.1%) did not answer the question.

When asked about distance education, of the 228 respondents, 62 (27.2%) have taken a college credit course or continuing education course via distance education; while 153 (67.1%) have not taken courses via distance education. Thirteen (5.7%) individuals did not respond to the question (item 13).

Research question 1b: How likely are dental hygienists, who hold associate degrees or certificates, to complete a baccalaureate degree if courses leading to a baccalaureate degree were made available near their residence and/or place of work? Item 18 asked

participants how likely they would be to enroll in distance education courses leading to a bachelor's degree in dental hygiene if they were made available. Forty-one (18.0 %) individuals responded "yes, definitely", 124 (54.4%) answered "possibly", 50 (21.9%) responded "definitely not".

Research questions 2a and b: Do associate degree/certificate level dental hygienists value the benefits of completing a baccalaureate degree enough to enroll in a distance education program?

- a. Do dental hygienists value the baccalaureate degree in dental hygiene?
- b. What factors are important to dental hygienists for seeking a baccalaureate degree via distance education?

Questionnaire items 11 and 12 asked participants to rank their feelings about various factors and reasons that would affect their decision in seeking an advanced degree in dental hygiene. These questions were rated on a Likert scale asking respondents to circle either 1 (not important), 2 (somewhat important) or 3 (very important). Tabulated responses are found in Tables 5 and 6.

Question 11 queried respondents about the importance of various factors in making a decision to pursue a baccalaureate degree in dental hygiene. When considering the importance of tuition costs, 25 (11.0%) responded not important, 80 (35.1%) answered "somewhat important", 114 (50.0%) responded "very important", and 9 (3.9 %) did not complete the question (n=228).

Regarding the importance of financial aid availability, 61 (26.8%) of the participants answered not important, 76 (33.3%) answered "somewhat important", 79 (34.6%) answered "very important" while 12 (5.3%) did not respond.

Table 5

Importance of various factors to Virginia dental hygienists when deciding to pursue a bachelor of science degree in dental hygiene (N=228)

Factor	NI		SI		VI		missing	
	n	%	n	%	n	%	n	%
Tuition costs	25	11.1	80	35.1	114	50.0	9	3.9
Financial aid availability	61	26.8	76	33.3	79	34.6	12	5.3
Weekend/evening course availability	20	8.8	44	19.3	153	67.1	11	4.8
Geographic location	17	7.5	30	13.2	169	74.1	12	5.3
Length of time to complete program	21	9.2	88	38.6	108	47.4	11	4.8
Entrance requirements	41	18.0	101	44.3	73	32.0	13	5.7
Program requirements	23	10.1	93	40.8	102	44.7	10	4.4
Part-time study availability	18	7.9	65	28.5	134	58.8	11	4.8
Faculty/institution reputation	21	9.2	55	24.1	140	61.4	12	5.3
Release time from work	47	20.6	77	33.8	91	39.9	13	5.7
Employer's attitude toward BS deg.	92	40.4	76	33.3	49	21.5	11	4.8

NI = not important, SI = somewhat important, VI = very important, Missing = participants not completing questionnaire item.

Table 6

Importance of various reasons to Virginia dental hygienists for seeking an advanced degree in dental hygiene (N=228).

Reasons	NI		SI		VI		missing	
	n	%	n	%	n	%	n	%
Increased knowledge/skill	13	5.7	47	20.6	159	69.7	9	3.9
Career advancement	46	20.2	81	35.5	90	39.5	11	4.8
Career opportunities outside private practice	38	16.7	82	36.0	97	42.5	11	4.8
Status of degree	64	28.1	85	37.3	68	29.8	11	4.8
Better serve patients/clients	28	12.3	67	29.4	124	54.4	9	3.9
Personal satisfaction	17	7.5	58	25.4	142	62.3	11	4.8
Increased job security	76	33.3	79	34.6	63	27.6	10	4.4
Enhance salary potential	52	22.8	86	37.7	79	34.6	11	4.8
Graduate school entrance	116	50.9	63	27.6	36	15.8	13	5.7

NI = not important, SI = somewhat important, VI = very important, Missing = participants not completing questionnaire item.

Regarding the importance of the availability of weekend or evening courses, 20 (8.8%) responded not important, 44 (19.3%) responded “somewhat important”, 153 (76.1%) responded “very important”, and 11 (4.8%) did not complete the question.

About the importance of geographic location, 17 (7.5%) answered “not important”, 30 (13.2%) responded “somewhat important”, 169 (74.1%) responded “very important”, and 12 (5.3%) did not complete the item.

About the importance of the length of time to complete the program, 21 (9.2%) answered “not important”, 88 (38.6%) responded “somewhat important”, 108 (47.4%) responded “very important” and 11 (4.8%) did not complete the question.

Regarding the importance of entrance requirements, 41 (18.0%) respondents answered “not important”, 101 (44.3%) responded “somewhat important”, 73 (32.0%) responded “very important”, and 13 (5.7%) did not answer the question.

When asked to consider the importance of program requirements for obtaining a degree, 23 (10.1%) responded “not important”, 93 (40.8%) answered “somewhat important”, 102 (44.7%) responded “very important”, and 10 (4.4%) did not complete the item.

Regarding the importance of part-time study availability, 18 (7.9%) answered “not important”, 65 (28.5%) responded “somewhat important”, 134 (58.8%) responded “very important”, and 11 (4.8%) did not complete the item.

Considering the importance of the reputation of faculty and/or institution when considering pursuing a higher degree in dental hygiene, 21 (9.2%) responded “not

important”, 55 (24.1%) responded “somewhat important”, 140 (61.1%) responded “very important”, and 12 (5.3%) did not complete the item.

Regarding the importance of release time from work, 47 (20.6%) answered “not important”, 77 (33.8%) responded “somewhat important”, 91 (39.9%) answered “very important”, and 13 (5.7%) did not complete the item.

Considering the importance of their employer’s attitude toward the bachelor’s degree, when making a decision to pursue a bachelor’s degree, 92 (40.4%) answered “not important”, 76 (33.3%) responded “somewhat important”, 49 (21.5%) answered “very important”, and 11 (4.8%) did not complete the item.

Components of question 12 queried respondents about the importance of several reasons for seeking an advanced degree in dental hygiene. When asked about the importance of increased knowledge and skill, 13(5.7%) responded “not important”, 47 (20.6%) responded “somewhat important”, 159 (69.7%) answered “very important”, and 9 (3.9%) did not answer the item.

When asked to rate the importance of career advancement, 46 (20.2%) answered “not important”, 81 (35.5%) responded “somewhat important”, 90 (39.5%) answered “very important”, and 11 (4.8%) did not answer the question.

Regarding the importance of dental hygiene career opportunities outside private practice, 38 (16.7%) people responded “not important”, 82 (36.0%) answered “somewhat important”, 97 (42.5%) said “very important”, and 11 (4.8%) did not complete the question.

When asked about the importance of degree status, 64 (28.1%) individuals answered “not important”, 85 (37.3%) responded “somewhat important”, 68 (29.8%) answered “very important”, and 11 (4.8%) did not complete the item.

When asked about the importance of being able to better serve their patients/clients, 28 (12.3%) answered “not important”, 67 (29.4%) responded “somewhat important”, 124 (54.4%) responded “very important” and 9 (3.9%) did not answer the question.

When asked about the importance of personal satisfaction, 17 (7.5%) people said “not important”, 58 (25.4%) responded “somewhat important”, 142 (62.3%) answered “very important”, and 11 (4.8%) did not complete the question.

Regarding the importance of increased job security when deciding to seek an advanced degree in dental hygiene, 76 (33.3%) respondents answered “not important”, 79 (34.6%) responded “somewhat important”, 63 (27.6%) responded “very important”, and 10 (4.4 %) did not complete the item.

When asked to consider the importance of the potential for enhanced salary, 52 (22.8%) answered “not important”, 86 (37.7%) responded “somewhat important”, 79 (34.6%) said “very important”, and 11 (4.8%) did not answer the question.

When rating the importance of potential graduate school entrance, 116 (50.9%) answered “not important”, 63 (27.6%) responded “somewhat important”, 36 (15.8%) said “very important” and 13 (5.7%) did not complete the item.

Cross-tabulations were done between the variable of likelihood of enrollment in a distance education dental hygiene degree completion program (“yes, definitely”,

“possibly”, “definitely not”) and demographic factors. Because of the low number of respondents ($n = 41$) who answered “yes, definitely” to this question, the categories of “yes, definitely” and “possibly” were combined for cross-tabulations (see Table 7). The chi-square test of association was done to determine any relationship between these variables (see Table 8).

Chi-square contingency table analysis revealed that two of the five demographic characteristics were related to the likelihood of enrollment in a distance education program. In regards to age of participant and the likelihood of enrollment in a distance education dental hygiene degree completion program, there was a significant relationship between age and the likelihood of enrollment ($\chi^2 = 16.69523$, $df = 3$, $p = .00082$). In regards to likelihood of enrollment, participants in the four age categories answered as follows: ages 20-30, 32 (86.5%) answered positively and 5 (13.5%) answered negatively; ages 31-40, 68 (82.9%) answered positively and 14 (17.1%) responded negatively; ages 41-50, 54 (75.0%) responded positively and 18 (25.0%) answered negatively; and over 50, 11 (45.8%) answered positively and 13 (54.2%) answered negatively.

Analysis of the residuals revealed that the age group of 31-40 were more likely to answer positively to enrollment in a distance education program. It also revealed that the over 50 year old group were more likely to answer negatively to enrollment possibility. Although chi-square analysis showed a relationship between these two variables, the lambda score ($\lambda = .04000$) revealed that age is not a predictor of enrollment.

Table 7

Cross-tabulations with analysis of residuals between the likelihood of enrollment in a distance education degree completion program and demographic characteristics of Virginia dental hygienists surveyed (N =228).

Sociodemographic characteristics	those responding yes, definitely and possibly			those responding definitely not		
	n	%	AOR	n	%	AOR
Age						
20-30	32	86.5	3.6	5	13.5	-3.6
31-40	68	82.9	5.1	14	17.1	-5.1
41-50	54	75.0	-1.3	18	25.0	1.3
50 and over	11	45.8	-7.4	13	54.2	7.4
Marital status						
single	28	70.0	-2.7	12	30.0	2.7
married	137	78.3	2.7	38	21.7	-2.7
Family Responsibilities						
yes	104	79.4	3.8	27	20.6	-3.8
no	59	72.0	-3.8	23	28.0	3.8
Employment status						
full-time	93	77.5	.5	27	22.5	-.5
part-time	63	81.8	3.6	14	18.2	-3.6
not employed as dental hygienist	9	52.9	-4.1	8	47.1	4.1

Bold print = demographics with significant associations with the likelihood of enrollment
AOR = analysis of residuals

Table 8

Results of chi-square and Lambda analysis when comparing demographic characteristics with the likelihood of enrollment

Demographic characteristic	χ^2	df	probability	Lambda
Age	16.69523	2	.00082	.04000
Marital status	1.25240	2	.26309	.00000
Family responsibility	1.55321	2	.21266	.00000
Employment status	6.60196	2	.03685	.00000

When considering employment status and likelihood to enroll in a distance education dental hygiene degree completion program, there was a significant relationship between employment status and the likelihood of enrollment ($\chi^2 = 6.60196$, $df = 2$, $p = .03685$). Of those participants employed full-time, 93 (77.5%) answered positively to the likelihood of enrollment, while 27 (22.5%) responded negatively. Of those hygienists employed part-time, 63 (81.8%) answered “yes, definitely” or “possibly” to the likelihood of enrollment while 14 (18.2%) answered “definitely not”. Of those participants currently not employed as dental hygienists, 9 (52.9%) answered positively and 8 (47.1%) responded negatively to likelihood of enrollment. Analysis of residuals revealed that part-time dental hygienists were more likely to answer positively to likelihood of enrollment, while those not employed as a dental hygienist were more likely to answer negatively. The lambda score ($\lambda = .00000$) revealed that this variable is of no help in predicting the likelihood of enrollment.

When comparing likelihood to enroll with the following demographics, there was no statistically significant relationship with marital status ($\chi^2 = 1.25240$, $df = 1$, $p = .26309$), family responsibility ($\chi^2 = 1.55321$, $df = 1$, $p = .21266$), and place of employment ($\chi^2 = .81108$, $df = 3$, $p = .84682$).

Cross-tabulations and the chi-square test were done to determine the association of factors considered when making a decision to seek an advanced degree in dental hygiene with the likelihood of enrollment. There was no significant association with the following factors and reasons: entrance requirements ($\chi^2 = 3.24092$, $df = 2$, $p = .19781$), employer’s attitude toward the bachelor’s degree ($\chi^2 = 3.26911$, $df = 2$, $p = .19504$), career

advancement ($\chi^2 = 4.01095$, $df = 2$, $p = .08582$), increased job security ($\chi^2 = 2.13642$, $df = 2$, $p = .34362$), enhanced salary potential ($\chi^2 = 2.98898$, $df = 2$, $p = .22436$) and potential graduate school entrance ($\chi^2 = 2.11092$, $df = 2$, $p = .34803$). Frequencies, percentages, and analysis of residuals may be found in tabular form in Tables 9 and 10.

There was a significant association between tuition costs as a factor for seeking an advanced degree and the likelihood of enrollment ($\chi^2 = 19.93306$, $df = 2$, $p = .00005$). Of those dental hygienists who responded “very important” when asked to rate the importance of tuition costs when making a decision to pursue a bachelor’s degree, 91 (82.7%) answered positively when asked about the possibility of enrollment in a distance education dental hygiene degree completion program, while 19 (17.3%) answered negatively. Of those who answered “somewhat important”, 64 (81.0%) responded positively to likelihood of enrollment, while 15 (19.0%) responded negatively. Of those hygienists who rated tuition costs as “not important”, 10 (41.7%) responded positively to enrollment possibility while 14 (58.3%) responded negatively. The analysis of residuals revealed that hygienists who rated tuition costs as “not important” were more likely to answer negatively to enrollment possibility and those who rated this factor as “very important” and “somewhat important” were more likely to answer positively to the possibility of enrollment. Although chi square revealed an association between these two variables, the lambda score ($\lambda = .08333$, $p = .41348$) revealed no predictable relationship between tuition costs and the likelihood of enrollment.

Table 9

Cross-tabulation table with analysis of residuals of the importance of various factors when making a decision to pursue a bachelor's degree in dental hygiene compared to the possibility of enrollment in a distance education program by Virginia dental hygienists (N = 228)

Factor	dental hygienists responding yes, definitely or possibly			dental hygienists responding definitely not		
	n	%	AOR	n	%	AOR
<u>tuition costs</u>						
not important	10	81.0	-8.6	14	58.3	8.6
somewhat important	64	82.7	2.8	15	19.0	-2.8
very important	91	41.7	5.8	19	17.3	-5.8
<u>financial aid avail.</u>						
not important	39	66.1	-6.5	20	33.9	6.5
somewhat important	65	85.5	6.4	11	14.5	-6.4
very important	58	77.3	0.1	17	22.7	-0.1
<u>avail. of weekend or evening courses</u>						
not important	5	27.8	-8.9	13	72.2	8.9
somewhat important	32	74.4	-1.2	11	25.6	1.2
very important	126	84.0	10.1	24	16.0	-10.1
<u>geographic location</u>						
not important	4	23.5	-9.1	13	76.5	9.1
somewhat important	22	75.9	-0.4	7	24.1	.4
very important	136	82.9	9.5	28	17.1	-9.5
<u>length of time to complete program</u>						
not important	10	47.6	-6.2	11	52.4	6.2
somewhat important	72	83.7	5.6	14	16.3	-5.6
very important	81	77.9	.7	23	22.1	-0.7
<u>entrance requirements</u>						
not important	26	66.7	-4.2	13	33.3	4.2
somewhat important	79	79.8	2.3	20	20.2	-2.3
very important	57	80.3	2.0	14	19.7	-2.0
<u>prog. requirements</u>						
not important	10	45.5	-7.0	12	54.5	7.0
somewhat important	75	81.5	3.8	17	18.5	-3.8
very important	79	80.6	3.2	19	19.4	-3.2

Table 9 continued

<u>part-time study availability</u>						
not important	6	35.3	-7.1	11	64.7	7.1
somewhat important	48	75.0	-1.4	16	25.0	1.4
very important	109	83.8	8.6	21	16.2	-8.6
<u>faculty/institution reputation</u>						
not important	9	45.0	-6.4	11	55.0	6.4
somewhat important	47	87.0	5.3	7	13.0	-5.3
very important	106	77.9	1.1	30	22.1	-1.1
<u>release time from work</u>						
not important	30	63.8	-6.4	17	36.2	6.4
somewhat important	64	85.3	5.9	11	14.7	-5.9
very important	68	78.2	0.6	19	21.8	-0.6
<u>employer's attitude</u>						
not important	68	75.6	-1.5	22	24.4	1.5
somewhat important	62	83.8	4.8	12	16.2	-4.8
very important	33	70.2	-3.3	14	29.8	3.3

Bold print = factors with statistical association with the variable likelihood of enrollment
AOR = analysis of residuals

Table 10
 Chi-square and lambda analysis results of various factors considered when making a decision to pursue a baccalaureate degree in dental hygiene and the likelihood of enrollment in a distance education dental hygiene degree completion program (N=228)

factor	χ^2	df	probability	Lambda
tuition costs	19.3306	2	.00005	.08333
financial aid	7.10994	2	.02858	.00000
availability of weekend/evening courses	29.15381	2	.00000	.16667
geographic location	30.85123	2	.00000	.18750
length of time to complete program	12.56467	2	.00187	.02083
entrance requirements	3.24092	2	.19781	.00000
program requirements	14.29769	2	.00079	.04167
part-time study availability	20.43120	2	.00004	.10417
faculty/institution reputation	14.76593	2	.00062	.04167
release time from work	7.70078	2	.02127	.00000
employer's attitude	3.26911	2	.19504	.00000

Bold print = significant association between variables

A significant association was found between the variable likelihood of enrollment with the factor financial aid availability ($\chi^2 = 7.10994$, $df = 2$, $p = .02858$). Of those dental hygienists who rated financial aid availability as “very important”, 58 (77.3%) expressed a positive interest in enrolling in a distance education program compared to 20 (33.9%) who answered negatively. Of those answering “somewhat important”, 65 (85.5%) answered positively to enrollment while 11 (14.5%) responded negatively. Of those rating this factor as “not important”, 39 (66.1%) responded favorably to the possibility of enrollment while 20 (33.9%) responded negatively. The analysis of residuals revealed that those who rated this factor as “somewhat important” were more likely to answer positively to the likelihood of enrollment and those who rated this factor as “not important” were more likely to respond negatively. Lambda analysis revealed no predictable relationship ($\lambda = .00000$, $p = .10382$) between these two variables.

There was a statistically significant association between the variable likelihood of enrollment with the availability of weekend/evening courses as a factor in making a decision to seek an advanced degree ($\chi^2 = 29.15381$, $df = 2$, $p = .00000$). Of those dental hygienists who rated this factor as being “very important”, 126 (84.0%) answered positively to likelihood of enrollment, while 24 (16.0%) answered negatively. Of those hygienists who rated this factor as “somewhat important”, 32 (74.4%) responded positively to the likelihood of enrollment, while 11 (25.6%) responded negatively. Of those respondents who rated this factor as “not important”, 5 (27.8%) answered positively to the likelihood of enrollment, while 13 (72.2%) answered negatively. The analysis of residuals revealed that dental hygienists who rated the availability of weekend/evening

courses as being “very important” were more likely to respond positively to the likelihood of enrollment and hygienists who rated this factor as “not important” or “somewhat important” were likely to respond negatively to the possibility of enrollment. Lambda analysis ($\lambda = .16667$, $p = .05721$) revealed a weak predictable association between these variables.

When considering geographic location, there was a significant relationship between the variable likelihood of enrollment with the factor geographic location ($\chi^2 = 30.85123$, $df = 2$, $p = .00000$). Of those dental hygienists who rated geographic location as being “very important”, 136 (82.9%) answered “yes, definitely” or “possibly” to the likelihood of enrollment in a distance education dental hygiene degree completion program, while 28 (17.1%) answered “definitely not”. Of those hygienists who rated this factor as being “somewhat important”, 22 (75.9%) answered positively to the likelihood of enrollment, while 7 (24.1%) answered negatively. Of those hygienists who rated geographic location as “not important”, 4 (23.5%) answered positively to the possibility of enrollment, while 13 (76.5%) responded negatively.

An analysis of residuals revealed that those dental hygienists who rated geographic location as being “very important” were more likely to answer positively to enrollment and those who rated this factor as being “not important” were more likely to respond negatively to the possibility of enrollment. Lambda analysis ($\lambda = .18750$, $p = .02724$) revealed that this factor may predict the likelihood of enrollment.

When comparing the factor “length of time to complete program” and the possibility of enrollment, there was a significant relationship between this factor and the

variable of the likelihood of enrollment ($\chi^2 = 12.56467$, $df = 2$, $p = .00187$). Of those hygienists who rated this factor as being “very important”, 81 (77.9%) answered “yes, definitely” or “possibly” to the possibility of enrollment in a distance education dental hygiene degree completion program, while 23 (22.1%) answered “definitely not”. Of those hygienists who rated this factor as being “somewhat important”, 72 (83.7%) responded favorably to the likelihood of enrollment, while 14 (16.3%) responded negatively. Of those dental hygienists who rated this factor as being “not important”, 10 (47.6%) responded positively to the possibility of enrollment, while 11 (52.4%) answered negatively. An analysis of residuals revealed that hygienists who rated this factor as being “somewhat important” were more likely to answer positively to the likelihood of enrollment and those who rated this factor as being “not important” were more likely to answer negatively to enrollment possibility. Lambda analysis ($\lambda = .02083$, $p = .82724$) revealed no predictable relationship with these two variables.

When considering the factor “program requirements for obtaining a degree” and enrollment likelihood, there was a significant relationship between this factor and the likelihood of enrollment ($\chi^2 = 14.28769$, $df = 2$, $p = .00079$). Of those who rated this factor as being “very important”, 79 (80.6%) responded “yes, definitely” or “possibly” to the likelihood of enrollment, while 19 (19.4%) responded “definitely not” to the likelihood of enrollment. Of those dental hygienists who rated this factor as being “somewhat important”, 75 (81.5%) responded positively to the likelihood of enrollment, while 17 (19.4%) responded negatively. Of those respondents who rated this factor as being “not important”, 10 (45.5%) responded positively to the likelihood of enrollment, while 12

(54.5%) responded negatively. An analysis of residuals revealed that those hygienists who rated this factor as being “very important” or “somewhat important” were more likely to answer positively to enrollment and those who rated this factor as “not important” were more likely to respond negatively to enrollment. Lambda scores ($\lambda = .04167$, $p = .66968$) revealed that this factor is of no help in predicting the possibility of enrollment.

A significant relationship was found when comparing the factor “part time study availability” with enrollment possibility ($\chi^2 = 20.43120$, $df = 2$, $p = .00004$). Of those dental hygienists who rated the importance of this factor as “very important”, 109 (83.6%) answered “yes, definitely” or “possibly” to the likelihood of enrollment in a distance education dental hygiene degree completion program, while 21 (16.2%) 66.9% responded “definitely not”. Of those who rated this factor as “somewhat important”, 48 (75.0%) answered positively to enrollment possibilities, while 16 (25.0%) responded negatively. Of those who rated part time study availability as being “not important”, 6 (35.3%) responded positively to the likelihood of enrollment, while 11 (64.7%) responded negatively. An analysis of residuals revealed that dental hygienists who rated this factor as being “very important” were more likely to respond positively to the likelihood of enrollment, and those who rated this factor as being “not important” or “somewhat important” were more likely to respond negatively to enrollment. Lambda analysis ($\lambda = .10417$, $p = .22363$) revealed that this factor would not predict the likelihood of enrollment.

A statistically significant relationship was found when comparing the factor “faculty/institution reputation” with the possibility of enrollment ($\chi^2 = 14.76593$, $df = 2$, p

= .00062). Of those who rated this factor as “very important”, 106 (77.9%) answered “yes, definitely” or “possibly” to the likelihood of enrollment, while 30 (22.1%) responded “definitely not”. Of those who rated this factor as “somewhat important”, 47 (87.9%) answered positively to the likelihood of enrollment, while 7 (13.0%) responded negatively. Of those who rated this factor as “not important”, 9 (45.0%) answered positively to the likelihood of enrollment, while 11 (55.0%) responded negatively. An analysis of residuals revealed that those dental hygienists who rated this factor as “somewhat important” and “very important” were more likely to respond positively to the likelihood of enrollment and those who rated this factor as “not important” responded negatively to enrollment. Lambda analysis ($\lambda = .04167$, $p = .65457$) revealed that the importance of faculty/institution reputation does not predict the likelihood of enrollment in a distance education degree completion program.

There was a statistically significant association when comparing the factor “release time from work” and the likelihood of enrollment ($\chi^2 = 7.70078$, $df = 2$, $p = .02127$). Of those respondents who rated this factor as being “very important”, 68 (78.2%) answered “yes, definitely” or “possibly” to the likelihood of enrollment, while 19 (21.8%) responded “definitely not”. Of those who rated this factor as “somewhat important”, 64 (83.3%) answered positively to the likelihood of enrollment while 11 (14.7%) answered negatively to the likelihood of enrollment. Of those who rated this factor as “not important”, 30 (63.8%) answered positively to the likelihood of enrollment, while 17 (36.2%) answered negatively. An analysis of residuals revealed that hygienists who rated this factor as being “somewhat important” were more likely to answer positively to the likelihood of

enrollment, and those who rated this factor as “not important” were more likely to answer negatively to enrollment. Lambda analysis ($\lambda = .00000$) revealed that this factor is not helpful in predicting the likelihood of enrollment.

Cross-tabulations and the chi-square test of association were done between reasons for seeking an advanced degree in dental hygiene and the likelihood of enrollment in a distance education degree completion program (see Tables 11 and 12). When comparing “increased knowledge/skill” as a reason for seeking an advanced degree in dental hygiene and the possibility of enrollment, there was a statistically significant association between the two variables ($\chi^2 = 25.17894$, $df = 2$, $p = .00000$). Of those dental hygienists who rated the reason of increased knowledge/skill as “very important”, 128 (83.1%) answered “yes, definitely” or “possibly” when asked about enrollment possibility, while 26 (16.9%) responded “definitely not” to likelihood of enrollment. Of those who rated this reason as “somewhat important”, 34 (73.9%) responded positively to the likelihood of enrollment, while 12 (26.1%) responded negatively to the likelihood of enrollment. Of those who rated this reason “not important” for seeking an advanced degree in dental hygiene, 3 (23.1 %) answered positively to the likelihood of enrollment, while 10 (76.9%) responded negatively to the possibility of enrollment. An analysis of residuals revealed that hygienists who rated this reason as “very important” were more likely to answer positively to enrollment and those who rated this reason as “not important” were more likely to respond negatively to enrollment. Lambda analysis ($\lambda = .14583$, $p = .05013$) indicated that the desire for increased knowledge/skill may be a predictor of enrollment.

Table 11
 Cross-tabulations and analysis of residuals comparing the likelihood of Virginia dental hygienists' enrollment in a distance education program with reasons for seeking an advanced degree in dental hygiene (N = 228)

reason	dental hygienists responding yes, definitely or possibly			dental hygienists responding definitely not		
	n	%	AOR	n	%	AOR
<u>increase knowledge</u>						
not important	3	23.1	-7.1	10	76.9	7.1
somewhat important	34	73.9	-1.6	12	26.1	1.6
very important	128	83.1	8.7	26	16.9	-8.7
<u>career advancement</u>						
not important	30	65.2	-5.5	16	34.8	5.5
somewhat important	63	79.7	2.0	16	20.3	-2.0
very important	70	81.4	3.6	16	18.6	-3.6
<u>DH career opport. outside priv. pract.</u>						
not important	21	55.3	-8.4	17	44.7	8.4
somewhat important	67	82.7	4.4	14	17.3	-4.4
very important	75	81.5	3.9	17	18.5	-3.9
<u>status of degree</u>						
not important	40	63.5	-9.3	23	36.5	9.3
somewhat important	71	84.5	5.3	13	15.5	-5.3
very important	54	84.4	4.0	10	15.6	-4.0
<u>better serve patients/clients</u>						
not important	16	59.3	-4.9	11	40.7	4.9
somewhat important	49	81.8	-1.4	16	24.6	1.4
very important	100	78.3	6.3	21	17.4	-6.3
<u>personal satisfac.</u>						
not important	7	41.2	-6.2	10	58.8	6.2
somewhat important	38	67.9	-5.5	18	32.1	5.5
very important	119	86.2	11.7	19	13.8	-11.7
<u>increased job security</u>						
not important	54	72.0	-4.0	21	28.0	4.0
somewhat important	63	81.8	3.4	14	18.2	-3.4
very important	47	78.3	0.6	13	21.7	-0.6

Table 11 continued

<u>enhance salary potential</u>						
not important	35	68.6	-4.4	16	31.4	4.4
somewhat important	67	78.8	1.3	18	21.2	-1.3
very important	61	81.3	3.1	14	18.7	-3.1
<u>graduate school entrance</u>						
not important	85	73.3	-4.4	31	26.7	4.4
somewhat important	51	82.3	3.2	11	17.7	-3.2
very important	25	80.6	1.1	6	19.4	-1.1

Bold print = reasons that have significant association with the variable likelihood of enrollment

AOR = analysis of residuals

Table 12
Results of chi-square and lambda analysis of reasons for pursuing an advanced degree in dental hygiene with the likelihood of enrollment in a distance education dental hygiene degree completion program (N = 228)

reason	χ^2	df.	probability	Lambda
increased knowledge/skill	25.17894	2	.00000	.14583
career advancement	4.91095	2	.08582	.00000
career opportunities outside private practice	12.78550	2	.00167	.00000
status of degree	11.39593	2	.00335	.00000
better serve patients/clients	7.14716	2	.02806	.00000
personal satisfaction	22.03417	2	.00002	.06383
increased job security	2.13642	2	.34362	.00000
enhance salary potential	2.98898	2	.22436	.00000
graduate school entrance	2.11092	2	.34803	.00000

Bold print = significant associations between variables

There was a statistically significant association found between the reason “dental hygiene career opportunities outside private practice” and the possibility of enrollment ($\chi^2 = 12.78550$, $df = 2$, $p = .00167$). Of those who rated this reason as “very important”, 75 (81.5%) responding “yes, definitely” or “possibly” concerning enrollment in a distance education program, while 17 (18.5%) responded “definitely not”. Of those who rated this reason as “somewhat important”, 67 (82.7%) responded positively to the possibility of enrollment, while 14 (17.3%) responded negatively. Of those who rated this reason as “not important” for seeking an advanced degree in dental hygiene, 21 (55.3%) answered positively to the likelihood of enrollment, while 17 (44.7%) responded negatively. An analysis of residuals revealed that dental hygienists who rated this reason as “very important” or “somewhat important” were more likely to respond positively to enrollment and those who rated this reason as “not important” were more likely to respond negatively to enrollment. Lambda analysis ($\lambda = .00000$, $p = 1.0000$) revealed that this reason is of no help in predicting enrollment.

When considering “status of degree” as a reason to seek an advanced degree in dental hygiene compared to the possibility of enrollment, there was a statistically significant relationship between these two variables ($\chi^2 = 11.39593$, $df = 2$, $p = .00335$). Of those dental hygienists who rated this reason as “very important”, 54 (84.4%) answered “yes, definitely” or “possibly” to likelihood of enrollment, while 10 (15.6%) responded “definitely not” to likelihood of enrollment. Of those who rated this reason as “somewhat important”, 71 (84.5%) answered positively to the likelihood of enrollment, while 13 (15.5%) answered negatively to the likelihood of enrollment. Of those who rated

this reason as “not important” for seeking an advanced degree in dental hygiene, 40 (63.5%) responded positively to the possibility of enrollment, while 23 (36.5%) responded negatively to enrollment. An analysis of residuals revealed that hygienists who rated this reason as “very important” or “somewhat important” were more likely to respond positively to the likelihood of enrollment, and those who rated this reason as “not important” were more likely to respond negatively. Lambda analysis ($\lambda = .00000$, $p = .09340$) revealed that this reason was of no help in predicting enrollment.

There was a statistically significant association between the reason “to better serve patients/clients” and the likelihood of enrollment ($\chi^2 = 7.14716$, $df = 2$, $p = .02806$). Of those who rated this reason as “very important”, 100 (82.6%) responded “yes, definitely” or “possibly” to the likelihood of enrollment, while 21 (17.4%) responded “definitely not” to the likelihood of enrollment. Of those who rated this reason as “somewhat important”, 49 (75.4%) responded positively, while 16 (24.6%) responded negatively. Of those who rated this reason as “not important” for seeking an advanced degree in dental hygiene, 16 (59.3%) answered positively to the likelihood of enrollment, while 11 (40.7%) responded negatively. An analysis of residuals revealed that hygienists who rated this reason as being “very important” were more likely to respond positively to the likelihood of enrollment and those who rated this reason as “not important” were more likely to respond negatively to enrollment. Lambda analysis ($\lambda = .000000$) revealed that no predictable association exists between these two variables.

When comparing the reason “personal satisfaction” with possibility of enrollment, there was a statistically significant relationship between these variables ($\chi^2 = 22.02317$, df

= 2, $p = .00002$). Of those dental hygienists who rated this reason “very important”, 119 (186.2%) answered “yes, definitely” or “possibly” to the likelihood of enrollment in a distance education dental hygiene degree completion program, while 19 (13.8%) responded “definitely not” to the likelihood of enrollment. Of those who rated this reason as “somewhat important”, 38 (67.9%) responded positively to the likelihood of enrollment, while 18 (32.1%) responded negatively. Of those who rated this reason as “not important” for seeking an advanced degree in dental hygiene, 7 (41.2%) answered positively to the likelihood of enrollment while 10 (58.8%) responded negatively. An analysis of residuals revealed that hygienists who rated this reason as “very important” were more likely to respond positively to the likelihood of enrollment and those who rated this reason as “not important” were more likely to respond negatively to the likelihood of enrollment. Lambda analysis ($\lambda = .06383$, $p = .46629$) revealed that this reason is of no help in predicting enrollment.

Additional Data Items on the questionnaire that indirectly related to the research questions were tallied using frequencies and percentages. This data focused on dental hygienists’ satisfaction levels with previous distance education courses and the most convenient class times for those interested in enrolling in distance education courses.

Of those dental hygienists who had taken a college credit course or continuing education course via distance education, 41 (66.13%) reported to have been very satisfied with their experience with distance education, 18 (29.03%) were somewhat satisfied, 2 (3.2%) were very dissatisfied and 1 (1.6%) individual did not answer the question (item 14).

When asked to choose two convenient class meeting days and times that best met their needs for enrollment, 127 chose evening, followed by 117 for weekend, 36 for late afternoon, and 29 preferring daytime. Twenty-five respondents chose not applicable and 16 did not answer the question (see Figure 4).

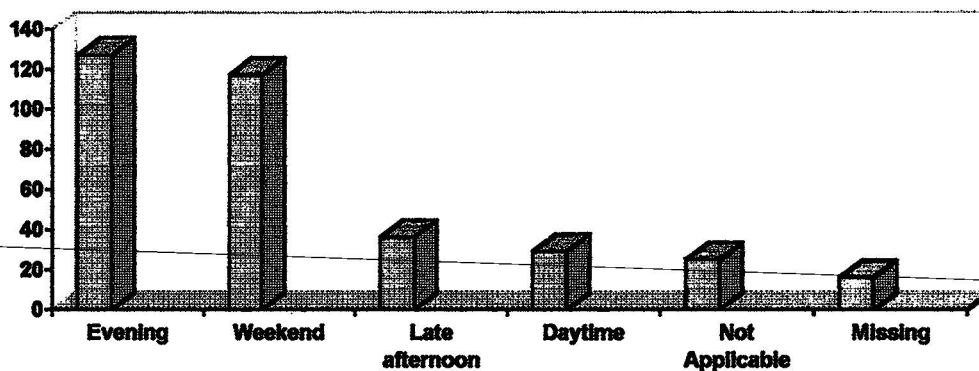


Figure 4

Distance education course time choices of Virginia dental hygienists when asked to choose two. (N = 228)

Discussion

Regarding the demographics of the participants, the age of dental hygienists surveyed ranged from 20 to over 50 years old with the majority of respondents between the ages of 31 and 50. All respondents who answered the question concerning gender reported to being female. It is unknown if the two respondents not answering the question were female or male. If they were in fact male, perhaps they chose not to complete this question for fear of being identified. This information is similar to demographics gathered in an earlier study (Shuman, 1994) in which the average age of Virginia dental hygienists was 38.

The majority (59.9%) of dental hygienists in this sample reported to have family responsibilities, either elderly parents or children living at home. The majority (56.9%) of study participants reported to be employed full-time. Of those dental hygienists reported to being currently employed as a dental hygienist, the majority (95.1%) reported to being employed in a private practice setting.

Regarding the credential held by respondents, 56% hold an associate degree, 41.1% hold a baccalaureate degree and 2.0% have a master's degree in dental hygiene. These figures vary slightly from data gathered by The 1994 Dental Hygiene Practice Survey in the Commonwealth of Virginia (Shuman, 1994). At that time 49.6% of respondents held an associate degree while 43.5% held an baccalaureate degree. No information was provided concerning master's degrees. This slight change in degree held by dental hygienists may be attributed to dental hygienists receiving their associate degree education in other states and being licensed by credential in the Commonwealth of Virginia. The large military population in the Northern Virginia and Hampton Roads areas of Virginia creates a constant influx of dental hygienists from other states in the country.

These demographic findings suggest that the majority of dental hygienists in Virginia are female, between the ages of 31 and 50, have family responsibilities of either elderly parents or children living at home, hold an associate's degree, were first licensed between 1961 and 1990, are employed full-time and work in a private practice setting.

Research Question 1: This research question addressed the need for a distance education program designed for geographically dispersed dental hygienists to complete a baccalaureate degree program at locations away from a four year college or university.

Question 10 queried participants about their general interest in a dental hygiene degree completion program. Of the 228 respondents, the distribution was fairly even between responses of “very interested” (28.1%), “somewhat interested” (36.4%), and “not interested” (34.2%). Respondents were instructed to complete the entire questionnaire even if they had responded “not interested” to item 10. These results differ from results in studies done by DeBiase (1988) and Newell (1989). DeBiase’s study revealed that over 70% of licensed dental hygienists and students were interested in a baccalaureate degree completion program (DeBiase, 1988). Newell’s (1989) study revealed that nearly half of all respondents in her study were interested in a baccalaureate degree. Perhaps,

respondents to the present questionnaire were unsure of the type of degree completion program being considered (traditional residency versus distance education) and therefore were reluctant to answer the question in a definitive direction. Furthermore, given the rural nature of the Commonwealth, some respondents may have perceived limited opportunities for degree completion. This might account for the high rate (36.4%) of those answering “somewhat interested”. The changes in the population of practicing dental hygienists over the last 10-15 years may provide another explanation for these conflicting results. Considering that many dental hygiene graduates are married with family and employment responsibilities, hygienists may have concerns about incorporating further education into their already busy schedules.

Research question 1a: This question asked if dental hygienists are pursuing alternatives to traditional education, such as distance education, in order to achieve a baccalaureate degree in dental hygiene. Since 148 (64.9%) of the respondents answered no to this

question, findings suggest that more than half of the sample participants have not sought further education beyond their associate degree or certificate in dental hygiene.

When asked to describe college credit courses taken, 37 (16.2%) respondents replied "community college level courses", 10 (4.4%) said "university upper level course related to dental hygiene", 29 (12.7%) answered "university level course not related to dental hygiene" and 4 (1.8%) reported to being "currently enrolled in a baccalaureate degree program in another discipline". One (0.4%) participant replied "other" and described the course as a postgraduate course at a school of dentistry. This data suggest that very few Virginia dental hygienists have pursued higher educational levels beyond their dental hygiene degree that would possibly lead to a baccalaureate degree.

One limitation to this area of the questionnaire may have been the order in which the questions were posed to respondents. Prior to asking participants about educational history after graduating from their dental hygiene program, respondents were queried about their experiences with distance education. Perhaps when participants read the question concerning college courses taken, they assumed this included distance education courses only. Possibly, some reorganization and clarity of these questions would have eliminated this confusion and yielded more specificity in the data.

In regards to taking courses via distance education, 62 (27.2%) dental hygienists reported that they had taken either a college credit course or continuing education course via distance education. This question was designed to query participants about their experiences with distance education. Unfortunately, this question grouped into one category "college credit courses" and "continuing education courses". Had they been

separated, more specific information about the types of distance education courses taken by Virginia dental hygienists would have been gained by the survey. This information would have enabled the researcher to determine how distance education technology has been used by dental hygienists in the past. Although a small percentage of the sample had experience with distance education, the majority of these participants (66.13%) reported to have been “very satisfied” or 18 (29.03%) were “somewhat satisfied” and only 2 (3.2%) were “very dissatisfied”.

Research question 1b: This question deals with the likelihood of associate level dental hygienists enrolling in a dental hygiene degree completion program available near their residence and/or place of work. Questionnaire item 18 poses the question, “If distance education courses leading to a bachelor’s degree in dental hygiene were offered to you tomorrow, would you enroll?” The majority of respondents (124, 54.4%) answered “possibly”, while 41 (18.0 %) responded “yes, definitely” and 50 (21.9%) responded “definitely not”. Although the majority of dental hygienists would not respond with a definite positive or negative response, they seem to be open to the possibility of enrollment in a distance education degree completion program. Perhaps, many respondents felt that a response of “yes, definitely” would have committed them in some way. It is interesting to note that although questions 10 and 18 query participants about basically the same issue, the response rates were quite different. Perhaps, as the respondents proceeded through the questionnaire they became more cognizant of different factors and reasons for seeking an advanced degree in dental hygiene. Possibly the concept of distance education as an alternative to traditional baccalaureate degree

education appealed to them and therefore, would provide a possible explanation for why more respondents answered “possibly” to question 18 than those who answered “somewhat interested” in question 10.

Questionnaire item 20 asked participants for comments concerning the questionnaire. The overwhelming majority of these comments were in support of a distance education program for dental hygiene degree completion. Several participants stated that they had not pursued further education because of family and employment responsibilities that would keep them from relocating to attend a four year university. Many participants indicated an interest in receiving information should a program become available. A number of individuals voiced interest in obtaining continuing education credit via distance education. Some respondents stated reasons why they did not feel degree completion was important or worthwhile to pursue. Many felt that a baccalaureate degree would not increase their salary or abilities to treat their patients. All comments can be found in Appendix D.

Research question 2a and b: Do associate degree/certificate level dental hygienists value the benefits of completing a baccalaureate degree enough to enroll in a distance education program?

- a. Do dental hygienists value the baccalaureate degree in dental hygiene?
- b. What factors are important to dental hygienists for seeking a baccalaureate degree via distance education?

Questionnaire items 11 and 12 asked participants to rate their feelings about various factors and reasons affecting their decision to seek an advanced degree in dental

hygiene using a 3 point Likert scale. Tuition costs, weekend/evening course availability, geographic location, length of time to complete program, part-time study availability, and faculty/institution reputation were factors that were rated by the majority of the respondents as being "very important". Entrance requirements were rated as being "somewhat important" by the majority of the respondents. The majority of dental hygienists in this sample rated employer's attitude toward the bachelor's degree as "not important". These findings agree with data gathered by Waring (1991) and DeBiase (1988). Respondents in Waring's (1991) study also identified geographic location and accessibility as two primary concerns when considering enrolling in a baccalaureate degree completion program. DeBiase (1988) found that respondents to her study who did not express an interest in baccalaureate dental hygiene study expressed concern about geographic location, inconvenient course scheduling, and financial limitations. These results also confirm findings by Tobian (1989) who investigated the relationship between the educational level of dental hygienists and the perceptions of dental hygienists concerning the need for post - associate/certificate degree programs. Her study also revealed barriers that exist for dental hygienists to enroll in further dental hygiene education such as flexible scheduling, lack of funds, and geographical distance to the nearest program.

The majority of study participants rated the reasons "increased knowledge and skill, better serve patients/clients, and personal satisfaction" as being "very important" when making a decision to pursue an advanced degree in dental hygiene. These data support the results of previous studies conducted by DeBiase (1988) and Waring (1991)

who discovered that potential baccalaureate degree completion students were interested in pursuing a baccalaureate degree for personal satisfaction, increased knowledge and skill, and to better serve their patients.

When dental hygienists were asked about the importance of degree status, the majority of respondents responded “very important” or “somewhat important”. Perhaps, dental hygienists feel that a baccalaureate degree would give them more prestige and respect as health care professionals. A previous study by Parker and Fong (1987) revealed that dental hygienists are not viewed as professionals and were rated low on a prestige scale by other health professionals. It has been the opinion of many in the dental hygiene profession, that the baccalaureate degree as the entry level credential to dental hygiene practice would raise the level of respect by other professionals (Kraemer, 1985; Wayman, 1985; Walsh et al, 1988; Paarman et al, 1990; Devore, 1993).

The variable “likelihood of enrollment in a distance education dental hygiene degree completion program” was cross-tabulated with demographic characteristics of Virginia dental hygienists. Age appears to be a factor associated with the likelihood of dental hygienists in Virginia to enroll in a distance education program. Data suggest that older dental hygienists in Virginia will be less likely to enroll in a distance education degree completion program while the age groups of 31 to 40 seem to be more interested in further education. Perhaps, after several years as a practicing dental hygienist, this age group of people are more aware of the benefits of a baccalaureate degree, are ready for career enhancement, are dissatisfied with their employment status, or feel the need to pursue an advanced degree in dental hygiene for personal satisfaction. Another

explanation may be that with the age group of 31 to 40, many dental hygienists may have older children who are less dependent on their parents, consequently allowing hygienists to attend to their own needs and pursue their goals. Considering the fact that this age group was the most highly represented group of the sample, it is logical that this group also would be most likely interested in enrolling in a degree completion program. Data also revealed that those hygienists over the age of 50 would be less likely to enroll in a distance education degree completion program. It seems logical that as hygienists approach retirement age, their interest in furthering their education would diminish. Although the variables of age and the possibility of enrollment are statistically associated, age does not predict the possibility of enrollment.

When considering employment status and likelihood of enrollment in a distance education dental hygiene degree completion program, an association was found between these two variables. Dental hygienists who reported to be employed part-time were more likely to answer positively to the likelihood of enrollment. Those dental hygienists who reported to be not employed as a dental hygienist were more likely to respond negatively to the likelihood of enrollment. This suggests that those dental hygienists who are employed part-time are more interested in furthering their education, possibly realizing that they will be able to make time for classes and studying. It seems logical that those hygienists who are not currently employed as a dental hygienist would not want to further their education in dental hygiene. Perhaps they have chosen another career field to pursue or have retired from practice altogether, but continue to hold a Virginia license. Lambda

analysis revealed that employment status is of no help in predicting the likelihood of enrollment.

Regarding place of employment, marital status and family responsibility, there was no statistically significant relationship between these demographic factors when relating these factors to likelihood of enrollment. In contrast to studies by DeBiase (1988), who found that family commitments were a concern to study participants when considering a dental hygiene degree completion program, family commitments do not appear to be a factor associated with the likelihood of these dental hygienists to enroll in a distance education dental hygiene degree completion program. However, perhaps those with family commitments view distance education as a feasible way to complete a baccalaureate degree as compared to a traditional degree completion program that DeBiase was suggesting in her study.

Items 11 and 12 were cross-tabulated to investigate any associations between factors and reasons for pursuing an advanced degree in dental hygiene and the respondents' feelings about the likelihood of enrollment in a distance education dental hygiene degree completion program. Because of the low number of dental hygienists who answered "yes, definitely" to questionnaire item 18 about their likelihood to enroll in such a program (n = 41), this group of respondents was grouped with those answering "possibly". When tabulating the responses to questions 11 and 12 it appeared as though many of the respondents who answered positively to likelihood of enrollment, answered "very important" to every factor and reason for pursuing an advanced degree in dental hygiene. Similarly, several of those who responded negatively to likelihood of enrollment,

answered “not important” to every factor and reason for pursuing an advanced degree in dental hygiene. Perhaps these dental hygienists were so adamant in their opinion about degree completion that they did not give much thought to each factor or reason for pursuing an advanced degree. Consequently, the response rates to these questions may not accurately depict the true opinions of some participants.

When cross-tabulations were done between the factors and reasons for seeking an advanced degree in dental hygiene with the likelihood of enrollment in a distance education degree completion program, there was no statistically significant relationship with several factors and reasons. The following factors and reasons do not seem to be associated with the decision to pursue an advanced degree in dental hygiene by dental hygienists: entrance requirements, employer’s attitude toward the bachelor’s degree, career advancement, increased job security, enhanced salary potential and potential graduate school entrance. For those factors and reasons that were not statistically significant, responses were fairly equally divided between those hygienists who responded positively and those who responded negatively to the possibility of enrollment when cross-tabulated with their responses of “very important”, “somewhat important”, and “not important”.

After chi-square analysis, significant associations were found between the variable “the likelihood of enrollment” with several factors in making a decision to pursue an advanced degree in dental hygiene. An analysis of residuals revealed that dental hygienists who viewed tuition costs, financial aid availability, the availability of weekend/evening courses, geographic location, length of time to complete program, program requirements

for obtaining a degree, part-time study availability, faculty/institution reputation and release time from work as being “somewhat important” or “very important” were more likely to respond positively to the likelihood of enrollment. Apparently, these respondents value these factors that may be part of a distance education program enough to positively consider the possibility of enrollment in such a program. Therefore, these factors should be considered when planning degree completion programs, and when marketing these programs to prospective students. Conversely, hygienists who rated these factors as “not important” were more likely to answer negatively to the likelihood of enrollment. This implies that to some dental hygienists, regardless of how a distance education program may be designed, they do not value the baccalaureate degree enough to consider enrolling in a degree completion program. Lambda analysis revealed that two of these factors, availability of weekend/evening courses and geographic location, may be predictors of enrollment. Hygienists who felt that these two factors were very important will be more likely to enroll in a distance education degree completion program.

Chi-square analysis associations were found among several reasons hygienists would consider when deciding to pursue an advanced degree in dental hygiene and the likelihood of enrollment. An analysis of residuals revealed that hygienists who rated personal reasons including: “to increase knowledge/skill”, “dental hygiene career opportunities outside private practice”, “to better serve patients”, “status of degree”, as “very important” or “somewhat important” were more likely to express a positive interest in a dental hygiene degree completion program via distance education. Conversely, those hygienists who rated these reasons as being “not important” were more likely to answer

negatively to the possibility of enrollment. Lambda analysis found only one reason, “to increase knowledge or skill” to be a predictor of enrollment. From this data it is reasonable to conclude that hygienists who are interested in increasing their knowledge or skills in dental hygiene are more likely to enroll in a distance education dental hygiene degree completion program. These findings imply that dental hygienists who are interested in a degree completion program value the baccalaureate degree as an avenue to increase their knowledge and skill and to pursue dental hygiene career opportunities outside of a private practice setting, such as educational, industrial and public health settings. The status of a baccalaureate degree and the personal satisfaction gained from earning such a degree are other reasons cited for seeking an advanced degree in dental hygiene. Although a weak association ($p = .02806$) was found between the reason “better serve their patients/clients” and the likelihood of enrollment, the majority of those dental hygienists who rated this factor as being “very important” expressed interest in an advanced degree. Participants did not feel that a bachelor’s degree would increase their job security or enhance their salary potential, perhaps because traditionally dental hygienists holding a baccalaureate degree have not been paid more than those holding an associate degree or certificate in a clinical practice setting which is the practice setting for the majority of dental hygienists. In regards to job security, study participants commented that most dentists are not concerned with the degree held by dental hygienists that they employ in their office.

Career advancement within their current practice setting and gaining entrance into graduate school did not appear to be important reasons to respondents for seeking an

advanced degree. Many hygienists may feel that a baccalaureate degree would not increase the potential for an advancement of their career in a clinical practice setting. Regarding entrance into graduate school, it seems apparent that associate level dental hygienists who have not pursued a baccalaureate degree would not consider graduate education at this time. Perhaps after completing a baccalaureate degree their opinions about graduate education would change in time.

Additional data: The last questionnaire item asked participants to choose the two most convenient class times if they were to enroll in a distance education program. In order of preference they chose, evening, weekend, late afternoon and daytime. These data are consistent with the demographic data gained concerning the sample population. The majority of participants being employed full time with family commitments would most likely chose evening and weekend course times to accommodate their employment schedules. Therefore, distance education degree completion programs should be developed to accommodate the most interested students by scheduling courses during these hours.

CHAPTER V

SUMMARY AND CONCLUSIONS

Throughout the last 84 years, dental hygiene education has evolved from Dr. Fones' original concept of a one year course of study to a multidisciplinary course of study leading to either a diploma, associate or baccalaureate degree. Accreditation standards originally implemented in 1952, have brought about changes throughout the years in curricular requirements. Within the last 20 years, many students enrolled in certificate or associate degree dental hygiene education programs earn college credits equivalent to three or more years of education (Mescher, 1984; Wayman, 1985). However, the earned credit hours required for the dental hygiene certificate or associate degree often exceeds those for associate degrees in other disciplines.

The American Dental Hygienists' Association has called for the baccalaureate degree to be the entry level credential for licensed dental hygienists (Wayman, 1985; Paarman et al, 1990; ADHA, 1996). Many dental hygiene professionals believe that instituting the baccalaureate degree as the entry level credential for dental hygiene practice, is the first step toward respect and autonomy for the dental hygiene profession (Walsh et al, 1988; Devore, 1993; Kraemer, 1985). However, the majority of dental hygiene programs are housed in community college settings and grant associate degrees resulting in far more practicing dental hygienists with associate degrees than baccalaureate degrees (ADA, 1996).

Many associate/certificate level dental hygienists across the nation have expressed interest in completing a baccalaureate degree, but because of problems associated with

achieving that goal, a far fewer number have attended dental hygiene degree completion programs (DeBiase, 1988; Newell et al, 1989; Tobian, 1989; Waring, 1991). Many of the problems or obstacles cited by these dental hygienists may be eliminated through the availability of a distance education dental hygiene degree completion program. The purpose of this study was to determine the need for such a program for dental hygienists in the Commonwealth of Virginia. Results may be used by Old Dominion University to determine if the implementation of distance education courses leading to a dental hygiene baccalaureate degree would be of interest to Virginia dental hygienists. Data gathered from the questionnaire will be helpful in designing a program to meet the needs of these dental hygienists.

A questionnaire, entitled *The Distance Education for a Dental Hygiene Degree Completion Program Questionnaire* was designed to gather data concerning the perceptions of dental hygienists regarding their interest in a dental hygiene degree completion program via distance education. The design of the survey instrument was partially based on a questionnaire sent to dental hygienists to determine their interest in an external degree completion program (Waring, 1991). Data were analyzed using frequencies, percentages and the chi-square test for association. Frequencies and percentages were used to determine study participants' demographic information, employment status, degrees held, experience with distance education courses and college credits earned since graduation from their dental hygiene program. The chi-square test revealed whether significant associations existed between demographic characteristics and the likelihood of respondents to enroll in a distance education dental hygiene degree

completion program. Associations also were determined between the importance of factors and reasons for seeking an advanced degree in dental hygiene and the likelihood of enrollment. When the chi-square revealed significant association, an analysis of residuals was conducted to determine which values were larger than might be expected by chance. In order to determine the predictability of enrollment by any demographic characteristic, factor or reason considered by hygienists when deciding to enroll in a degree completion program, lambda scores were tabulated for analysis.

Results revealed that the majority of Virginia dental hygienists surveyed are between the ages of 31 and 40, are female, have family responsibilities, and are employed full-time in a private practice setting. The majority of dental hygienists surveyed are at least somewhat interested in pursuing a baccalaureate degree in dental hygiene. A small number of respondents reported to have sought further education beyond their associate degree or certificate in dental hygiene. Of those who have sought further education, the majority reported these courses to be community college level courses, suggesting that respondents have not pursued upper level university courses possibly leading to a baccalaureate degree. A small percentage of dental hygienists have taken distance education courses, either as continuing education or college credit courses. Of this small group of dental hygienists with distance education experience, the majority reported to have been very satisfied with these courses.

When dental hygienists were queried about their feelings concerning various factors and reasons affecting their decision to seek an advanced degree in dental hygiene, tuition costs, weekend/evening course availability, geographic location, the length of time

to complete the program, part-time study availability, and faculty/institution reputations were rated by the majority of the respondents as being “very important”. Entrance requirements were rated as being “somewhat important” by the majority of the respondents. The attitude of hygienists’ employers was rated as “not important” when making a decision to seek an advanced degree in dental hygiene. Increased knowledge and skill, to better serve patients/clients and personal satisfaction were reasons rated by the majority of dental hygienists as being “very important” when making a decision to pursue an advanced degree in dental hygiene.

When cross-tabulations were conducted between demographic characteristics of Virginia dental hygienists and their likelihood of enrollment in a dental hygiene distance education degree completion program, older dental hygienists appear to be less likely to enroll in a distance education degree completion program. Dental hygienists aged 31-40 appear to be more likely to enroll in a distance education program. Of those dental hygienists who report to be employed part-time, the majority expressed a positive interest in enrolling in a distance education degree completion program. No significant associations were found between place of employment, marital status, and family responsibility and the respondents’ likelihood to enroll in a distance education dental hygiene degree completion program. While these can be used for marketing a program, none of the demographic characteristics can be used as strong predictors of enrollment.

Regarding cross-tabulations between factors and reasons considered by dental hygienists when making a decision to pursue an advance degree in dental hygiene and their likelihood to enroll in a distance education degree completion program, there were

significant associations found with the following factors: tuition costs, financial aid availability, the availability of weekend/evening courses, geographic location, length of time to complete the program, program requirements for obtaining a degree, part-time study availability, faculty/institution reputation and release time from work. Dental hygienists who rated these factors as “very important” or “somewhat important” were more likely to express a positive interest in a distance education degree completion program. The dental hygienists who rated these factors as “not important” were more likely to answer negatively to the possibility of enrollment in a distance education degree completion program. The availability of weekend or evening courses and the geographic location of courses appear to be predictors of enrollment.

When making a decision to enroll in a degree completion program, dental hygienists who rated the reasons increased knowledge and skill, dental hygiene career opportunities outside private practice, the status of the degree, personal satisfaction, and to better serve their patients as “very important” or “somewhat important” were more likely to express a positive interest in a distance education degree completion program. Those dental hygienists who rated these reasons as not important were more likely to respond negatively to the likelihood of enrollment. The desire to increase their knowledge or skill appears to be a predictor of enrollment among dental hygienists surveyed in the study. There was no association found between the likelihood of enrollment and the following reasons: career advancement, increased job security, enhance salary potential, and gaining entrance into graduate school.

Study participants chose times of the week and days most convenient if they were to enroll in a distance education degree completion program. Due to the fact that the majority of those respondents who are employed at least part-time, expressed a positive interest in a distance education degree completion program, the most frequently chosen course times were evening and weekend followed by late afternoon and daytime.

Conclusions

The majority of associate/certificate level dental hygienists in Virginia are interested in a dental hygiene degree completion program via distance education. Apparently dental hygienists in Virginia are not pursuing alternatives to traditional education such as distance education to achieve a baccalaureate degree in dental hygiene. The availability of distance education to these individuals is either not known to them or they have not considered this type of education as an option towards achieving a baccalaureate degree.

Many dental hygienists in Virginia express an interest in pursuing a dental hygiene baccalaureate degree. They value a baccalaureate degree and place importance upon reasons to complete a baccalaureate degree such as: to increase their knowledge or skill, career opportunities outside of private practice, the status of a baccalaureate degree, to better serve their patients/clients, and personal satisfaction. The desire of dental hygienists to increase their knowledge or skill in dental hygiene may be a predictor of enrollment in a baccalaureate degree completion program. The possibility of increased job security, the

potential for salary enhancement, and admission to graduate school do not appear to be motivational factors for pursuing an advanced degree in dental hygiene.

Dental hygienists appear to be interested in seeking a baccalaureate degree via distance education if they are satisfied with the following program design factors: tuition costs, financial aid availability, the availability of weekend or evening courses, geographic location, the length of time to complete the program, program requirements, part-time study availability, faculty and/or institution reputation, and release time from work. The availability of weekend or evening courses and the geographic location of courses appear to be predictors of enrollment. Entrance requirements and the employer's attitude do not seem to be factors affecting dental hygienists' decisions to pursue a baccalaureate degree in dental hygiene.

Based on this study, it is apparent that many Virginia associate/certificate level dental hygienists are interested in pursuing a baccalaureate degree via nontraditional ways such as distance education. Due to the demographic characteristics of these dental hygienists, nontraditional settings and modes of course delivery would best accommodate them. If such a distance education degree completion were to become a reality, the School of Dental Hygiene and Dental Assisting at Old Dominion University should consider the factors identified as being important to dental hygienists when seeking an advanced degree particularly the availability of weekend and evening courses and the geographic location of courses. These results confirm findings in previous studies conducted concerning the interest level of dental hygienists in a degree completion

program (DeBiase, 1988; Waring, 1991). These factors should be considered during the planning and marketing phases of a distance education degree completion program.

Since limited research has been done in the past concerning the use of distance education in the dental hygiene discipline, some future research questions could include:

1. What types of distance education courses (Internet, video-conferencing, computer facilitated, videotapes) are being incorporated into dental hygiene programs in the United States leading to a baccalaureate degree in dental hygiene?
2. What types of distance education courses (Internet, video-conferencing, computer facilitated, videotapes) are being offered by dental hygiene programs in the United States leading to an associate degree/certificate in dental hygiene?
3. Of the dental hygiene programs offering distance education programs, are the students receiving the same quality of education as those enrolled in traditional programs?
4. What is the satisfaction level among students who have taken distance education courses as part of a dental hygiene program?
5. What is the satisfaction level among faculty members who teach distance education courses as part of a dental hygiene program?

A dental hygiene baccalaureate degree completion program via distance education may provide a viable alternative to many dental hygienists who would otherwise never be able to pursue a baccalaureate degree in dental hygiene. An unattainable dream may very well be an achievable goal for many Virginia dental hygienists should such a program be initiated in the Commonwealth.

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Appendix A
Questionnaire Cover Letter

OLD DOMINION UNIVERSITY

Gene W. Hirschfeld School of Dental Hygiene
and Dental Assisting
College of Health Sciences
Norfolk, Virginia 23529-0499
Phone: (757) 683-4310
FAX: (757) 683-5239

March, 1997



Dear Registered Dental Hygienist,

An investigation is being conducted to assess the need for a baccalaureate degree completion program for associate level dental hygienists via distance education. For the purposes of this survey, distance education will be defined as: *courses broadcast via television from one site to multiple remote sites throughout the Commonwealth of Virginia. These courses consist of a one-way video, two-way audio interactive broadcast.*

The information you provide will be helpful to the dental hygiene profession and the School of Dental Hygiene at Old Dominion University, that offers a baccalaureate degree completion program in dental hygiene. Your responses may influence the development of accessible dental hygiene degree completion programs and educational opportunities for dental hygienists. If you hold a baccalaureate degree in dental hygiene please complete the first portion of the survey and return it in the enclosed envelope.

Please take a few minutes to complete the enclosed questionnaire. The average time needed to complete the survey is 5-10 minutes, so I hope you will take the time to answer the questions as frankly and completely as possible. Your answers will remain confidential.

Please return the questionnaire in the enclosed self-addressed stamped envelope within two weeks. If for some reason you chose not to participate, please return the questionnaire so that you will not be bothered with a follow-up letter.

This research is a thesis project in partial fulfillment of the requirements for the degree of Master of Science in Dental Hygiene. There are no risks involved for survey respondents. If you have any questions or comments please contact Michele Darby, BSDH, MS at (757) 683-5232.

Results of the study will be reported in group form only and will be available upon request from the School of Dental Hygiene and Dental Assisting, Old Dominion University. Thank you for your cooperation and prompt response.

Sincerely,

Joan G. Ellison, RDH, BS
Dental Hygiene Graduate Student
Old Dominion University
Norfolk, VA 23529-0499

Appendix B

*Distance Education
for a
Dental Hygiene Degree Completion Program Questionnaire*

DISTANCE EDUCATION FOR A DENTAL HYGIENE DEGREE COMPLETION PROGRAM QUESTIONNAIRE

Directions: Please answer each question as it relates to you. Place an X in the appropriate space or spaces as requested in each question. The questionnaire is divided into two sections. The first section asks for background information. The second section is composed of questions relating to your interest in a degree completion program via distance education.

Section I DEMOGRAPHICS

1. Age:

- | | | |
|---------------------------------------|--------------------------------|----------------------------------|
| <input type="checkbox"/> less than 20 | <input type="checkbox"/> 26-30 | <input type="checkbox"/> 41-50 |
| <input type="checkbox"/> 20-25 | <input type="checkbox"/> 31-40 | <input type="checkbox"/> over 50 |

2. Gender:

- male female

3. Marital status:

- single married

4. Do you have responsibility for elderly parents or children living at home?

- yes no

5. What year were you first licensed as a dental hygienist? _____

6. What is your current employment status?

- full time (32-40 hours per week) as a dental hygienist
 part time (less than 32 hours per week) as a dental hygienist
 currently not employed as a dental hygienist

7. Where is your primary place of employment as a dental hygienist?

- not applicable
- private dental practice
- public health setting
- hospital/clinic setting
- educational setting
- other, please specify _____

8. What is the highest degree that you hold in Dental Hygiene? (choose one)

- Associate degree/certificate in dental hygiene
- Baccalaureate degree in dental hygiene
- M.S. in dental hygiene

9. Do you hold another degree besides a degree in Dental Hygiene?

- yes no

If yes, please name degree _____

If you have a baccalaureate degree in dental hygiene, you may stop here and return the questionnaire in the enclosed envelope. Thank you for your participation.

Section 2: INTEREST IN A DENTAL HYGIENE DEGREE COMPLETION PROGRAM

10. How interested are you in earning a bachelor's degree in dental hygiene?

- very interested
- somewhat interested
- not interested

Please complete the entire survey even if question #10 was answered "not interested".

11. How important are the following factors to you in making your decision to pursue a bachelor of science in dental hygiene degree? Please rank your responses with 1 being Not Important and 3 being Very Important.

	Not Important	Somewhat Important	Very Important
A. Tuition costs.....	1	2	3
B. Availability of financial aid.....	1	2	3
C. Availability of weekend/evening courses.....	1	2	3
D. Geographic location.....	1	2	3
E. Length of time to complete program.....	1	2	3
F. Entrance requirements.....	1	2	3
G. Program requirements for obtaining a degree.....	1	2	3
H. Availability of part-time study.....	1	2	3
I. Reputation of program faculty and/or institution.....	1	2	3
J. Release time from work.....	1	2	3
K. Employer's attitude toward the bachelor's degree.....	1	2	3

12. How important to you are each of the following general reasons for seeking an advanced degree in dental hygiene?

	Not Important	Somewhat Important	Very Important
A. Increased knowledge and skill.....	1	2	3
B. Career advancement.....	1	2	3
C. Dental hygiene career opportunities outside private practice.....	1	2	3
D. Status of degree.....	1	2	3
E. Better serve patients/clients.....	1	2	3
F. Personal satisfaction.....	1	2	3
G. Increased job security.....	1	2	3
H. Enhanced salary potential.....	1	2	3
I. Gain entrance into graduate school.....	1	2	3

13. Have you ever participated in a college accredited course or continuing education course via distance education?

- yes no

14. What was your general opinion of the distance education course?

- not applicable
 very satisfied
 somewhat satisfied
 very dissatisfied

15. How likely are you to enroll in another distance education course?

- not applicable
 very likely
 somewhat likely
 very unlikely

16. Have you enrolled in any college credit courses since graduating from your dental hygiene program?

- yes no

17. Choose the one best description of this course(s) from the list below:

- not applicable
 community college level course
 university upper level course related to dental hygiene
 university upper level course not related to dental hygiene
 currently enrolled in a dental hygiene degree completion program
 currently enrolled in a baccalaureate degree program in another discipline,
please specify: _____
 other, please explain: _____

18. If distance education courses leading to a bachelor's degree in dental hygiene were offered to you tomorrow, would you enroll?

- yes, definitely
- possibly
- definitely not

19. If you were to enroll in distance education courses, which days of the week and times are most convenient? Choose two that best meet your needs

- daytime, weekdays (8:00 A.M. - 5:00 P.M.)
- late afternoon, weekdays (4:00 P.M. - 7:00 P.M.)
- evening, weekdays (7:00 P.M. - 10:00 P.M.)
- weekend college (Friday evening, Saturday and Sunday)
- not applicable

20. Please provide any additional comments concerning the need for a dental hygiene degree completion program via distance education.

Thank you for your participation! Please return questionnaire in the enclosed self-addressed stamped envelope as soon as possible. If you would like to receive the results of the survey or have any additional comments or questions please direct correspondence to:

Joan Ellison, RDH, BS
School of Dental Hygiene
Old Dominion University
Norfolk, VA 23529-0499

Appendix C
Second Mailing Letter

June 1997

Dear Registered Dental Hygienist,

Recently you were sent a questionnaire to be completed regarding the need for a dental hygiene degree completion program for associate level dental hygienists via distance education. In order for this study to be representative of dental hygienists in the Commonwealth of Virginia, it is important that I receive as many responses as possible. Information obtained may influence the development of dental hygiene degree completion programs and educational opportunities for dental hygienists.

If you have already completed the questionnaire and returned it in the previously mailed envelope, please disregard this letter. Thank you for your time. If you have not completed the questionnaire, I have enclosed a copy of the questionnaire, for your convenience. Please return the completed questionnaire by June 30, 1997 in the enclosed self-addressed, stamped envelope. Your time and cooperation in participating in this study is greatly appreciated.

Sincerely,

Joan G. Ellison, RDH, BS
Dental Hygiene Graduate Student
Old Dominion University
Norfolk, VA 23529-0499

Appendix D
Comments by Questionnaire Respondents

Comments

This sounds great. I haven't pursued furthering my degree due to working full-time and length of drive to nearest program. I hope this will be successful.

I would like further information on BS degree if any options in # 19 become available.

There are so many DH schools that have closed which make it almost impossible to finish your BS degree. This is something that is worth trying. Other schools do it for other degree (example: education). It should be an option for DH.

At this time I do not feel a BS degree would help me professionally or personally. I am quite satisfied currently.

I have been searching for such a program for twenty years.

With 27 years experience as a hygienist who kept up with continuing ed. before it was mandatory, I don't feel that degree completion would give me any financial gain in Virginia.

I have been practicing for 33 years and have never felt the need for a college degree. I do, however, take CE course every year and enjoy the courses.

One always thought that you got a bachelor's degree in dental hygiene if you wanted to teach. Is there a raise in salary if you pursue it?

I think it's great idea. It gives you an opportunity to get a bachelor's degree without "going to college". It would work wonderful for me - I have a family and work part-time.

What kind of textbooks would be needed; where would the tele-courses be located and how often; how would missed classes be made up; would any clinical time be required; would these tele-courses fulfill the continuing education requirements of 15 credit hours per year?

I sure hope this program gets started. It sounds very exciting.

All dental hygienists should have a BS to practice. It is the only way our profession can gain respect.

I would be very interested in a degree completion program. I have 154 hours and no baccalaureate. I attended Louisiana State University two full years before attending dental hygiene school. Please let me know if the program is available.

Sounds exciting - hope to hear about this soon.

I feel the need for the DH completion program because all the community colleges only offer associates degree, and there are no opportunities for hygienists with families to leave the area to get their degree.

I don't necessarily believe a BS makes one better or more skilled hygienist but the closer the degree the more diverse the opportunities.

Since this is for a thesis, I assume it's not something that will become a reality. With the high burn-out rate in clinical dental hygiene, I'm surprised no university has developed distance learning courses before now. This type of learning is already a reality for many other degrees.

Another hygienist in my office already was investigating courses to take towards a Bachelor's degree so the interest is out there for this type program.

Beneficial for those seeking one and program not available in area.

Our profession needs to leave the walls of a building and increase the opportunity for RDH with AAS to earn BS.

I would be interested to know the course requirements would be met by the courses I've already completed for my BS in Health Education. Since the hygiene requirements were the same for associate and BS degree when I graduated I would assume the basic science and general requirement courses I've completed would be comparable. I've always assumed that my education was virtually identical to that of a BSDH.

I feel distance education would benefit me because I would have to travel 3 1/2 hours or more each way to achieve my bachelor's degree which is one reason why I haven't enrolled yet.

I am familiar with the ODU via television courses leading to a BSN offered at BRCC - a student enrolled in the program felt the transmission was often poor and sometimes it was not possible to ask questions because of a failure with the two way audio system. Sure hope the transmission is improving.

Because of the fact that I work full time I would need to study and take classes at my own pace, but I have always wanted to pursue a BS.

I would be interested in obtaining a baccalaureate degree in dental hygiene if I could do it while working full time.

I would like to be able to use my college credits, earned at a 4 year university. This would help in shortening the time it would take.

I hope this program will be possible. It'll probably be the only way I can complete my degree.

I need to take Latin 102. It is only offered during the day and at one time. To complete this class I would not be able to work 3 days of the week.

Need days close to home and weekends because of childcare needs spouse that works a second shift.

I feel that with an associate degree in dental hygiene I can offer as much to my patients as with a Baccalaureate degree.

This is an important point I want to share - although it's "prestigious" to be able to say you have a bachelor's degree in DH - it has NEVER been a requirement in my job searches. It's only handy for those who want to teach - but the salary is lower in teaching so why bother. I feel what's more important are courses given to older hygienists to offer us the updated information that the young hygienists learn in school nowadays.

When I graduated in '73 I looked into a BA degree. What I found I believe still is true. Dentists in private practice do not care if you have a BA degree. Salaries do not seem to be based on that, only experience. In fact I have a friend who has a BA degree. I make \$75,000 per year, she makes 45,000 per year.

If you are pursuing a teaching degree a four year degree is and always has been available. Unfortunate in the real world it doesn't apply to private practice. Continuing education continues to sharpen hygiene skills and knowledge and continued reading on your own. Friends from college who pursued four year degrees have left hygiene and are now dentists, teachers, and one became an engineer.

Students that I have known have used hygiene as a stepping stone while going to earn their degree. They later left their hygiene practice to go on to better jobs they felt met their new degree needs.

I think many students through the years were disappointed to find dentist share little interest in their four year degrees in regards to salaries. This caused many to continue in pursuit of other jobs.

I have moved a lot the last 20 years - took many CEU's via mail and loved them. I feel very thorough education could be obtained for DH completion via distance education.

I am moving to Switzerland so TV type distance education would probably not be possible although I'm still interested!

The main reason I have not pursued my BS degree (lacking 30 credits) is that to do so I would have to leave my job and move closer to ODU for the final year in order to graduate from ODU! It is not a possibility with my husband's job, family, etc.

I am now enrolled to take courses in health science because it's the only degree offered through CVCC (satellite) that will compliment my AS in Dental Hygiene.

Bravo on the distance education offered at Lord Fairfax Community College - which started last year! I would favor such any opportunity at Lord Fairfax for dental hygiene BS!

Although I consider myself retired, my 42 years as a practicing hygienist in four different states, has not lessened my desire to further my education in the dental hygiene field.

I'd like to teach and I know you must have a BA degree.

I commuted 2 hours one way to dental hygiene school for 2 years. In order for me to continue my education, I would have to use distance education courses. (I have 3 children also)

I feel certain there are many dental hygienists that would complete their degree if a program other than daytime hours was offered. In today's economy one must work full time to support oneself and/or family - leaving no day time hours for educational advancement.

I would personally love to finish my degree and pursue graduate school, but my current financial situation and the fact that my husband is still in college prohibits that. If there were a program closer with better hours; I would definitely enroll.

Any additional education helps very little in advancement financially in dental hygiene.

Emphasis on fully accredited program need for site to handle advanced clinical. This sounds like a wonderful thesis project. A couple of years ago I would have been the 1st in line for such an opportunity.

I would be interested in obtaining my continuing education credits via distance education.

I feel if we stay current - truly current we can obtain the knowledge we need. I make more than 2 other women in our office that have a BS. We do the same quality of work. they do more perio. I limit my perio due to hand problem and still earn a very respectable income and serve my patients well!

I think distance education could be utilized for continuing education purposes. While I am not currently working as a RDH I attend meetings and maintain my license in 2 states, and therefore, am interested in continuing education courses. I hope the information obtained from the questionnaires provides the input helpful for the thesis project and for the RDH statewide. I think remote conferences for meetings and educational purposes can provide an environment, for better educated, and more career minded hygienists. This can lead to

a more cohesive group of hygienists - making changes to improve working conditions salaries, benefits, etc. for RDH within (and outside) the state.

For those seeking degree completion programs, distance education is a great, non-traditional approach. Since I have had a BSDH since 1970, this is not something I need.

I may wish to teach eventually, so that's where my interest lies!

I have not received my bachelor's degree because there is not applicable college close to me. I have two teenagers and am a single parent. This opportunity would be wonderful!

Freedom to pursue advanced education!

I believe that this would be a wonderful option which should be made available to hygienists.

We will be able to educate our patients better and hopefully dentists will have more respect for a hygienist with a bachelor's degree.

At this point in my life I do not feel I could gain from getting another degree in hygiene. I take many CE courses which lead to an inner depth improvement, but it does not enhance my career (financial or placement).

At my age, I am not interested in this program, but I think it's an excellent opportunity for hygienists with an AAS to further their career.

At this time I do not have the need to enroll in a bachelor's degree but I feel other may choose to do so if beneficial.

I think this type of education would be fine for basic science classes but I personally feel the face to face contact and hands on experience can not be beat. I do think this type of education would be beneficial to students who do not have the time or can not afford to be full time students. Keep in mind that I am not familiar with this type of education except what I read in the survey.

I do not plan to practice all that much longer to seek my degree.

I would have been very interested a few years ago, but I am now getting close to retiring. I have had to venture to another career because of my back, arm and hand pain. I can only work 1-2 days a week.

This sounds interesting, although at this point in my life, after practicing DH for 31 years it is unlikely I would enroll. I plan to work another 5-6 years and hang up my scalers!

Through my experience a certificate in dental hygiene is adequate for private practice. The degree would only be needed if you were going into teaching.

Distance education courses should be made available. Why are you not wanting more input concerning this issue from those holding bachelor's degree already? (i.e. question #18) The time has come for academia to offer this opportunity for dental hygiene education. Distance education is important to obtain a dental hygiene degree. I see no reason for someone with an associate degree to obtain a bachelor's degree unless interested in teaching. Thank you for this opportunity.

If this questionnaire were to lead to a bachelor's degree in dental hygiene, then I could fulfill my dream. I am in hopes that this program will materialize. Best of luck to you!!

I am currently living in Charleston, S.C. Trident Technical College educates hygienists in this area. Hygienists are not regarded as "professionals" in this area, and salaries reflect it as well as expectations of employers.

To make a dental hygiene degree program via distance education would be a very valuable asset to the graduates of N.V.C.C. in Annandale, VA.

It would be quite convenient living and working in Charlottesville, VA. I think there would be a great response in this area.

I feel program via distance education is very important to dental hygiene - just not for me personally. I practiced until 2 years ago 3 times a week and due to physical problems had the need to retire. I have since filled my time with volunteer work and family responsibilities.