A Comparison of Attrition Rates in Dental Hygiene Programs Using
Selective and Non-Selective Admissions.

THESIS

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of Dental Hygiene in the Graduate School of The Ohio State University

By

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Abstract

**Purpose:** The purpose of this study was to determine if there is a difference between selective admissions and non-selective admissions dental hygiene program attrition rates. Admission to dental hygiene programs is predetermined by class size, therefore applicants must meet the criteria to either be considered for selection or to be put on a wait list for entrance. Dental hygiene programs want to retain their enrolled students and maximize their student successes, therefore it is imperative to validate current admissions practices that help reduce attrition rates.

**Methods:** A researcher-designed online survey was developed and sent to the directors of dental hygiene programs across the United States. The survey, comprised of 17 questions, examined what components are used in the programs that use selective admissions, and if there are any factors that may help eliminate or reduce the possibility of attrition once the student is accepted into the dental hygiene program. It also identified institutions that do not utilize selective admissions and evaluated their student’s attrition rates.
**Results:** There was a 30% response rate to the survey. The results showed that there was no statistical difference in attrition rates when selective or non-selective admissions criteria is used in dental hygiene programs (year 2011 p=.435 and year 2012 p=.784). The significant findings reject our null hypothesis. Results of this study also showed baccalaureate degree dental hygiene programs have higher completion rates than associates degree dental hygiene programs (2011 p=.002 and 2012 p=.005).

**Conclusion:** Evidence suggests that baccalaureate degree dental hygiene programs have less attrition compared to associates degree dental hygiene programs. The findings in this investigation may assist states to evolve their entry-level dental hygienists to be baccalaureate prepared, rather than associates degree prepared.
Acknowledgements

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Fields of Study

Major Field: Dental Hygiene
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Chapter 1: Introduction

Background of the Problem

Student attrition is of great consequence in dental hygiene education. Many studies have explored the reasons why students withdraw from allied health programs after they have been admitted.\textsuperscript{1,2} Ideally, it would benefit all students, faculty, dental hygiene programs and institutions if students most likely to withdraw were identified prior to program enrollment.\textsuperscript{2}

The term “attrition” in dental hygiene education, is defined as a reduction or loss in the number of students. Dental hygiene programs are committed to student retention and make significant efforts to help students succeed.\textsuperscript{2} The term “retention” when used in dental hygiene education refers to continuing to hold or have students in the program until graduation. Many allied health programs in the United States, including dental hygiene and nursing, experience attrition of students and it is a consistent problem. Current attrition rates are due to many reasons with the highest percentages due to academic and clinical skills difficulties.\textsuperscript{3}

In dental hygiene education, remediation is the process of correcting a fault, deficiency or skill by providing additional educational opportunities.
Accreditation requires dental hygiene programs to remediate at risk students. Remediation requires additional time for the dental hygiene faculty. This not only affects the students, but also faculty and the institution. It is often utilized to help reduce attrition and increase the number of successful students in the dental hygiene program.

Not every dental hygiene program utilizes preadmission criteria. Those that do use pre-admission criteria to help select candidates for admittance to help ensure retention and success. Selection methods for admissions may influence attrition rates and therefore consideration should be given to the effect the variables have on student attrition.

Significance of the Problem

The issue of student retention is of interest to all schools and dental hygiene programs, but is of great interest to professional health care programs charged with graduating qualified competent practitioners that serve to meet the health care needs of society.

After selection or matriculation, students enter a dental hygiene program with the idea that they will graduate and become licensed to practice dental hygiene. When selective admissions are utilized, the program’s admissions committee choose qualified students who are most likely to succeed. The undertaking of choosing which admissions criteria are best utilized can be difficult. Dental hygiene programs utilize many different variables during the
admissions process. Admission to dental hygiene programs is limited; therefore applicants must meet the requirements to either be considered for selection or to be put on a wait list for entrance. Some dental hygiene programs have few or no prerequisites needed to enter into the dental hygiene program. This study will focus on determining whether there is a difference in the attrition rates between programs that utilize selective admissions compared to programs that admit students in order of a wait list. There is very limited research that has been conducted in the dental hygiene profession regarding the comparison between selective and non-selective admissions and their attrition and/or retention rates. If dental hygiene programs want to retain more students and increase their student successes, then admission criteria should be based on evidence correlating the criteria to success.

**Purpose of the Study**

The purpose of this study will examine if there is a difference in attrition rates in dental hygiene programs when selective versus non-selective admissions are utilized.

**Research Question**

Is there a difference in attrition rates for dental hygiene programs that use selective and non-selective admissions?
Definition of Terms

1. Selective Admissions- The ability of a college or institution to choose a student from an applicant pool that has more qualified candidates than the college can accommodate. The admissions process takes different academic and character-related criteria into account when selecting the students.

2. Non Selective Admissions- Non-competitive college admissions. The Institution/ college or programs accepts students without asking for evidence of academic successes or experiences.

3. Attrition- A reduction or loss in the number of students

4. Retention- To continue to hold or have students until graduation

5. Remediation- The action or process of correcting a fault, deficiency or skill by providing additional educational opportunities during dental hygiene education

6. Registered Dental Hygienist- (RDH) A licensed dental professional who specializes in preventative oral health, typically focusing on promotion and maintenance of good oral health.

7. Associate’s Degree in Dental Hygiene- A degree awarded after completing generally a 2 year program and required predetermined pre-requisite coursework

8. Bachelor of Science Degree in Dental Hygiene- A degree awarded after completing generally a 4 year program
9. National Board Dental Hygiene Examination (NBDHE)- a written examination that must be completed and passed at a 75% or higher by the dental hygiene student in order for them to become licensed in the state in which they work.
Chapter 2: Review of Literature

The review of literature aims to broaden the understanding of selective admissions and non-selective admissions in dental hygiene programs and dental hygiene student retention and attrition.

Admissions and Predictors of Student Success in Dental Hygiene Education

Predicting academic success is a common challenge for dental hygiene programs, especially when students withdraw prior to completing the program. At some institutions, prospective students are selected from a pool of applicants who are most likely to succeed, which is the goal of dental hygiene programs. Dental hygiene programs typically develop their own point or evaluation system to assist in determining which applicants are most likely to be successful.

According to the American Dental Hygienists’ Association (ADHA), admissions requirements and prerequisites vary from institution to institution, but generally include: high school diploma or GED, high school courses in mathematics, chemistry, biology, English; minimum “C” average in high school, college entrance test scores, typically up to 40 credit hours of prerequisite college courses in chemistry, English, speech, psychology and sociology, and then dependent on the institution a personal interview, dexterity test and/or essay. Dental hygiene programs not only utilize preadmission criteria to help select
candidates for admittance but also assess criteria that can ensure student retention.  

The results from a nursing education program study indicate that baccalaureate degree programs have more strict admission policies that may “weed out” students who would otherwise be unsuccessful during the nursing major or fail the National Council Licensure Examination for Registered Nurses (NCLEX-RN). However, even with more stringent admissions policies, students who only minimally meet admission criteria often have academic difficulties after starting the nursing program.  

Downey examined the predictive reliability of GPA and Scholastic Aptitude Test scores in predicting dental hygiene program success and National Board Dental Hygiene Exam score.  

A retrospective review of 134 dental hygiene graduates of the Medical College of Georgia from 1996-2001 revealed that incoming GPA added significantly to the ability to predict the dental hygiene GPA.  

Georgia Regents University research found the use of incoming GPA to be predictive of students’ dental hygiene GPA.  

Models to predict dental hygiene GPA and the NBDHE can be used during recruitment and for admissions selection as well for initial counseling sessions with entering students. The biographical essay, letters of recommendation and student interviews are non-cognitive admissions criteria that can be examined for use in a future probability model.  

Alzahrani concluded that when Old Dominion University admissions variables were combined into a cluster of variables, they proved significant at
predicting success. This research hypothesized that a student who had to repeat a prerequisite science course to achieve a passing grade would be less likely to be successful in the dental hygiene program and on NBDHE. However, the analysis of data collected from student transcripts regarding multiple attempts to achieve a passing course grade revealed no statistically significant relationship between multiple attempts and success. Additionally, multiple attempts were not cross-referenced to see if they occurred when the student was enrolled on a full-time or part-time basis. Both of these parameters might affect the student’s true ability to succeed.

Bauchmoyer, et al, studied 10 individual courses that comprise the preadmissions requirements and basic college science requirements for the dental hygiene program at The Ohio State University to determine whether or not a correlation existed between course grades and program and NBDHE success. The strongest correlation with program success was demonstrated by course grades in biology and chemistry and the strongest correlation with NBDHE success was determined by course grades in biology and psychology.

The study of grade point average as a predictor variable appears often in the literature. Researchers have studied high school GPA, college course pre-professional program GPA, science and other prerequisite course GPA, and dental hygiene GPA at specific intervals and at graduation. While the literature supports a strong correlation between GPA and success in a given dental hygiene program, the exact definition of GPA caries widely. Sanderson’s study discovered specific preadmissions criteria that correlates to dental hygiene student retention. The
study supports the use of overall high school GPA, overall college GPA and interviews as part of the dental hygiene student selection process.\textsuperscript{2}

Bauchmoyer et al, obtained data on 173 graduates of the dental hygiene program at The Ohio State University from 1998-2002 to examine the relationship between pre-admission requirements, site of academic preparation, cumulative dental hygiene GPA and NBDHE scores.\textsuperscript{1} NBDHE success was strongly predicted by the cumulative dental hygiene GPA, followed by the science GPA and then entering cumulative GPA.

A study by Sanlow was conducted to provide current information on the relationship between admission criteria and dental school performance, including the association of admissions criteria and dental school outcomes such as remediation and attrition. In order to determine whether a strong correlation existed among the admissions criteria of students who did not graduate or who required substantial remediation in order to graduate, they compared the mean of each admission score across the groups through the dental program. The study demonstrated that the admission interview score showed a significant positive correlation with academic success, particulate with the yearly and final GPAs. Students with a low undergraduate science GPA, a low DAT academic score, and a low PMAT score were more greatly associated with the need for delayed graduation or dismissal.\textsuperscript{8}

Currently, there are several standardized testing that is often implemented for dental hygiene admissions. Sanderson determined that retention rates were higher when the Accuplacer Asset, Compass, SAT and Test of Essential
Academic Skills (TEAS) were not used by programs for preadmission requirements. The ACT, Health Occupations Basic Entrance Test (HOBET), and the Health Sciences Reasoning Test (HSRT) did not show a distinct pattern when comparing averages between the programs using or not using these standardized tests. The use of the Allied Health Professions Admission Test (AHPAT) showed a greater tendency toward higher dental hygiene program retention rates. The SAT was found to be a positive predictor of program success by Ward et al. Standardized tests used in dentistry, specifically the academic component of the Dental Aptitude Test (DAT) as well as the Perceptual Motor Aptitude Test (PMAT) are statistically significant admission criteria when correlated to dental school performance.

Alzahrani examined predictors of student success and concluded that final grades in oral pathology, and oral anatomy and histology can significantly predict graduation and NBDHE success, suggesting that educators look to improve student performance after admissions to the program to improve the likelihood of success.

Sanlow et al reported the use of interviews as statistically significant admissions criteria when correlated to dental school performance. Conflicting medical research reported that the use of interview was not a valid predictor of student success in medical school. A noncognitive factor that could affect student attrition, is a preadmission requirement for community service. McClain et al looked at increasing diversity through program recruitment and retention strategies. Although, the focus was on minority populations, the recommendations
offered through this study could be considerations for general admissions policies. The researchers suggested early and repeated opportunities for predental students to explore the dental profession. It was recommended that potential candidates participate in community outreach initiatives.

Dental Hygiene Student Retention and Remediation

Attrition in dental hygiene programs impacts the individual, the institution, and the community. When a student is not successful, the financial, time and emotional impact on the individual and his/her family can be enormous. Retention of students is particularly important to institutions whose programs are evaluated and funded based on retention and graduation. The early identification of factors affecting student success and providing support interventions can influence student persistence. Researchers and admissions personnel continue to discuss, debate, and seek reliable predictors of student performance. Most dental hygiene programs apply selective admission criteria to prospective students, usually resulting in classes filed with high academic achievers.

Dental hygiene accreditation standards require a published process to ensure students meet academic, professional and clinical criteria as well as adherence to academic standards and institutional due process for remediation or dismissal. Holt reported entry-level associate degree dental hygiene programs graduate a wide range (50%-100%) with a mean of 83 percent of students compared to 46 percent overall student retention in most two-year institutions.
The primary reasons reported for student attrition in Holt’s study included academic and clinical difficulties, family and personal responsibilities, as well as dissatisfaction with career choice. According to Holt’s study, all participating programs required students to maintain a grade of “c” or better in all dental hygiene courses and to repeat the course if not successful.\textsuperscript{13}

The results of Freudenthal and Bowen’s research showed that of the students enrolled in the Idaho State University baccalaureate dental hygiene program between August 1999-May 2008, fifty-five students withdrew or did not meet academic standards. The records review indicated an overall retention rate of 92.7 percent, ranging from 86.7 percent- 96.6 percent for each class.\textsuperscript{3}

Numerous strategies are employed by programs to assist students in their efforts to succeed. Those most often reported by respondents were academic and clinical remediation, academic advising and financial aid. Those programs implementing clinical remediation strategies reported primarily using one-on-one assistance during prescribed clinic sessions or in open clinics.\textsuperscript{13} According to Branson and Toev, the method most frequently reported was one-on-one practice along with typodont practice and extra clinical time under supervision.\textsuperscript{15}

In Branson and Toev’s study from 1999, if clinical remediation was indicated, participants were asked to identify the most common action taken by the program at the end an academic term. The most common response was the assignment of an incomplete grade, requiring students to attend additional clinical sessions and allowing them to continue with their peers. The second most common action that was taken was giving a failing grade and requiring the
student to repeat the clinical course, thus delaying completion of the program. The majority of the faculty responsible for the remediation received no financial compensation for the remedial instruction.\textsuperscript{15} According to Holt, only 2 out of 10 dental hygiene programs offered additional compensation.\textsuperscript{13} There is limited research and information available if there is a difference in remediation in selective admissions and non-selective admissions dental hygiene programs.

Remediation can be a vital part of becoming a competent clinician. The development of remediation policies is reinforced in the accreditation standards for dental hygiene educational programs.\textsuperscript{14} According to Branson and Toev, clinical remediation action widely varied among programs. One-third of the respondents awards the grade of incomplete and requires students to attend clinical sessions along with peers.\textsuperscript{15} This mode of action supports competency-based dental hygiene education, and is consistent with accreditation standards.\textsuperscript{14} The findings suggest that remediation is an integral part of clinical skill acquisition in dental hygiene education. Educators are encouraged to develop written policies on remediation and communicate them to students, examine end of term grading procedures in light of competency-based levels of qualifications, provide support and guidance for faculty assuming responsibility for skill remediation instruction, and plan and implement remediation strategies based on theories of psychomotor skill acquisition.\textsuperscript{15}

In conclusion, there is much research done on predictors in dental hygiene education success along with some research studies on attrition in education. However, this study will examine if there is a difference in attrition rates in dental
hygiene programs when selective versus non-selective admissions are utilized and determine the types and variation of selective admissions criteria.
Chapter 3: Methodology

This chapter outlines the specific steps utilized to gather and analyzed data to determine if there was a difference between selective admissions and non-selective admission’s dental hygiene programs and their attrition rates. The research investigates admissions criteria, attrition rates of students who matriculated in 2011 and 2012, and remediation. The research design, subject selection, data collection and data analysis are addressed in this chapter.

Research Design

This study utilized an electronic survey study design with a convenience sample. A survey instrument was developed by the researcher to investigate admissions criteria and attrition rates in dental hygiene programs. The survey was pilot-tested for content and form by dental hygiene faculty and was revised accordingly prior to distribution. The study protocol was approved and determined except by the Ohio State University’s Institutional Review Board. A follow-up email was sent 14 days later to non-respondents.
Subject Selection

The population for this study was dental hygiene directors responsible for managing programs accredited by the American Dental Association, Commission on Dental Accreditation. The total number of invited participants was based on the number of dental hygiene programs in the United States. Programs were identified from a 2014 list of 335 accredited entry-level dental hygiene educations programs made available through the American Dental Hygienists’ Association (ADHA). Although participation in the survey was voluntary, the dental hygiene program directors input and participation was particularly valuable to this study. The program directors acquire the most knowledge about their specific program including administration, student information, data and curriculum.

Data Collection

Qualtrics software (Provo, UT) was utilized to distribute and analyze the survey. The survey instrument consisted of 10 forced-choice and 7 open-ended questions. Sections regarding type of program, admission criteria, questions related to the dental hygiene class that entered in 2011 and the dental hygiene class that entered in 2012 and remediation within the dental hygiene program was included (Appendix B). All of the respondents remained anonymous, IP addresses were not collected and data was encrypted. A follow-up mailing after 14 days was sent via email to non-respondents.
Statistical Analysis

Data was analyzed using descriptive statistics and comparisons were made using t-tests.
Chapter 4: Results and Discussion

The online survey was sent to 335 dental hygiene program directors in the United States. Number of surveys were completed for a response rate of 30%, which is common to online surveys of this nature. Programs were identified from a 2014 list of accredited entry-level dental hygiene education programs made available through the American Dental Hygienists’ Association (ADHA). The survey revealed that over half of the responding institutions were from either a community college or junior college, followed by a University or college. A small percentage of respondents were within a technical college or within a dental school. Most institutions offered an associate’s degree in dental hygiene, followed by a baccalaureate degree in dental hygiene. The majority responded that they utilize selective/competitive admissions (applications are evaluated each year against the entire applicant pool); the remaining utilize non-selective admissions (applicants are required to meet established criteria and are admitted as spaces becomes available or are wait-listed) (Table 1).

Science course grades (90%) and college grade point average (75%) were most used as admissions criteria, followed by standardized testing (41%) and math course grades (35%) (Figure 1). Science course grades and standardized testing (ACT, SAT, Entrance Test Scores, etc.) were utilized more by associate’s
degree programs. Other requirements that were specified included but were not limited to: job shadowing, essay, English, HESI, previous dental experience, and critical reasoning test.

The average number of students who matriculated into a dental hygiene program in 2011 and 2012 was 26.68, with a range of 9 to 90. Of the students who entered a program in 2011 and 2012, an average of 23.71 students, with a range of 9 to 83, successfully completed the first year of the dental hygiene program. The data shows an overall average attrition rate of 2.97% during the first year of the dental hygiene program (Table 2). From a list of prescribed force choices, respondents were asked to report all of the situations that have influenced student attrition for the students who had matriculated into a dental hygiene program in 2011 and 2012. The data in Table 3 displays that failure to meet academic standards, personal issues, and preclinical course failures were the most common factors that played a role in the students’ attrition, followed by clinical skills and dissatisfaction with career choice. Where failure to meet academic standards and preclinical skills played a role, the majority of the students were from an associate’s degree program.

The mean of students who graduated with their matriculated class of 2011 and 2012 was 22.83, with a range of 9-72. After completing the first year of the program, only .89% of students did not successfully complete the dental hygiene program. The most common factors that played a role in the students’ attrition prior to graduation were failure to meet academic standards, personal issues and clinical skills, followed by preclinical course failures and dissatisfaction with career choice. Where academic standards and clinical skills played a role, the number of students from an associate’s
degree program were greater than that of a baccalaureate degree program. The data shows an overall average attrition rate for the matriculated class of 2011 and 2012 was 3.85% (Table 2).

Two additional questions were explored to determine what forms of remediation are offered in the participating dental hygiene programs and if additional compensation is received by the faculty. One-on-one assistance from faculty (88%), individual remedial plan of success (69%) and repeating a course out of sequence (28%) were among the top responses. Supplemental clinical course work (19%) and other specified answers such as refer for tutoring, re apply the following year, and repetition of the entire year were also among the responses. Only 16% of program directors stated their faculty receive some form of additional compensation for remediation.

Attrition rates were compared for selective and non-selective admissions using an independent sample t-test. Statistical data was analyzed using selective and non-selective admissions criteria and the results showed no statistical difference in the attrition rates (year 2011 $p=.435$ and year 2012 $p=.783$) (Figure 2). An additional independent sample t-test, comparing the attrition rates for associate degree programs and baccalaureate degree programs, indicated a higher completion rate for the year 2011 for baccalaureate degree programs ($p=.001$). The mean for attrition rates for associate’s degree programs was 9.75% while the mean for completion of a baccalaureate degree program was higher 3.72%. For the year 2012, baccalaureate degree programs (mean=4.31%) also had a lower average attrition rate than associate degree programs (mean=10.91%) (Figure 3).
The final questions from the survey, program directors were asked to provide additional comments or questions related to dental hygiene admissions. Comments and responses made that were related to dental hygiene admissions, attrition rates, and remediation were made by 24 individuals. Although responses varied, two themes emerged from these responses. The first theme centered around attrition rates. Seven program directors state that attrition was not an issue in their program. One program director explained that they have had a consistent 1%- 1.5% attrition rate for the last 38 years, while another had only lost one student in the past 10 years. A second theme referred to the applicant pool. Five program directors commented that the applicant pool is a contributing factor to attrition. One director state more students have to work which has a negative effect on success while another director commented that applicants are not ready for a structured program.

The results of the study showed that there was no statistical difference in attrition rates when selective or non-selective admissions criteria is used in dental hygiene programs (year 2011 p=.435 and year 2012 p=.784). The mean attrition rate for non-selective admissions was 10.31% and for selective admissions was 7.94% for the year 2011. The mean attrition rate for non-selective for the year 2012 was 8.7% and selective admissions was 9.48%. The number of programs were highly unbalanced (87 vs 12). The significant findings reject our null hypothesis. Results of this study also showed a statistical difference in attrition rates between baccalaureate degree dental hygiene programs and associates degree dental hygiene programs (2011 p=.002 and 2012 p=.005).
Discussion

A significant challenge for dental hygiene admissions committee members is selecting the most qualified applicants. Observation suggests that individual dental hygiene programs have developed their own rating or point system to assist in ranking applicants to determine those who will be most likely to succeed. However, limited publications are found that discuss the use of an institution’s custom-designed rating system.

Investigations of cognitive variables such as grade point averages, science course grades, and scores on standardized tests have produced mixed results in determining correlation between the variable of interest and academic success. Studies of noncognitive variables, such as dental assisting experience, personality tests, and admissions interviews, have produced equally mixed results. The study of grade point average (GPA) as a predictor variable appears often in the literature. Researchers have studied high school GPA, college course preprofessional programs GPA, science and other prerequisite GPA, and dental hygiene GPA at specified intervals and at gradation. While the literature supports a strong correlation between GPA and success in a given dental hygiene program, the exact definition of GPA varies widely. The current study showed that science course grades (90%), college grade point average (75%) are most used as selective admissions criteria, followed by standardized testing (41%) and math course grades (35%). The findings relate to a study that was completed by Sanderson in 2014. Sanderson’s study reported that 70% of accredited dental
hygiene programs utilize overall college GPA and overall high school GPA is used by 23% of programs.²

The mean for student attrition rate for participating dental hygiene programs in this study was 3.85%. The rate is lower in this study when compared to rates of attrition reported in other studies. It is further supported by surveys from the ADA where approximated attrition rates for dental hygiene can be calculated at 11%.¹⁷ The mean for program attrition of participating accredited dental hygiene programs was 9% in a study completed in 2014.² Attrition in education in general is an issue, but the results of this study suggest that it may not be as much of a concern as previous studies propose. In addition, the response rate, which does not encompass all CODA accredited dental hygiene programs may account for the difference in the attrition rate as compared to the attrition rate reported by the ADA. The open ended statements from the respondents showed that some programs do not struggle with attrition and it is not a problem at their institution.

The risk of attrition is often greatest during the first year. This can be due to more difficult courses, heavier workload, and often times the first year is an adjustment period. It is especially important to understand the factors both related and possibly contributing to student attrition. The primary reasons reported for student attrition in this study included failure to meet academic standards, personal issues (including medical and family responsibilities), as well as preclinical course failures and dissatisfaction with career choice. This portion of the study paralleled the research of Holt, who investigated student retention
practices in associate degree, entry-level dental hygiene programs. The reasons for student attrition can be complex, and it is recommended that additional research in this area be conducted to further explore attrition and retention issues in dental hygiene education. When attrition occurs in dental hygiene programs, it impacts the individual, the institution, and the community at large. When the student is unsuccessful, the financial, time and emotional impact of the individual and his/her family can be vast.

Due to the sequential nature of dental hygiene programs, limited options are available for students who do not meet standards for progression. Remediation methods vary depending if the failure is in an academic or clinical course or both. If a student requires remediation, the strategies used must meet the specific needs and weaknesses of the learner. In addition to the clinical remediation strategies, additional non-traditional methods recommended including peer tutoring, videotaping, student as observer, interactive computer programs, and faculty serving as patients. Frequently, students who have difficulty are identified late in the curriculum and are at risk of failure if effective interventions are not utilized. Interventions should include well defined goals and objectives, a realistic time frame, and how remediation will be addressed, evaluated, and documented.

The results from this study provide evidence that suggests that baccalaureate degree dental hygiene programs have less attrition compared to associates degree dental hygiene programs. Perhaps this is because those who attend baccalaureate degree programs have already invested 1-2 years in obtaining their degree prior to admission in a
dental hygiene program and are accustom to college classes and are less likely to drop out or withdraw for academic reasons. The findings in this investigation may assist states to evolve their entry-level dental hygienists to be baccalaureate prepared, rather than associates degree prepared. This would support the American Dental Hygienists’ Association’s (ADHA) adopted policy that declares its intent to establish the baccalaureate degree as the minimum entry level for dental practice in the future.\textsuperscript{19}

However, the attrition rate for students at community colleges even those students who are committed to pursue baccalaureate degrees, is greater than the attrition rate of students at four year colleges.\textsuperscript{20} In 2009, the percent of college freshmen returning for their 2nd year at 4-year public colleges and universities was 73\%.\textsuperscript{21} The National Center for Higher Education Management Systems puts this figure at 77\%, nationally.\textsuperscript{22} At 2-year community colleges, the reported first-to 2nd-year retention rates are far worse: 54\%.\textsuperscript{20} Holt reported entry level associate degree dental hygiene programs graduate 83\% of students compared to 46\% overall student retention in most two- year institutions.\textsuperscript{13} Therefore, the findings from this study with lower attrition rates for baccalaureate degree dental hygiene programs compared to associate dental hygiene programs are similar to national educational statistics.

This study questioned whether there was a difference in attrition rates between selective admissions or non-selective admissions in dental hygiene programs. The results of the study showed that there was no statistical difference in attrition rates when selective or non-selective admissions criteria is used in dental hygiene programs (year 2011 $p=.435$ and year 2012 $p=.784$). However, the
findings of this study suggest that baccalaureate degree, entry-level dental hygiene programs have a statistically significant lower attrition rate than an associate’s degree institution.

Limitations

A major limitation of this study was that there was a maldistribution of the two groups, selective and non-selective admissions. Specifically, the participants represented a majority of selective admissions dental hygiene programs. There also are more associate degree programs compared to baccalaureate degree programs in the United States, therefore for the number of associate degree programs that responded to the survey were greater than the number of baccalaureate degree programs.

Even though selective admissions was defined in the operational definitions, the interpretation of the definition may have been varied. Some dental hygiene programs may be competitive while others have minimal institutional requirements to apply for admittance to the program. With a diverse interpretation of selective admissions, the responses may be skewed.

In the survey, a question was asked for the program directors to list reasons for student withdrawal or attrition. The most common choice was failure to meet academic standards. Failure to meet academic standards was not clearly defined. With no standardized definition among dental hygiene programs, there is uncertainty on what level or what courses was the actual cause of student attrition.
Conclusion

Future researchers might build upon the results by analyzing which specific admissions criteria would best reduce attrition in dental hygiene programs. Researchers might also look at the causes of student attrition and examine how they can be minimized. Additional studies may want to investigate how much time is spent remediating and doing remediation work.

The results of the study showed that there was no statistical difference in attrition rates when selective or non-selective admissions criteria is used in dental hygiene programs. Results of this study also showed baccalaureate degree dental hygiene programs have lower attrition rates than associate’s degree dental hygiene programs.
References


Appendix A: Letter to Dental Hygiene Program Directors

Dear Dental Hygiene Program Directors,

I am a graduate student in the Masters in Dental Hygiene program at The Ohio State University. We are conducting a study on the admissions process and attrition rates in dental hygiene programs. This study has been determined exempt from Institutional Board review at The Ohio State University. As a dental hygiene program director, your input is particularly valuable to this study. The 17 question survey will take no longer than 20 minutes to complete. **Before beginning the survey it would be helpful if you had the following information for the classes that entered your program in 2011 and 2012:** number of students who matriculated in both 2011 and 2012, number of graduates in 2013 and 2014, and the causes of attrition for those who did not graduate. You will also be asked to provide the admission criteria for your program.

Participation in the survey is voluntary. All of your answers will remain anonymous, IP addresses will not be collected and data will be encrypted.

If you decide to participate, you are free to not answer any questions or withdraw at any time. Completing and submitting the survey implies your consent to participate in this research study.

In order to access the survey, click on the link below. Thank you for your willingness to complete the survey and contribute to the body of knowledge in dental hygiene.

**Follow this link to the Survey:**
Take the Survey

Or copy and paste the URL below into your internet browser:
http://osudenthy.co1.qualtrics.com/SE/?Q_SS=3x7Ew9N7alopBzf_9Ytfnknk7Be2hUDh&_=1

Follow the link to opt out of future emails. Click here to unsubscribe

If you have any questions about the survey you can contact:

Brittany Moore, BSDH, EFDA
Masters in Dental Hygiene Student
College of Dentistry- Division of Dental Hygiene
The Ohio State University
Moore.1925@osu.edu
Or
Michele Carr, RDH, MA
Associate Professor and Chair
College of Dentistry- Division of Dental Hygiene
The Ohio State University
Carr.3@osu.edu

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.
Appendix B: Survey

1. Your dental hygiene program is within what type of institution?
   a. Community College/ Junior College
   b. Technical College
   c. Dental School
   d. University

2. What type of entry level dental hygiene degree does your institution offer?
   a. Certificate
   b. Associate
   c. Baccalaureate

3. What type of admissions does your program utilize?
   a. Selective
   b. Non-Selective

4. What are your admissions requirements (Select all that apply)?
   a. Standardized Testing (ACT, SAT, College Entrance Test Scores, ect.)
   b. College grade point average
   c. High School grade point average
   d. Math Course Grades or GPA (Algebra, Statistics, Geometry, Trigonometry, Calculus, other)
e. Science Course Grades or GPA (Biology, Anatomy & Physiology, Chemistry, Microbiology, Nutrition, other)

f. Behavioral Science Course Grades or GPA (Psychology, Sociology, Human Development, Anthropology, other)

g. Psychomotor/ Dexterity skill evaluation

h. Interview

i. Letters of recommendations

j. Dental Hygiene Aptitude Test

k. Other (please specify)

5. How many students matriculated into your program in 2011?

6. How many students (of those who matriculated in 2011) successfully completed the first year?

7. Of those students who did not successfully complete the first year, what factors played a role in the students’ attrition? (choose all that apply)

   a. Failure to meet Academic standards

   b. Preclinical course failures

   c. Clinical skills

   d. Personal issues (including medical and family responsibilities)

   e. Professional standards

   f. Dissatisfaction with career choice

   g. Academic dishonesty

   h. Geographic relocation

   i. Financial difficulties
j. Disability hindered skill development
k. Time restraints due to work commitments
l. Other (please specify)

8. How many students (who matriculated in 2011) successfully graduated on time with their cohort?

9. If you had students who did not successfully graduate on time, what factors played a role in the students’ attrition? (choose all that apply)
   a. Failure to meet Academic standards
   b. Preclinical course failures
   c. Clinical skills
   d. Personal issues (including medical and family responsibilities)
   e. Professional standards
   f. Dissatisfaction with career choice
   g. Academic dishonesty
   h. Geographic relocation
   i. Financial difficulties
   j. Disability hindered skill development
   k. Time restraints due to work commitments

10. How many new students matriculated into your program in 2012?

11. How many students (of those who matriculated in 2012) successfully completed the first year?

12. Of those students who did not successfully complete the first year, what factors played a role in the students’ attrition? (choose all that apply)
a. Failure to meet Academic standards
b. Preclinical course failures
c. Clinical skills
d. Personal issues (including medical and family responsibilities)
e. Professional standards
f. Dissatisfaction with career choice
g. Academic dishonesty
h. Geographic relocation
i. Financial difficulties
j. Disability hindered skill development
k. Time restraints due to work commitments
l. Other (please specify)

13. How many students (who matriculated in 2012) successfully graduated on time with their matriculating class/cohoot?

14. If you had students who did not successfully graduate on time, what factors played a role in the students’ attrition? (choose all that apply)
   a. Failure to meet Academic standards
   b. Preclinical course failures
   c. Clinical skills
d. Personal issues (including medical and family responsibilities)
e. Professional standards
f. Dissatisfaction with career choice
g. Academic dishonesty
h. Geographic relocation
i. Financial difficulties
j. Disability hindered skill development
k. Time restraints due to work commitments

15. What forms of remediation does your program offer? (You may choose more than one)
   a. One-on-one assistance from faculty
   b. Individual remedial plan of success
   c. Repeating a course out of sequence
   d. Supplemental clinical course
   e. Other (please specify)

16. Do your faculty receive additional compensation for remediation? (if yes, please specify how they are compensated)
   a. Yes
   b. No

17. If you would like, please provide any comments or questions related to dental hygiene admissions, attrition rates and remediation. Thank you!
Appendix C: List of Tables

Table 1. Demographics of Respondents (n=99)

<table>
<thead>
<tr>
<th>Type of Institution</th>
<th>Community/Junior College</th>
<th>Technical College</th>
<th>Dental School</th>
<th>University College</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53 (54%)</td>
<td>11 (11%)</td>
<td>9 (9%)</td>
<td>26 (26%)</td>
</tr>
<tr>
<td>Degree Awarded</td>
<td>Certificate</td>
<td>Associates Degree</td>
<td>Bachelor’s Degree</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 (0%)</td>
<td>77 (78%)</td>
<td>22 (22%)</td>
<td></td>
</tr>
<tr>
<td>Admissions Type</td>
<td>Selective</td>
<td>Non-Selective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>87 (88%)</td>
<td>12 (12%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Demographics associated with the respondents from dental hygiene programs. The number of programs is noted along with the percentage.

Table 2. Number of Students per Class

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Students Matriculated</th>
<th>Completed 1st year</th>
<th>Attrition rate for 1st year</th>
<th>Graduated with matriculated class</th>
<th>Attrition rate (%)</th>
<th>Overall Attrition Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>27.98</td>
<td>24.47</td>
<td>2.97%</td>
<td>23.84</td>
<td>4.15%</td>
<td>3.87%</td>
</tr>
<tr>
<td>2012</td>
<td>25.37</td>
<td>22.95</td>
<td></td>
<td>21.81</td>
<td>3.56%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. The mean number of students that matriculated in the years 2011 and 2012 and their attrition rates.
<table>
<thead>
<tr>
<th>Table 3. Number of Responses to Factors in Student Attrition (n=99)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Failure to meet Academic Standards</td>
</tr>
<tr>
<td>Preclinical course failures</td>
</tr>
<tr>
<td>Clinical skills</td>
</tr>
<tr>
<td>Personal issues (including medical and family responsibilities)</td>
</tr>
<tr>
<td>Dissatisfaction with career choice</td>
</tr>
<tr>
<td>Professional standards</td>
</tr>
<tr>
<td>Academic dishonesty</td>
</tr>
<tr>
<td>Geographic relocation</td>
</tr>
<tr>
<td>Financial difficulties</td>
</tr>
<tr>
<td>Disability hindered skill development</td>
</tr>
<tr>
<td>Time restraints due to work</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Table 3. Dental hygiene program responses for factors in student attrition. The number of programs is noted along with the percentages.
Appendix D: List of Figures

Figure 1. Frequency of Criteria used in Dental Hygiene Admissions