

RESEARCH

A Comparison of Attrition Rates in Dental Hygiene Programs Using Selective and Nonselective Admissions

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Abstract

Purpose: The purpose of this study was to determine if there is a difference between attrition rates for dental hygiene programs that use selective admissions and nonselective admissions. Admissions to dental hygiene programs is based on a predetermined class size; therefore, applicants must meet the criteria to be considered for selection. 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: An online survey consisting of forced choice and open-ended questions was sent to the directors of accredited dental hygiene programs in the United States. Surveys were analyzed using descriptive statistics and frequency distributions. Open-ended questions were analyzed using the constant comparative method to identify recurring themes.

Results: Ninety-nine surveys were returned for a 30% response rate. There was no statistical difference in attrition rates when selective or nonselective admissions criteria was used in dental hygiene programs (year 2011 $p=.435$ and year 2012 $p=.784$). Results of this study also showed baccalaureate degree dental hygiene programs have significantly higher completion rates than associate degree dental hygiene programs (2011 $p=.002$ and 2012 $p=.005$).

Conclusion: Evidence from this study suggests there is no difference between attrition rates for dental hygiene programs that use selective admissions versus nonselective admissions. Additionally, this study determined that baccalaureate degree dental hygiene programs have less attrition compared to associate degree dental hygiene programs.

Keywords: dental hygiene education, admissions, attrition, entry-level dental hygiene

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INTRODUCTION

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 the individual's family can be devastating. Retention of students is particularly important to institutions whose programs are evaluated and funded based on retention and graduation.¹ 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 in academic programs.² Many dental hygiene programs apply selective admission criteria to prospective students in an effort to fill their class-

es with the highest academic achievers.³ According to the *Princeton Review*, colleges in general may be very selective, not selective at all, or somewhere inbetween.⁴ Highly selective colleges consider transcripts, extracurricular activities, standardized test, essays, teacher recommendations, etc. Admission to these schools is competitive in terms of both the number and the quality of the applicants. Colleges utilizing nonselective admissions still have standards, yet they usually operate on a more open admission basis, or rolling admission, where they will accept college applications until their class size is full.⁴

Dental hygiene programs typically develop their own point or evaluation system to assist in determining which applicants are most likely to be suc-

cessful. 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.⁵ Dental hygiene programs not only utilize preadmission criteria to help select candidates for admittance but also assess criteria that can ensure student retention.⁶

Downey et al. examined the predictive reliability of GPA and Scholastic Aptitude Test scores in predicting dental hygiene program success and National Board Dental Hygiene Examination (NBDHE) 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.⁷ A follow-up study was completed to assess the relationship between the predicted success from the aforementioned study and the actual success of entry-level students who graduated between 2002 and 2007. The authors confirmed incoming GPA and total SAT scores remained useful in predicting student success.⁸ In addition, the authors analyzed dental hygiene GPA at the end of the first year in the program in lieu of incoming GPA, and a stronger correlation was found when predicting student success.⁸

Alzahrani et al. examined predictors used by Old Dominion University Gene Hirschfeld School of Dental Hygiene to select dental hygiene students who are most likely to graduate and pass the NBDHE. The results suggested the final course grade in oral pathology was a significant predictor of successful graduation and final course grades in oral pathology, oral anatomy and histology, and admissions criteria points were significant predictors of NBDHE success.¹

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 preadmission requirements, site of academic preparation, cumulative dental hygiene GPA, and NBDHE scores. NBDHE success was strongly predicted by the cumulative dental hygiene GPA, followed by the science GPA, and then entering cumulative GPA.⁹ The study also reviewed 10 individual courses that comprise the preadmissions requirements and basic college science requirements for the dental hygiene program 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.⁹

The study of grade point average as a predictor variable appears often in the literature.⁶⁻⁹ 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. A study by Sanderson determined that the use of overall high school GPA, overall college GPA, and interviews were positive predictors of dental hygiene student retention and therefore were useful in the admissions process.⁶ Sandow et al. conducted a study to assess 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.⁹ 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 undergraduate science GPA and the admissions interview score were the most consistent criteria of dental school GPA at the University of Florida College of Dentistry.¹⁰ Conflicting medical research reported that the use of interview was not a valid predictor of student success in medical school.¹¹

Currently, there are several standardized tests that are utilized for dental hygiene admissions, such as the American College Test (ACT) and the Scholastic Aptitude Test (SAT). Sanderson determined there was no statistical relevance that retention rates were higher when standardized tests were utilized.⁶ The SAT has been found to be a positive predictor of program success.⁸ Sandow et al. determined that standardized tests used in dentistry, specifically the academic component of the Dental Aptitude Test (DAT) as well as the Perceptual Motor Aptitude Test (PMAT), positively correlated with dental school performance.¹⁰

Research has been done on predictors of dental hygiene program success along with studies on attrition and retention in postsecondary education in general with respect to admissions procedures.^{1,3,6-11} Historically, dental hygiene programs have evidenced a higher degree of structure in the admissions process.¹² Although many studies have investigated pre-admission criteria and criteria within dental hygiene programs to ensure success of students, the purpose of this study is to determine if there is a difference in attrition rates in dental hygiene programs when selective versus nonselective admissions are utilized and determine the types and variation of selective admissions criteria.

Table I: Demographics of Respondents (n=99)

Type of Institution	Community/Junior College 53 (54%)	Technical College 11 (11%)	Dental School 9 (9%)	University College 26 (26%)
Degree Awarded	Certificate 0 (0%)	Associates Degree 77 (78%)	Bachelor's Degree 22 (22%)	
Admissions Type	Selective 87 (88%)	Nonselective 12 (12%)		

METHODS AND MATERIALS

This study utilized an electronic survey 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 instrument consisted of 10 forced-choice and 7 open-ended questions. Sections regarding type of program and admissions criteria, and 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, were included. The instrument was pilot-tested for content and organizational structure by 7 dental hygiene faculty, and was revised accordingly prior to distribution. The study protocol was approved and determined exempt by the University's Institutional Review Board.

Qualtrics software (Provo, UT) was utilized to distribute and analyze the survey. The population for this study included 335 dental hygiene program directors of accredited dental hygiene programs. Programs were identified from a 2014 list of 335 accredited entry-level dental hygiene education programs made available through the American Dental Hygienists' Association (ADHA).¹³ A follow-up email was sent 14 days after initial distribution to all program directors to request completion of the survey from nonrespondents. No other requests to complete the survey were made. Informed consent was implied by way of accessing and answering the survey.

All of the respondents remained anonymous, IP addresses were not collected, and data was encrypted. Data was analyzed using descriptive statistics and frequency distributions. Independent sample t-tests were used to determine differences in attrition rates. Open ended questions were collected to identify recurring themes. For the purposes of this survey, "selective admissions" was defined as the ability of a college/institution/program to choose a student from an applicant pool utilizing academic and character-related criteria into account when selecting students. "Nonselective admissions" was defined as the ability of the college/institution/program to choose a stu-

dent from an applicant pool without asking for evidence of academic successes or experiences.

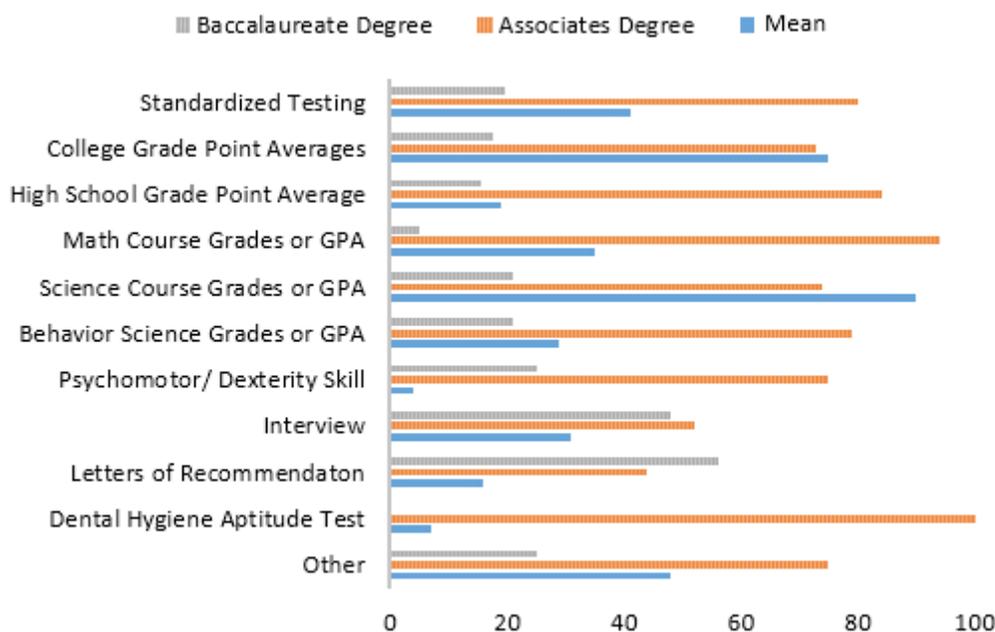
RESULTS

Ninety-nine surveys were returned for a 30% response rate, which is common for online surveys of this nature.¹⁴ The survey revealed that over half of the responding institutions were from a community or junior college (54%), followed by a university (26%). Eleven percent of the responding institutions were within a technical college, and 9% were within a dental school. Seventy-seven responding institutions (77%) offered an associate's degree in dental hygiene, while 22 (22%) offered a baccalaureate degree in dental hygiene. This is comparable to ADHA's 2014 data on entry-level dental hygiene programs, listing 288 associate degree programs (84%) and 56 baccalaureate degree programs (16%).¹³ Eighty-seven program directors responded that they utilize selective/competitive admissions (applications are evaluated each year against the entire applicant pool); the remaining 12 program directors utilize nonselective admissions (applicants are required to meet established criteria and are admitted as spaces becomes available or are wait-listed) (Table I).

Science course grades (90%) and college GPA (75%) were the most used as admissions criteria, followed by standardized testing (41%) and math course grades (35%), which are displayed in 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, Health Education Systems Incorporated exam (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 the 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

Figure 1: Frequency of Criteria used in Dental Hygiene Admissions (%)



rate of 2.97% during the first year of the dental hygiene program (Table II).

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. Table III displays that failure to meet academic standards, personal issues, and pre-clinical course failures were the most common factors that played a role in the students' attrition, followed by clinical skills and dissatisfaction with career choice.

The mean number 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 0.89% of students did not successfully complete the rest of 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 pre-clinical course failures and dissatisfaction with career choice. The data shows an overall average attrition rate for the matriculated class of 2011 and 2012 was

3.85% (Table II).

Two additional questions were explored to determine the forms of remediation offered in the participating dental hygiene programs and if additional compensation is received by the faculty who provide the remediation. One-on-one assistance from faculty (88%), individual remedial plans 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 referral for tutoring, reapplying the following year, and repeating 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 nonselective admissions using an independent sample t-test. Statistical data was analyzed using selective and nonselective 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 years 2011 and 2012 for baccalaureate degree programs ($p=.002$ and $.005$, respectively). In 2011, the mean attrition rate for associate degree programs was 9.75% while the mean attrition rate of baccalaureate degree programs was 3.72%. For the year 2012, the mean attrition rate for associate degree programs was 10.91% while the mean attrition rate of baccalaureate degree programs was 4.31%.

Table II: Mean Number of Students per Class

Matriculated	Completed First Year	Graduated With Matriculated Class	Attrition Rate
2011 27.98	24.47	23.84	4.15%
2012 25.37	22.95	21.81	3.56%

The final questions of the survey asked program

Table III: Factors in Student Attrition (Number of Respondents n=99)

	Matriculating Class of 2011		Matriculating Class of 2012	
	During First Year	Prior to Graduation	During First Year	Prior to Graduation
Failure to Meet Academic Standards	42 (61%)	24 (52%)	43 (70%)	20 (45%)
Preclinical Course Failures	19 (28%)	6 (13%)	21 (34%)	8 (18%)
Clinical Skills	13 (19%)	26 (35%)	13 (21%)	17 (39%)
Personal Issues (including medical and family responsibilities)	35 (51%)	19 (41%)	32 (52%)	17 (39%)
Dissatisfaction With Career Choice	13 (19%)	3 (7%)	15 (25%)	3 (7%)
Professional Standards	1 (1%)	2 (4%)	1 (2%)	1 (2%)
Academic Dishonesty	6 (9%)	4 (9%)	3 (5%)	2 (5%)
Geographic Relocation	1 (1%)	0 (0%)	1 (2%)	0 (0%)
Financial Difficulties	6 (9%)	3 (7%)	7 (11%)	5 (11%)
Disability Hindered Skill Development	2 (3%)	0 (0%)	0 (0%)	0 (0%)
Time Restraints Due to Work	4 (6%)	3 (7%)	4 (7%)	3 (7%)
Other	9 (13%)	10 (22%)	7 (11%)	6 (14%)

directors to provide additional comments related to dental hygiene admissions. Twenty-four directors (24%) added comments. Although responses varied, two themes emerged from these responses. The first theme focused on attrition rates. Seven program directors stated 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 stated 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 nonselective admissions criteria is used in dental hygiene programs (year 2011 $p=.435$ and year 2012 $p=.784$). The mean for nonselective admissions was .8969 and for selective admissions was .9206 for the year 2011. The mean for nonselective for the year 2012 was .9130 and selective admissions was .9052. Results of this study also showed baccalaureate degree dental hygiene programs have higher completion rates than associate's degree dental hygiene

programs (2011 $p=.002$ and 2013 $p=.005$).

DISCUSSION

A significant challenge for dental hygiene admissions committee members is selecting the most qualified applicants.⁶ Dental hygiene programs who utilize selective admissions have developed their own rating system, based on evidenced-based criteria, to assist in ranking applicants to determine those who will be most likely to succeed.

Investigations of cognitive variables such as GPAs, 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.¹ The study of GPA as a predictor variable appears often in the literature. Researchers have studied high school GPA, college course preprofessional program GPA, science and other prerequisite GPA, and dental hygiene GPA at specified 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 varies widely.¹ The current study showed that

science course grades (90%) and college GPA (75%) are the most commonly used selective admissions criteria, followed by standardized testing (41%) and math course grades (35%). These findings are similar to a study by Sanderson who reported that 70% of accredited dental hygiene programs utilize overall college GPA, and overall high school GPA is used by 23% of programs.⁶

The mean 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.^{3,6,15} The attrition rate findings in this study are also lower than reported in the ADA's 2012-2013 Survey of Dental Hygiene Education Programs where approximated attrition rates for dental hygiene programs were calculated at 11%.¹⁶ The differences may be attributed to the fact that the response rate in this study was 30% whereas the ADA survey must be completed by each dental hygiene program accredited by the Commission on Dental Accreditation. Sanderson found the mean attrition rate of participating accredited dental hygiene programs was 9%.⁶ Attrition in postsecondary 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 and is not correlated to the selectivity of the admissions process.^{3,6,15} 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 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 and reported similar reasons for attrition.³ 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 the student is unsuccessful, the financial, time, and emotional impact of the individual and the individual's family can be vast.¹

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.¹⁷ National data representing the 2007 entry cohort reported the percent of college freshmen returning for their second year at four-year public colleges and universities was 80%.¹⁷ For the 2010 entry cohort at two-year community colleges, the reported first- to second-year retention rates are far worse at 60%.¹⁷

Holt reported entry-level associate degree dental hygiene programs graduate 83% of students compared to 46% overall student retention in most two-year institutions.³ Therefore, the findings from this study reporting lower attrition rates for baccalaureate degree dental hygiene programs compared to associate dental hygiene programs are similar to national educational statistics.

Limitations

A major limitation of this study was that there was a maldistribution of the two groups, selective and nonselective 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, the number of associate degree programs that responded to the survey was greater than the number of baccalaureate degree programs.

Even though selective and nonselective admissions were defined in the survey, 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, program directors were asked to list reasons for student withdrawal or attrition. The most common choice was failure to meet academic standards, which was not clearly defined. With no standardized definition among dental hygiene programs, there is uncertainty on what level or what course(s) were the actual cause of student attrition.

CONCLUSION

The results of the study showed that there was no statistical difference in attrition rates when selective or nonselective admissions criteria is used in dental hygiene programs. Results also showed baccalaureate degree dental hygiene programs have higher completion rates than associate's degree dental hygiene programs. The results suggest that baccalaureate degree dental hygiene programs have less attrition compared to associates degree dental hygiene programs and may provide data to justify exploring the student population and differences in the two program types that may influence attrition rates.

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