

Connecting Students to Institutions: the Relationship Between Program Resources and Student Retention in Respiratory Care Education Programs

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BACKGROUND: Respiratory care education programs are being held accountable for student retention. Increasing student retention is necessary for the respiratory therapy profession, which suffers from a shortage of qualified therapists needed to meet the increased demand. The present study investigated the relationship between student retention rate and program resources, in order to understand which and to what extent the different components of program resources predict student retention rate. **METHODS:** The target population of this study was baccalaureate of science degree respiratory care education programs. After utilizing a survey research method, Pearson correlations and multiple regression analysis were used for data analysis. **RESULTS:** With a 63% response rate ($n = 36$), this study found a statistically significant relationship between program resources and student retention rate. Financial and personnel resources had a statistically significant positive relationship with student retention. The mean financial resources per student was responsible for 33% of the variance in student retention, while the mean personnel resources per student accounted for 12% of the variance in student retention. Program financial resources available to students was the single best predictor of program performance on student retention. **CONCLUSIONS:** Respiratory care education programs spending more money per student and utilizing more personnel in the program have higher mean performance in student retention. Therefore, respiratory care education programs must devote sufficient resources to retaining students so that they can produce more respiratory therapists and thereby make the respiratory therapy profession stronger. *Key words:* program effectiveness, student retention, program resources, quality assessment, financial resources, personnel resources, clinical resources. [Respir Care 2009; 54(9):1187–1192. © 2009 Daedalus Enterprises]

Introduction

Student retention in allied health education programs is a concern for the institution, the individual, and the pro-

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feffion.¹ While attrition impacts on the institution in terms of academic reputation, a program's ability to compete for future students, and resources spent for students, it also influences the student's personal and professional future. Because of decreasing state funding, student retention has become a matter of economic survival for some colleges.²⁻⁴ For the good of the student and the institution, colleges and universities are increasingly being held accountable for student retention. Policy makers use retention rate as one of several indicators of performance for higher education institutions, in order to make appropriate judgments about institutional effectiveness and performance.^{5,6}

In this study the student becomes classified as a respiratory therapy student when he or she is accepted into the respiratory care education program with an intention of graduating. Therefore, student retention is defined as those students who have actually completed all of the program

requirements and have graduated on time. This study investigated the relationship between student retention rate and program resources in order to understand which and to what extent the components of program resources predict student retention rate.

Whether student retention is considered an institutional effectiveness issue, a financial issue, or an enrollment management issue, it continues to be a challenge for not only respiratory care education programs but also for other allied health education programs.⁷ Students in the health care profession were less likely to persist in their studies than students with other majors. Forty-four percent of all students admitted to a bachelor's degree allied health program for the period 1972 to 1986 failed to complete their program successfully.⁷ Similar to the other allied health education programs, the high failure rate of students in respiratory care education programs is a concern for educators and administrators.⁸ Respiratory care education programs expend a substantial amount of resources to attract students, but if students who enroll do not complete their programs, these institutional expenditures become losses. As a result, the respiratory therapy profession suffers from a shortage of qualified respiratory therapists (RTs) who are needed to meet the increased demand. According to the United States Bureau of Labor Statistics,⁹ demand for RTs will expand by 35% by the year 2012, due to aging "baby boomers," chronic diseases, and lack of qualified applicants to respiratory care education programs.

Nationally, respiratory care education programs have reported declines in the number and quality of student applicants in the last 10 years. In fact, the number of applicants per program has decreased from a high of about 100 applicants per program for advanced-level RT programs in 1993 to approximately 24 applicants per program in 2000, and to an average of 20 applicants per program in 2002. The number of program graduates for advanced-level programs has also declined, from a high of 4,910 in 1995 to 3,953 in 2000.¹⁰ Increasing student retention and success through continued enrollment up to graduation is necessary to meet the demand.⁸ Understanding the effects of program resources on student retention and effectively utilizing program resources may help connect students to institutions and improve the economic sustainability of respiratory care education programs and their students. Therefore, this study focused on the role of financial, personnel, and clinical resources of programs on student retention in respiratory care education.

Given the general and RT-specific absence of research that investigates the relationship between institutional context and student retention, not enough is known about the influence of program resources on student retention in respiratory care education programs. Considering the lack of literature, the following important questions arose:

1. What are the characteristics of bachelor of science degree respiratory care education programs across institutions, in terms of program resources and student retention?
2. What is the relationship between respiratory care education program resources and student retention rate?
3. To what extent can the components of program resources predict student retention rate?

Methods

Study Population

The target population in this study was bachelor of science degree respiratory care education programs, and all 57 bachelor of science degree respiratory care education programs in the United States were surveyed. The directors of these programs were contacted in order to collect 2 consecutive years of retrospective data on program resources and student retention rate. Then the mean scores for the variables of program resources and student retention rate were calculated and the results were used for statistical analysis.

Instrument

Based on the studies conducted by other researchers in the respiratory profession,¹¹⁻¹⁶ a survey instrument was developed to obtain data for this study. In order to evaluate face and content validity of the survey instrument, allied health educators and respiratory care education program directors reviewed the contents of the survey instrument prior to distribution, for clarity, relevance, and importance of each item. This occurred prior to sending the surveys out. Comments and suggestions from these experts were then incorporated, thereby minimizing potential misinterpretation of the survey questions. Subsequently the survey items were rephrased and redundant items were eliminated.

The final instrument included the following variables for the resource component in this study: the number of staff-level positions in the program, the number of full-time faculty members, the number of part-time faculty members, the operating budget, the personnel budget, and the number of clinical sites.^{11,12} The operating budget included financial expenditures for travel, laboratory supplies, books, instructional aids, and electronic media. The personnel budget consisted of the salaries of full-time and part-time faculty members as well as support personnel in the program. The total program budget was calculated by adding the operating and personnel budget together. Definitions of operating and personnel budget were first provided to the respondents in a separate sheet attached to the cover letter and survey. Also, when a telephone call was made to those who had not responded, the description of

these variables were explained to the participants while these questions were asked via telephone.

Data Collection

A personalized pre-notice letter was sent to all program directors in order to build anticipation and thereby improve response rate. The questionnaire package, which contained a cover letter, the questionnaire, and a return envelope, was mailed out within a week of the pre-notice letter. A reminder was sent one week after the questionnaire was mailed, and a follow-up letter including the questionnaire package was mailed via first class mail 2 weeks later. Then a telephone call was made to those who had not responded, and if they agreed to participate in the study, the questions were asked via telephone.

Data Analysis

To determine whether program resources (ie, financial, personnel, and clinical) are related to program retention rate, the raw scores of the independent and dependent variables were correlated using Pearson product-moment correlations. Then multiple regression analysis was utilized to establish which of the predictor variables performed best in predicting respiratory care education program success on student retention.

Results

After utilizing a survey research method, a total of 36 (63%) out of 57 programs responded after 3 follow-up mailings of the questionnaire packets and telephone interviews with program directors. A frequency distribution of participants showed that universities sponsored the largest segment (81%) of respiratory care education programs, and 4-year colleges made up the remaining sponsorship (19%). This study revealed a variety of information about what type of resources bachelor of science degree respiratory care education programs have and how their personnel, financial, and clinical resources relate to student retention rate. Table 1 indicates the descriptive statistics of program resources, including the number of programs respondent to the study, and the minimum, maximum, and mean \pm standard deviation values for each component of program resources.

As shown in Table 1, the mean for total operating budget for respiratory care education programs was \$118,229 \pm \$63,749 ($n = 36$), whereas the mean for total personnel budget was \$246,426 \pm \$117,455). There was wide variation among programs in terms of program resources, and the mean for total expenditures by respiratory care education programs was \$367,830 \pm \$245,322, ranging from \$99,232 to \$1,020,728. Across all programs that

Table 1. Program Resources ($n = 36$)

Program Resources	Minimum	Maximum	Mean \pm SD
Financial resources (\$)			
Operating budget	2,000	539,114	118,229 \pm 63,749
Personnel budget	89,000	491,240	246,426 \pm 117,455
Total budget	99,232	1,020,728	367,830 \pm 245,322
Personnel resources (n)			
Full-time staff	0	5	2 \pm 1
Full-time faculty	2	7	3 \pm 1
Part-time faculty	0	6	2 \pm 2
Total faculty	2	11	5 \pm 2
Clinical resources (n)			
Number of clinical affiliations	1	31	9 \pm 7

Table 2. Personnel Resources

Personnel Resources	Programs* n (%)	Range of Personnel (n)
Programs employing full-time staff	29 (81)	0–5
Programs employing full-time faculty	36 (100)	2–7
Programs employing part-time faculty	26 (72)	0–6

* $n = 36$

responded, salaries of faculty and support personnel made up 66% of total program expenditures. The operating budget made up the remaining 34% of financial resources, including expenditures for equipment purchases, leases, maintenance, and instructional supplies.

Table 2 provides the frequency distributions of personnel resources. Approximately 72% of respiratory care education programs utilized part-time faculty, and most (81%) of the programs had full-time support personnel (see Table 2). Similar to the wide range of financial resources, clinical resources of respiratory care education programs had wide variations. The mean number of clinical sites affiliated with the respiratory care education programs was 9 \pm 7 ($n = 36$), with a range from 1 to 31 in the number of clinical sites. This study indicated that the mean retention rate of respiratory care education programs was 84%.

The mean financial resources per student, personnel resources per student, and clinical resources per student were calculated to determine which of these were significantly related to the student retention rate. In order to obtain the ratio of financial resources to students, the total program budget, including the total operating budget and total personnel budget, was divided by the number of students enrolled in the program. For the mean personnel resources per student, the number of faculty and full-time support staff were added together to arrive at a total number for personnel, and this was then divided by the number of

Table 3. Financial Resources Per Student, Personnel Resources Per Student, and Clinical Resources Per Student ($n = 36$)

Financial resources per student (mean \pm SD \$)	22,285 + 15,873
Personnel resources per student (mean \pm SD)	0.43 + 0.32
Clinical resources per student (mean \pm SD)	0.56 + 0.48

students enrolled. Similarly, the number of clinical affiliations of the program was divided by the number of students to compute the mean clinical resources per student. The mean for total number of admissions was 21, and the range was from 5 to 67. Table 3 presents the descriptive statistics of the ratios of financial resources to students, personnel resources to students, and clinical resources to students. The mean for financial resources per student was $\$22,285 \pm \$15,873$, while the mean for personnel resources per student was 0.43 ± 0.32 . The mean for clinical resources per student was 0.55 ± 0.48 .

Pearson product-moment correlations were then computed between these variables and program performance on student retention (see Table 4). The mean financial resources per student was strongly positively correlated with the mean student retention rate ($r = 0.566, P < .001$) and was responsible for 33% of the variance in student retention. These statistically significant results supported the assertion that the more money spent per student, the higher the rate of student retention in the program. The mean personnel resources per student was also significantly positively correlated with the mean student retention rate ($r = 0.353, P = .001$) and accounted for 12% of the variance in student retention. These findings indicate that respiratory care education programs spending more money per student and utilizing more personnel in the program had higher student retention rate. The mean clinical resources per student were not significantly correlated with the mean student retention rate ($r = 0.065, P = .35$).

Because the mean clinical resources per student did not impact retention rate, the mean financial resources per student and mean personnel resources per student were used in the multiple regression analysis, resulting in an $r = 0.58, r^2 = 0.336$, and adjusted $r^2 = 0.274 (P < .004)$. Multiple regression analysis indicates that only the mean financial resources per student significantly predicted program performance on student retention. The unstandardized regression model generated to predict program performance on student retention rate was statistically significant ($P < .004$). The unstandardized coefficient of 0.001 for the ratio of financial resources to students means that every unit change on financial resources spent per student increased program performance on the student retention rate by 0.001 ($P < .003$). Specifically, every \$1,000

spent per student will increase the student retention rate of the program by 1%.

In summary, utilizing a mailed survey to all bachelor of science degree respiratory care education programs in the United States, a response rate of 63% was achieved. Descriptive statistics, Pearson correlations, and multiple regression analysis were used for data analysis. As for research question 1, this study revealed that universities sponsored the majority of bachelor of science degree respiratory care education programs, and program characteristics vary widely in terms of student component, program structure, resources, and outcomes. Regarding research question 2, while Pearson correlations did not show any relationships between clinical resources and student retention rate, they indicated that financial and personnel resources had a statistically significant positive relationship with program performance on student retention. Regarding research question 3, multiple regression analysis identified that the financial resources to student ratio was the best single predictor of program success on student retention rate, accounting for 33% of the variation in program performance on student retention rate. In conclusion, this study indicated that a strong relationship does indeed exist between program financial resources and program performance on student retention.

Discussion

Because the increasing demand for program accountability in allied health education requires a critical look at program effectiveness, this study examined the extent to which program resources predicted the effectiveness of programs in retaining students in respiratory care education programs. A very good response rate (63%) validates the results of this investigation. The mean retention rate for respiratory care education programs was 84%, and the mean financial resources per student was responsible for 33% of the variance in student retention rate, indicating that the more money spent per student, the better the student retention rate of respiratory care education programs. Because descriptive statistics of financial resources indicated that there was a wide variation among respiratory care education programs in terms of both operating budget and personnel budget, we believe this finding to be very significant. No studies investigating the impact of financial resources on the student retention rate in allied health education were found to compare with the findings in this study. Regarding the personnel resources of respiratory care education programs surveyed, 72% had part-time faculty in the program. The mean number of full-time faculty was 3.1. Johnson found that the mean of full-time faculty in respiratory care education programs was 2.9, which is very close to the mean in this study.¹¹

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Table 4. Pearson Product-Moment Correlation Coefficients between Program Resources and Program Performance on Student Retention Rate

	Student Retention Rate	Financial Resources Per Student	Personnel Resources Per Student	Clinical Resources Per Student
Financial resources per student				
r	0.566*	1		
P	< .001			
Personnel resources per student				
r	0.353*	0.659*	1	
P	.001	< .001		
Clinical resources per student				
r	0.065	0.324	0.221	1
P	.35	.03	0.10	

* Correlation is significant at the .05 level (2-tailed).

While the findings of this study showed that the mean retention rate of respiratory care education programs was 84%, Shelledy et al found that the mean attrition rate for bachelor of science degree respiratory care education programs was 12%.¹⁴ According to Shelledy et al, the strongest predictors of attrition were finances, number of full-time FTE faculty, maximum number of students accepted, and actual number of students accepted. In contrast Douce and Coates indicated that academic performance was the most common cause of attrition in respiratory care education.^{14,15} These findings are certainly not mutually exclusive—the fact that some institutions lose more students than others cannot entirely be explained by their quality of applicants. The question remains: why do some institutions lose more students than others?

A lack of academic and social interaction probably plays a major factor in student departure/withdrawal behavior.^{4,16,17} Although the effect of orientation programs on academic success and student retention has been studied less than other academic factors, Galloway has stated that orientation in an off-campus setting does promote academic competence and improve retention.¹⁸ Other studies have found that the student-faculty interaction has a stronger relationship to student satisfaction with the college experience than any other variable.¹⁹ Student retention is positively associated with academic involvement, positive relationships with faculty, and involvement with student peer groups.²⁰ Terenzini and Wright determined that a student's perception of academic success is influenced by the frequency and quality of student and faculty contact during the first 2 years of academic preparation.¹⁷ Student attachment to the institution and students' perception of their academic performance were the most important variables for explaining the variance associated with persisting (16% and 10%, respectively).²¹ Consequently, it might be helpful for faculty and staff in respiratory care education programs to cultivate a climate in which students are given personalized and positive attention, particularly at the stu-

dent's introduction to the program. The personalized approach might also be extended into both formal and informal educational experiences.

Several studies have found that the frequency and quality of student and faculty contact is very important for student retention.^{4,17,19,20,22} Therefore, faculty members should be encouraged to have a plan on how to incorporate retention strategies into their classroom interactions and also to plan more out-of-class contacts for students, such as study groups, peer tutoring, and collaborative projects.

Respiratory care education programs should conduct a systematic analysis of their resources and establish realistic short-term and long-term student retention strategies and progression and completion goals. The findings of this study indicate that every \$1,000 spent per student will increase the student retention rate of the program by 1%. When respiratory care education programs have adequate financial resources, they can hire high-quality faculty with graduate degrees who will be able to create an inclusive environment for students that promotes knowledge, competence, and satisfaction. With adequate financial resources, the institution can provide accessible, effective support services and build a learning community in order to help students succeed in the program and retain them, which in turn allows for funding to continue. Thus, the institution can provide for the needs of students by connecting them to each other, to program faculty, to the institution, and to the resources needed for their success.

The primary limitation of this study is that it focused only on bachelor of science degree respiratory care education programs, and so the findings cannot be generalized to associate degree respiratory care education programs and other allied health care programs. Replication of the study using a sample of associate degree programs would be important. Also, drawing a sample from nursing, physical therapy and other health-care education programs would establish a more general picture of how program resources affect student retention. Further, this study used

input-output evaluation, not process evaluation of respiratory care education programs. Process evaluation is essentially the process of determining to what extent the educational objectives are actually being realized by a program's curriculum and instruction. The effect of quality of student and faculty contact on student retention was not investigated in this research. Therefore, more research is needed to evaluate the process of curriculum preparation and teaching in respiratory care education programs, and the impact of teaching methods on student retention.

Conclusions

There is no simple formula that ensures student retention in respiratory care education programs. The results of this study indicate a significant positive effect of financial and personnel resources on program student retention rate, as well as a positive but nonsignificant effect due to number of clinical sites on the mean student retention rate. This study highlights a significant relationship between program resources and student retention in respiratory therapy education. Examining institutional resources is a way in which programs can seek to improve retention of their students. This study proposes a role for institutional research in shifting attitudes about the priority placed on student retention efforts and argues that institutions should devote sufficient institutional resources to student retention. If respiratory care education programs can devote sufficient resources to retaining students, they can produce more qualified RTs and thereby make the respiratory therapy profession stronger.

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