Respiratory Care Education Annual

*The American Association
for Respiratory Care*

Original Research

Abstracts from 2001 Summer Forum

Editorial Staff

FACTORS ASSOCIATED WITH RESPIRATORY CARE AS A CAREER CHOICE

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Abstract

Many Respiratory Care education programs are experiencing student recruitment problems. One recruitment strategy is to target applicants similar to program graduates or current students. Use of a career choice survey makes it possible to determine what makes someone choose respiratory care and, once that choice is made, to learn what factors come into play when selecting a school. This information may then be used to recruit students who fit these criteria. The purpose of this study was to determine factors associated with the choice of respiratory care as a career and important factors students consider when choosing a school or program using a career choice survey instrument developed at our institution. Our results showed that the most important reasons for choosing respiratory care as a career were interest in a health care field, a desire to help others and make a contribution, and employment opportunities in the field. Other important factors included the reputation of the school, program faculty and graduates, clinical training provided, location of the school, and cost. Attention to these factors may improve the effectiveness of respiratory care program recruitment activities.

Factors Associated with Respiratory Care as a Career Choice

In the face of declining applicant pools, respiratory care educators have struggled to identify methods to attract prospective students to the profession and into their schools (*AARC Times* Roundtable 2000, *AARC Times* Roundtable 2001). While selling the profession to prospective students is important, perhaps it is time to try a different recruitment strategy: targeting applicants much like the students we already have. It is possible to determine what makes someone choose respiratory care as a career and, once that choice is made, to find out what factors come into play when selecting a school.

Discerning the factors that influence career choice is not a new concept. A number of allied health schools have surveyed their students and learned that such things as helping others, prestige, professional autonomy, income potential, variety and challenge are among the common reasons that people cite for entering health care professions (Brown-West, 1991; Craik et al, 2001; Nelson, 1994). While these reasons may be important, they are somewhat intuitive and could apply to any profession. The key to recruitment success is to appeal to students who are likely to choose a respiratory care career. It is also helpful to determine how students learned about the profession to begin with, because prospective applicants must be aware that the respiratory care profession exists in order to consider it when making career choices. The *Journal of Allied Health* reported the results of a survey designed to measure the interest of graduates of a health professions high school in pursuing higher education as well as careers in allied health fields (Thomson et al, 1991). Only 8% of survey respondents expressed an interest in allied health. Upon examining these respondents, it was determined that they either did not know about allied health or did not perceive it as an attractive career option. Marketing the profession and our education programs through resources that have been successful in attracting our current students is a first step. When we are armed with this knowledge and other information regarding why students chose a career in respiratory care, we may be much more effective in targeting future students.

In an effort to achieve this goal, The University of Texas Health Science Center at San Antonio (UTHSCSA) developed a career choice survey instrument to learn why our students chose a career in health care, why their choice was Respiratory Care, and why they elected to achieve their career goals as students of the UTHSCSA's baccalaureate Respiratory Care education program. The career choice survey instrument used in this study is currently available as a part of the American Association for Respiratory Care School Protection Tool Kit, which may be downloaded at www.aarc.org/education. While our findings may be unique to our program and region of the country, the career choice questionnaire could be used by other programs to determine more precisely who their potential applicants may be.

Methods

A 78-item career choice survey was administered near the beginning of the program to four classes of students (n=64; graduates and currently enrolled students) of our baccalaureate respiratory care program to determine general demographic information (age, gender, marital status, number of children living at home, and employment status),

Table 1
Student Profile at The University of Texas Health Science Center at San Antonio

Demographic	Frequency	Percentage
Male	26	41.3%
Female	37	58.7%
Marital status:		
Single	43	68.8%
Married	20	31.2%
Number of children at home:		
0		78%
1		7.8%
2		7.8%
3		6.2%
Current work status:		
Part time		43.8%
Full time		4.7%
Unemployed		29.7%
Other		18.8%
Current job is RT		34%

reasons for choosing respiratory care as a career, and why they chose the program at UTHSCSA. Questions were derived from an extensive review of the literature and modification of a previous survey instrument that was developed to assess respiratory care program directors' beliefs regarding effectiveness of student recruitment techniques. In addition to general demographic information, students were given a list of factors and asked to rank them according to how important each was in making a decision to pursue respiratory care as a career. They were then asked to rank factors in choosing a health sciences school, followed by factors specific to their choice of UTHSCSA. Finally, students were asked in an open-ended fashion to list their top five reasons for choosing the profession of respiratory care and their top five reasons for choosing the program at UTHSCSA. Respondents used a Likert scale (5 = very important; 4 = important; 3 = neither important nor unimportant; 2 = unimportant; 1 = very unimportant) to rank 34 factors considered in choosing the profession of respiratory care, 16 factors considered when choosing a school for the health sciences, and 20 factors used to narrow their selection to UT Health Science Center at San Antonio.

Results

The UTHSCSA student profile is shown in Table 1. Most of our students are young (age 26.6 ± 6.2; range 20-54 years), single, and have no children. While our program has

Table 2
Reasons for Choosing Respiratory Care as a Career

Reason	Mean Rank (SD)
Interest in health care	4.8 (0.5)
Desire to help others	4.7 (0.5)
To make a contribution to society	4.4 (0.7)
Desire to work in specialty area such as neo/peds	4.4 (0.8)
Job opportunities in the field	4.1 (0.8)
Availability of the educational program	4.1 (1.0)
Interest in working with infants/children	4.1 (1.1)
Education requirements	4.1 (0.8)
Part-time work available after graduation	4.0 (1.1)
Earning potential/salary	3.9 (0.8)
Flexible hours on the job	3.9 (1.0)
Interest in working in adult critical care	3.9 (1.0)
Exciting, dynamic profession	3.9 (0.9)
Working conditions	3.9 (0.9)
Direct mail received about respiratory care	3.7 (1.2)
Interest in working in cardiopulmonary diagnostics or pulmonary function lab	3.6 (1.2)
Status of respiratory therapists	3.6 (1.1)
Hospital visit	3.5 (1.2)
Employment opportunities to work in the field while going to school	3.5 (1.0)
Program brochure or viewbook	3.4 (1.1)
Friend or relative works in health-related field	3.3 (1.2)
Family or friend needed RC as a patient	3.1 (1.4)
School catalog	3.1 (1.2)
Interest in working in home care	3.1 (1.2)
Family or friend has chronic respiratory disorder	3.0 (1.3)
Contact with a respiratory therapist	2.9 (1.3)
Career books	2.6 (1.2)
Recommendations from current students	2.6 (1.1)
Personal experience receiving respiratory care	2.6 (1.3)
Radio or TV	2.5 (1.1)
Recommendation from graduates	2.5 (1.1)
Family or friend is a respiratory therapist	2.4 (1.2)
Guidance counselors	2.4 (1.1)
Newspapers	2.2 (1.0)

5 = Very important
4 = Important
3 = Neither important nor unimportant
2 = Unimportant
1 = Very unimportant

Table 3

Factors That Influenced Choice of a School for the Health Sciences

Factor	Mean Rank (SD)
Recreation facilities	4.7 (0.7)
Ethnic diversity/minority support provided	4.6 (0.6)
Reputation	4.4 (0.8)
Tuition and fees	4.3 (1.0)
Flexible class hours	4.1 (1.1)
Current students' comments	4.1 (1.1)
Class size	4.1 (1.1)
Parking	3.9 (1.2)
Faculty reputation	3.7 (1.3)
Student activities (clubs, sports, etc.)	3.7 (1.2)
Degree offered	3.5 (1.3)
Student-teacher ratio	3.5 (1.2)
Available child care	3.1 (1.2)
Financial aid	3.0 (1.2)
Housing	3.0 (1.2)
Location	2.3 (1.0)

5 = Very important
4 = Important
3 = Neither important nor unimportant
2 = Unimportant
1 = Very unimportant

slightly more women, men comprise just under half of the students who have completed or are currently enrolled in our program. Our students are ethnically diverse, including Hispanics, Asian/Pacific Islanders, African-Americans and Caucasians. Almost half of our students work at least part time. Ranked factors for choosing respiratory care as a career are shown in Table 2. The most important factors cited were an interest in health care, a desire to help others, a desire to make a contribution, interest in working in a specialty area such as neonatal/pediatrics, and job opportunities in the field. Table 3 lists the factors that were considered when choosing a school for the health sciences. These included recreation facilities, ethnic diversity, reputation, and tuition and fees. Table 4 outlines the reasons our students chose The University of Texas Health Science Center at San Antonio as the institution at which to fulfill their career goals. Choice of school was based on the reputation of the institution, clinical training sought, reputation of both the respiratory care program and program faculty, as well as location of the school. When asked to state, in their own words, their top five reasons for choosing both respiratory care as a career and the RC program at UTHSCSA, a greater number of students listed a desire to help others and the location of the school, respectively, as number one in each category (see Tables 5 and 6).

Discussion

The typical baccalaureate respiratory therapy student in our program is young; yet the age range (20-54 years) indicates that there is a very diverse group of potential students who are interested in respiratory care as a first or second career choice. With this information in mind, our recruitment materials must be geared, not only to *traditional* students, but also to *transitional* students who are retiring from the military or other first careers, and to those seeking to enter the workforce after rearing a family.

The most frequently cited reasons for choosing respiratory therapy as a career are similar to reasons for which people choose any health care profession, *i.e.* interest in health care, as well as a desire to help others and contribute to society. Students also cited job opportunities, having received information in the mail, and exposure to friends or family members in respiratory care or a related health field as reasons for choosing the

Table 4

Reasons for Choosing the BS Program in Respiratory Care at The University of Texas Health Science Center at San Antonio

Reason	Mean Rank (SD)
Reputation of the Health Science Center	4.6 (0.7)
Clinical training provided	4.4 (0.7)
Reputation of the respiratory care program	4.4 (0.9)
Reputation of program faculty	4.4 (1.0)
Location of the School	4.4 (0.8)
Reputation of graduates	4.1 (1.1)
Program facilities (labs, classrooms, etc.)	4.1 (0.9)
Availability of a seat in the class	4.0 (1.0)
Clinical affiliates of the program	4.0 (1.1)
Interest in going to graduate school	3.9 (1.0)
Cost of the program	3.8 (1.1)
Interest in pursuing another health career following graduation	3.8 (1.0)
Interest in becoming a clinical specialist	3.8 (1.0)
Availability of financial aid	3.8 (1.3)
Interest in becoming a manager or supervisor	3.7 (1.2)
Interest in a teaching career in respiratory care	3.5 (1.2)
Interest in respiratory care research	3.3 (1.2)
Interest in going on to medical school	3.3 (1.3)
Availability of advanced standing for current practitioners	2.8 (1.2)
Availability of housing	2.6 (1.2)

5 = Very important
4 = Important
3 = Neither important nor unimportant
2 = Unimportant
1 = Very unimportant

Table 5
Students' Top Five Reasons for Choosing Respiratory Care as a Career

Rank	Reason	Percentage of Students
1	A desire to help others	42.9 %
2	Want to work in the healthcare field	39.7 %
3	Family member/friend/self with respiratory problem	20.6 %
4	Employment opportunities	15.9 %
5	Stepping stone to other professions	15.9 %

profession. Sources that had little or no effect on a respiratory care career choice, as indicated by their low ranking, included radio and television, newspapers, and guidance counselors.

Factors taken into consideration when looking for health sciences institutions reveal somewhat different preferences compared with reasons stated for choosing the UT Health Science Center in San Antonio specifically. When students are searching out health sciences institutions in general, they may be interested in recreation facilities available, reputation of the institution, the cost of receiving an education there, and ethnic diversity. Of less importance may be availability of financial aid, housing, and the location of the school. Once the search is narrowed, however, the school that the student ultimately decides to attend may be based primarily on the reputation of the school and program, followed by the caliber of the clinical training they expect to receive, the school's location, and financial considerations, such as tuition, fees, and availability of financial aid.

It is interesting to compare the students' ratings of factors important in choosing a career in respiratory care and the specific respiratory care program at UTHSCSA to their responses on the open-ended questions on career and school choice. Both the ratings and most common responses to the open-ended questions indicated that a desire to help others, interest in a health care field, and job opportunities were very important in choosing a career in respiratory care.

A desire to work in a specialty area, such as neonatal/pediatrics and the desire to make a contribution to society were highly rated, while the open-ended question responses included an interest in respiratory care due to a family member, friend or self with a respiratory problem. It is also of interest to note that using the BS degree in respiratory

Table 6
Students' Top Five Reasons for Choosing the Respiratory Care Program at UTHSCSA

Rank	Reason	Percentage of Students
1	Location of school	73.0 %
2	Reputation of school and faculty	58.7 %
3	Cost	30.2 %
4	Bachelor of Science program	15.9 %
5	Clinical affiliates	7.9 %

care to pursue further education in the health professions was important to our students. While our survey did not explore this factor in detail, many RT students have expressed an interest in pursuing a career in medicine or obtaining a master's degree in an allied health discipline.

Students' ratings and responses to the open-ended questions indicate that the reputation of the school, program, faculty and graduates were very important factors in choice of the RT program at UTHSCSA. Other important factors were school location, cost, and clinical training provided. The apparent inconsistency between a few of the factors ranked in Tables 2 and 4 and the student's answers to the open-ended questions in Tables 5 and 6 may be explained by the fact that the ratings items were limited to those provided on the questionnaire, and did not include some items that some students felt were important.

Conclusion

Determining what types of students are interested in respiratory care can provide valuable insight into how best to appeal to future applicants. Recruitment materials and presentations to pre-health professions students should emphasize the factors that brought current students and alumni to your school. While, there are sophisticated geodemographic marketing services available to further narrow the target group, such services are expensive. Nevertheless, they enable respiratory therapy education programs to spend their recruitment time and money on students who are most likely to have an interest, not only in health care, but in the profession of respiratory care. The results of this study indicate reasons why students enrolled at UTHSCSA choose respiratory care as a career and why they chose our specific program. The most important factors were an interest in health care, a desire to help others and make a contribution, and job opportunities in the field. Other important factors were reputation of the school, program faculty and graduates, clinical training provided, school location, and cost. Educational programs at other colleges and universities may want to assess their student's career choice using an instrument similar to the one we have developed. Regardless of how we go about finding our target audience, in today's health care environment where personnel shortages are becoming more and more prevalent, all successful student recruitment strategies are well worth the price and effort.

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Student Recruitment: Marketing Respiratory Care Educational Programs

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Abstract

The number and quality of applicants to allied health and nursing programs has declined over the past several years. We surveyed respiratory care educational program directors to assess the numbers of applicants, current enrollment, numbers of students graduating and job placement. Program directors were then asked to rate student recruitment techniques in terms of perceived effectiveness. Techniques perceived to be effective for student recruitment included the use of program materials (brochures, information packets, Web page), and personal contact with prospective applicants to include mentoring. Other effective techniques included hospital visits for prospective students, providing scholarships and financial aid packages, student employment in respiratory care departments while attending school, and direct mail.

Student Recruitment: Marketing Respiratory Care Educational Programs

Respiratory care educational programs have reported declines in the number and quality of student applicants over the last several years. The number of applicants per program has decreased from a high of about 100 applicants per program for advanced level respiratory therapist programs in 1993 to approximately 24 applicants per program in 2000, and an average of 20 applicants per program in 2001 (Committee on Accreditation for Respiratory Care, 2001; Shelledy, 2001). The number of program graduates for advanced level respiratory therapist programs has also declined from a high of 4,910 in 1995 to 3,953 in 2000 (Committee on Accreditation for Respiratory Care, 2001). The Bureau of Labor Statistics projects a 42.3% increase in demand with 5,000 new respiratory therapists needed per year through 2008 (US Department of Labor, 2000).

In the year 2000, there were 6,510 vacant full time respiratory therapist positions and an overall vacancy rate of 5.96% (Dubbs, 2000). This number was up from a 4.3% vacancy rate as reported in 1993. Marketing, student recruitment and retention, and manpower needs pose problems for other allied health care educational programs. Nursing programs experienced a one-year decline in student applicants of 12%, while occupational therapy and physical therapy experienced one-year declines of 26% and 33%, respectively (Shelledy, 2001). Reported vacancy rates for other allied health professions have ranged from 18% for radiologic technologists to 12% for laboratory technologists and 11% for registered nurses (Shelledy, 2001).

Marketing of respiratory care educational programs and recruitment of qualified students is a concern for the profession of respiratory care and the health care system. Put simply, the only major source of new respiratory therapists to meet the health care needs of society are existing respiratory care educational programs. The quality and quantity of new graduates will determine the quality and level of practice possible. Consequently, student recruitment and marketing of respiratory care as a career is a concern for current practitioners, employers, and consumers of health care.

The purpose of this study was to quantify student recruitment trends in the field of respiratory care and to identify specific recruitment strategies thought to be effective in increasing the number of qualified applicants to respiratory care educational programs.

Specific research questions addressed were:
1. What is the current situation for respiratory care educational programs in terms of numbers of applicants, numbers of students accepted, enrollment, and numbers of graduates?
2. What are the trends in terms of applicant pools for the past year and the past five years?
3. What is the projected job market for respiratory care program graduates for the next year and the next five years?
4. What recruitment methods are rated as most effective by program directors of respiratory care educational programs?

Method

In the spring of 1999, a recruitment survey instrument was developed, field tested, and mailed to all 374 respiratory therapist educational programs, as listed by the Committee on Accreditation for Respiratory Care (CoARC). A second mailout was sent to all survey

Table 1
Characteristics of Programs Responding to the Recruitment Survey (n = 253)

	Survey Participants
Sponsoring Institution	
Technical or vocational institute	40 (15.8%)
Community college or two-year college	150 (59.3%)
Four-year college	16 (6.3%)
University	44 (17.4%)
Other	3 (1.2%)
Program Funding Type	
Public	211 (83.7%)
Private	29 (11.5%)
Proprietary or business school	9 (3.6%)
Other	3 (1.2%)
Location	
Urban	128 (50.6%)
Suburban	76 (30%)
Rural	44 (17.4%)
Other	5 (2%)
Degrees or Certificates Offered	
Entry-level certificate (CRT)	25 (9.9%)
Advanced level certificate (RRT)	18 (7.1%)
Associate degree in respiratory care	163 (64.7%)
Bachelors degree in respiratory care	33 (13.1%)
Masters degree in health sciences, respiratory care or allied health	7 (2.8%)
Other	6 (2.4%)

non-respondents approximately one-month after the initial mailing in an attempt to increase the response rate. Approximately four weeks following the second mailing, a survey of a random sample of 10% of the non-respondents (n=12) was conducted by telephone to collect program information from those not completing the survey questionnaire. Respondents were compared to non-respondents using the Chi-Square statistical test. Specifically, respondents and non-respondents were compared by sponsoring institution (technical institute, community college, university), school (public/private), location (urban, suburban, rural), and degree or certificate awarded to determine if there were differences in the type or location of respondent and non-respondent programs.

Survey participants were asked to provide program information related to the type of program offered and numbers of students applying, enrolling and graduating from the

Table 2
Mean Number (SD) of Qualified Applicants, Students Accepted, Students Currently Enrolled, and Graduating Each Year By Program Type

Program Type	Qualified Applicants	Number Accepted	Current Enrollment	Graduates per Year	Attrition Rate (%)
One-year	41.6 (46.6)	28.6 (20.7)	19.9 (19.4)	18.9 (14.7)	28.8 (13)
Associate degree	32.2 (26.4)	24.0 (11)	21.7 (15.2)	15.5 (8.5)	25.4 (13.7)
BS degree	23.8 (14.2)	19.6 (10.3)	31.3 (26.8)	14.4 (7.2)	11.2 (7.2)
Graduate degree	2.5 (0.7)	11.5 (11.4)	4.8 (2.2)	2.5 (0.6)	0.0
Other	25.3 (15.8)	34.2 (24.3)	14.8 (15.7)	16.0 (15.4)	15.2 (19.6)
Total (all program types)	39.0 (36.4)	29.5 (20.6)	27.5 (21)	19.2 (13.1)	

program. Frequency counts and percentages of survey respondents were calculated by sponsoring institution, type of school, location, and degree or certificate awarded. The means (SD) were calculated for number of applicants, students accepted per year, students currently enrolled, and number of students graduating per year by program type. Mean (SD) attrition and job placement rates were also calculated. Survey participants were then asked to rate each of 32 recruitment methods in terms of perceived effectiveness using a 5-point ratings scale where 5 = very effective and 1 = very ineffective. Participants were also asked to indicate whether or not they had used each of these techniques in the last 12 months, the last 5 years, or both. Ratings scale items were analyzed by frequency and percent of respondents by category, as well as calculation of mean (SD) rating scores for methods of recruitment.

Participants were also asked three open-ended, fill in the blank questions to determine what they perceived as best recruitment techniques, reasons for problems in student

Table 3
Trends in Applicant Pools for Respiratory Care Programs

	Markedly Increased	Somewhat Increased	Neither Increased or Decreased	Somewhat Decreased	Markedly Decreased
Number of applicants this year	3.6%	16.5%	23.3%	39.4%	17.3%
Qualifications of applicants this year	2.8%	20.0%	47.6%	24.0%	5.6%
Number of applicants for the past five years	2.9%	13.4%	10.6%	42.3%	30.9%
Qualifications of applicants for the past five years	3.6%	26.2%	24.2%	34.3%	11.7%

Table 4
Job Market for Graduates this Year as Compared to Previous Years

Job Market	Percent of Programs
Markedly improved	15.4%
Somewhat improved	27.7%
Neither improved or unimproved	37.6%
Somewhat worse	17.8%
Markedly worse	1.6%

recruitment and common reasons students give for choosing their respiratory care program. These responses were grouped by category to determine the most common responses. Data were entered into a spreadsheet and analyzed using a statistical software package (STATISTICA, StatSoft, Tulsa, OK).

Results

Following two mailouts, there were a total of 253 usable surveys for 67.7% response rate. There were no significant differences (p > 0.05) between survey respondents as compared to non-respondents by type of sponsoring institution, program type (public/private), or degree or certificate offered. Characteristics of the programs responding to the survey are listed in Table 1. The majority of programs were at community or two-year colleges (59.3%) followed by university-based programs (17.4%), technical or vocational institutes (15.8%) and four-year colleges (6.3%). Most programs were at public institutions (83.7%) and located in urban (50.6%) or suburban (30%) areas. Approximately 65% of the programs awarded the associate degree while 13% of programs awarded the baccalaureate degree.

Table 2 lists the mean (SD) number of applicants, numbers accepted, current enrollment, number of graduates, and attrition rate by program type. The mean (SD) values for associate degrees programs were 32.2 (26.4) applicants, 24 (11) students accepted, and 15.5 (8.5) students graduating. For baccalaureate degree programs there were, on average, 23.8 (14.2) applicants, 19.6 (10.3) students accepted, and 14.4 (7.2)

Table 5
Job Demand Projections for Respiratory Care Program Graduates Over the Next Five Years

Demand for RTs	Percent of Programs
Significant increase in demand	9.8%
Some increase in demand	52.7%
No increase or decrease in demand	27.8%
Some decrease in demand	9.8%
Significant decrease in demand	0.0%

Table 6
Program Directors Ratings of the Effectiveness of Various Recruitment Methods

Recruitment Method	Mean (SD)	Method Used in Last 12 Months	Method Used in Last Five Years	Both
High school visits	3.0 (1.0)	38%	15%	28%
Health fairs	3.0 (0.9)	38%	13%	29%
Career days	3.4 (0.9)	44%	10%	31%
Community college visits	3.4 (0.9)	21%	8%	13%
Meetings with college career counselors	3.6 (0.84)	34%	11%	18%
Meetings with high school career counselors	3.1 (0.9)	32%	15%	15%
College catalog	3.5 (0.9)	43%	7%	23%
Recruitment brochures	3.8 (0.8)	47%	5%	31%
Recruitment posters	3.4 (0.8)	21%	11%	8%
Information packets	3.9 (0.7)	45%	4%	29%
AARC recruitment videos	3.6 (0.8)	34%	11%	25%
Other recruitment videos	3.3 (0.7)	14%	7%	2%
Direct mail to prospective students	3.8 (0.8)	36%	6%	23%
Open house or reception	3.4 (0.9)	30%	10%	13%
Newspaper advertisement (paid)	3.6 (0.9)	25%	10%	12%
Radio advertisement (paid)	3.4 (0.8)	13%	6%	6%
T.V. advertisement (paid)	3.7 (0.9)	12%	2%	2%
Public service announcement – radio	3.3 (0.8)	8%	3%	4%
Public service announcement – T.V.	3.3 (0.9)	6%	4%	1%
Web page	3.5 (0.8)	50%	1%	9%
Student employment available in RT departments	3.9 (0.9)	33%	5%	18%
Faculty guest lectures to high school classes	3.1 (0.9)	23%	15%	16%
Faculty guest lectures to college classes	3.6 (0.9)	21%	5%	14%
Hospital visits for prospective applicants	4.1 (0.7)	41%	5%	25%
Mentoring prospective students	3.9 (0.8)	21%	4%	11%
Scholarships	3.6 (0.8)	29%	3%	18%
Financial aid	3.8 (0.7)	37%	2%	23%
Campus tours	3.4 (0.8)	39%	4%	21%
Advanced standing for current practitioners	3.8 (0.9)	31%	6%	14%
Flexible class hours (evenings, weekends)	3.8 (0.8)	13%	2%	4%
Internet classes	3.7 (0.8)	8%	2%	0%
Video-conference or other distance ed courses	3.6 (0.7)	8%	1%	1%

5 = Very Effective
4 = Effective
3 = Neither Effective or Ineffective
2 = Ineffective
1 = Very Ineffective.

Table 7

Recruitment Methods Rated as Very Effective or Effective by 50 Percent or More of Program Directors

| | Rating | | |
Recruitment Method	Very Effective	Effective	Total
Community college visits	11%	40%	51%
Meetings with college career counselors	9%	51%	60%
College catalog	9%	43%	52%
Recruitment brochures	12%	58%	70%
Information packets	13%	63%	76%
AARC recruitment videos	9%	50%	59%
Direct mail to prospective students	17%	56%	73%
Newspaper advertisement (paid)	11%	52%	63%
Radio advertisement (paid)	6%	44%	50%
T.V. advertisement (paid)	18%	46%	64%
Web page	9%	43%	52%
Student employment available in RT departments	22%	53%	75%
Faculty guest lectures to college classes	12%	46%	58%
Hospital visits for prospective applicants	28%	57%	85%
Mentoring prospective students	17%	57%	74%
Scholarships	9%	48%	57%
Financial aid	15%	54%	69%
Advanced standing for current practitioners	19%	48%	67%
Flexible class hours (evenings, weekends)	19%	48%	67%
Internet classes	9%	55%	64%
Video-conference or other distance ed courses	6%	51%	57%

students graduating each year. The average attrition rates for associate and baccalaureate degree programs were 25.4 (13.7) and 11.2 (7.2) percent, respectively. The overall average placement rate within six months for graduates of all programs combined was 98.3 percent.

Table 3 describes trends in applicant pools for respiratory therapist programs. Most program directors reported that the number of applicants to their programs had declined over the past year (56.7%) and over the past five years (73.2%). Most program directors (73.2%) also reported that the qualifications of applicants to their programs had declined over the last five years.

Tables 4 and 5 describe the anticipated job market for respiratory care program graduates. Many programs reported an improved job outlook for the current year (43.1%) and projected an increased demand for program graduates over the next five years (62.5%).

Table 6 lists the mean (SD) ratings for recruitment methods and the percentage of

Table 8
Most Common Written Responses by Program Directors to Specific Questions Related to Student Recruitment

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What are the best recruitment techniques in terms of effectiveness for your program?

        Word of mouth (120)
        Career days (56)
        High school visits (47)
        Newspapers (47)
        Direct mailings (39)
        Counselors (37)
        Campus visits for prospective students (27)
        Web page (24)
        Visits to college science classes (24)
        Hospital tours (23)

What are the most likely reasons or explanations for the fact that some respiratory care programs are having difficulties with student recruitment?

        Low unemployment/good economy (86)
        Lack of awareness of respiratory field (70)
        Bad press for healthcare field (52)
        Re-organizing of hospitals/managed care (49)
        Poor or no recruiting (39)
        Competition with other healthcare professions (33)
        Low salary (27)
        Able to get unskilled jobs with good pay (27)
        Poor attitude presented by respiratory therapists (24)
        Rumors that nursing is going to replace respiratory care (20)

What are the most common reasons students give for choosing your respiratory care program?

        Family, friend, or self with respiratory problems (113)
        Reputation (55)
        Word of mouth from friends and past graduates (54)
        Good employment opportunities (50)
        Desire to help others (46)
        Family or friend in the respiratory care field (39)
        Want to work in the healthcare field but not in nursing (35)
        Length of the program (22)
        Location (21)
        Salary (18)

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* Ranking is 1-10, with 1 being the most common response.

programs using each method in the past year and the past five years. The most effective recruitment methods, based on the mean ratings for each method, were hospital visits for prospective applicants (4.1), information packets (3.9), student employment availability in the field (3.9), mentoring (3.9), financial aid (3.8), recruitment brochures (3.8), and direct mail to prospective applicants (3.8). Providing flexible class hours (3.8) and advanced standing for current practitioners (3.8) were also rated highly.

The most common recruitment methods used in the past year were Web pages (50%), recruitment brochures (47%), information packets (45%), career days (44%), the college catalog (43%), and hospital visits for prospective applicants (41%).

Table 7 lists recruitment methods rated as effective or very effective by 50% or more of the program directors. The methods rated as highly effective or effective included hospital visits for prospective applicants (85%), information packets (76%), student employment availability in RT while in school (75%), mentoring prospective students (74%), direct mail to prospective students (73%), and recruitment brochures (70%).

Table 8 lists the most common written responses to the fill in the blank questions regarding student recruitment. The most frequent responses for "best recruitment techniques" were word of mouth, career days, high school visits, newspapers, and direct mailings to prospective applicants. The most common reasons suggested to explain the problem some programs are having in recruiting students were low unemployment/good economy and lack of awareness on the part of prospective students of respiratory care as a career option. The most common reasons cited by students (Table 8) for choosing respiratory care as a career (as reported by program directors) were family, friend, or self with a respiratory problem; reputation of the program; word of mouth; good employment opportunities; and a desire to help others.

Discussion

This survey confirms that while the demand for respiratory therapists is expected to continue to increase, the numbers of applicants to respiratory care programs has been declining. Corresponding with the decline in numbers of applicants to respiratory care programs is a perception on the part of program directors that the quality of applicants has also declined. Certainly, programs are much less selective, with the number of applicants being reported at, or even below the number of seats available for many programs.

The best methods for student recruitment, as rated by program directors, focus on the effective use of program information (brochures, information packets, college catalog and Web page), with activities designed to personally involve prospective applicants. These activities ranged from presentations to college classes, career days and hospital visits for prospective students, to specific mentoring programs and direct mail to prospective applicants. Useful recruitment adjuncts included developing financial aid and scholarship packages, and informing prospective applicants of job opportunities for students in the field while they are going to school.

Nontraditional approaches to marketing and student recruitment that were rated as highly effective by program directors included providing advanced standing for current practitioners to allow them to upgrade their credentials and/or degree and the use of

flexible class hours. Web-based instruction and distance education methods, including teleconferencing, were also rated highly.

It is interesting to note that the lowest rated recruitment techniques were high school visits (3.0), health fairs (3.0), meetings with high school career counselors (3.1), and faculty guest lectures to high school classes (3.1). This is in contrast to meetings with college career counselors (3.6), and faculty guest lectures to college classes (3.6). It would seem that focusing on current college students is a more productive use of limited resources in terms of student recruitment. Yet in the fill-in-the-blank written response section, program directors listed high school visits third, in spite of its low effectiveness rating.

Common reasons cited for the problems some schools are having with student recruitment included a general lack of knowledge about the field of respiratory care. Everyone seems to be aware of nursing and medicine as career options, but most prospective students know little or nothing about many of the allied health fields, including respiratory care. Perhaps enlisting advisory committee and community resources can help improve awareness of respiratory care to prospective applicants and the general public.

Another interesting aspect of this survey was the perception that a strong economy and low unemployment contribute to declines in the number of applicants to health care programs. When the economy is strong and job options are many, prospective students may avoid fields which require a difficult program of study, involve hard work on the job, night and weekend shifts, and for which salaries may not be as attractive as some of the currently popular high technology career options. It will be interesting to see if the recent economic recession and "crash" of the technology sector of the economy results in increased numbers of applicants to respiratory care and other health care fields. Certainly, the long-term career outlook for respiratory care in terms of demand is excellent.

It is also interesting to note that reasons cited for recruitment problems in respiratory care include "bad press" for health care in general and a poor attitude presented by some current practitioners. There is an abundance of anecdotal accounts of current health care workers counseling friends and family out of the health care field. This is the inevitable result of high workloads, burnout, and a lack of attention to aspects of job satisfaction by employers. These factors have coincided with the wave of hospital restructuring, including staff layoffs, that has characterized health care over the last ten years. Employers must wake up to the need to provide a high quality, rewarding work environment if they hope to improve recruitment into health care careers and retain current practitioners in the face of worsening human resource shortages.

A word of caution is provided on the interpretation of the results of this study. First, data was collected in the spring of 1999. Conditions may have changed since that time. Second, it is possible that respondents to the study questionnaire were different than non-respondents, though the evidence indicates that respondents and non-respondents were similar. Last, this study provides educational program directors' perceptions of the best techniques for recruitment. A more sophisticated study design would be needed to evaluate cause and effect and determine which methods really increase the number of applicants to programs.

Conclusion

The number and quality of applicants to respiratory care educational programs has been declining, and this decline is in the face of a human resource shortage in the field of respiratory care. Techniques perceived to improve student recruitment include effective use of program materials (brochures, information packets, Web page), personal contact with prospective applicants (to include mentoring), and direct mail. Other useful techniques may include hospital visits for prospective students, financial aid packages and scholarships, and student employment opportunities in the field while attending school.

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Is the Written Registry Self-Assessment Examination Reliable for a Student Population?

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Abstract

Applied Measurement Professionals, Inc. markets self-assessment examinations (SAE's) to respiratory therapy programs as an evaluation tool. However, the validity and reliability of these examinations for a student population is not available. The purpose of this study was to find the reliability of the Written Registry SAE for that population. The web-based Form B of the SAE was administered to 60 advanced-level respiratory therapy students enrolled in the final semester of their programs. Of the four programs that participated in the study, one was at the baccalaureate level and three were at the associate degree level. Fifty-eight students completed the examination with an average score of 60.5%. Cronbach's alpha, an index of internal reliability, was 0.79. We concluded that this approached good reliability for a competence examination.

Is the Written Registry Self-Assessment Examination Reliable for a Student Population?

Applied Measurement Professionals, Inc. (AMP), a subsidiary of the National Board for Respiratory Care (NBRC), offers a number of self-assessment examinations (SAE's). The SAE's are developed using the same procedures as are used for the development of NBRC examinations that are used to credential entry-level and advanced respiratory care practitioners (Applied Measurement Professionals, Inc., 1999). The content of these examinations is based on a national job analysis, the most recent of which was conducted in 1997 (Wilson, Long, & Barnes, 1998). However, some studies have challenged the validity of this job analysis (Van Scoder, Johnson, & Nyhuis, 2000; Van Scoder, Cullen, Johnson, & Nyhuis, 1999).

In 1999 AMP began to offer its SAE's in a web-based format, similar to the format that the NBRC now uses for its credentialing examinations (G. A. Smith, personal communication to directors of accredited respiratory care education programs, December 10, 1999). These examinations are marketed to respiratory therapy program directors as a program evaluation tool that can be administered to an entire class at the same time, or to individual students. Individual student results and group performance reports are made available to the program, which may use them to predict performance on the actual credentialing examinations (Applied Measurement Professionals, Inc., 1999). Although AMP claims that SAE results estimate performance on the credentialing examinations, there is evidence that this is not the case for a student population (LeGrand & Shelledy, 2000; Shelledy, Dehm, & Padilla, 2001). Programs may also be encouraged to use the SAE's as an evaluation tool because the Committee on Accreditation for Respiratory Care (CoARC) advises them to use the NBRC examination content matrices as guides for curricular development (Committee on Accreditation for Respiratory Care, 2000).

Even though respiratory therapy programs administer the SAE's to students, data are not available as to their validity and reliability for that population. Since reliability is a necessary, although not sufficient, criterion for validity we set out to find that key piece of information. The purpose of this study was to find the reliability of the Written Registry SAE for a student population.

Methods

The subjects were a convenience sample of 60 advanced-level respiratory therapy students enrolled in the final semester of their programs. The four programs used for this study were located in California, Georgia, Indiana, and Ohio. One program (17 students) was at the baccalaureate degree level, and the other three programs (43 students) were at the associate degree level. The cost of the subjects' examinations was paid from a project grant. All of the students in the baccalaureate degree program and two of the associate degree programs were asked to take the examination. In the third associate degree program two students were chosen at random to take the examination. Each student completed the web-based Form B of the written registry SAE while monitored by an instructor.

Scores were collected and analyzed utilizing S-Plus statistical software. The descriptive statistics computed for the scores included a correlation of the subsections of the examination. We found that the three subsections (clinical data – 17 questions, equipment – 20 questions, and therapeutic procedures – 63 questions) were not well correlated (see Table 1). The weak dependence between the subsections of the examination suggested that they were not parallel in nature and could result in an underestimated value of internal reliability (Carmines & Zeller, 1979). When we deal with parallel measurements or tests this lower bound becomes equal to the reliability (Lord & Novick, 1968). The subsections of the SAE were probably not parallel by design since AMP designates three distinct categories. With this in mind, our goal was to construct a "new" set of questions by splitting the 100 questions into 17 groups that contained a proportional representation of questions from each subsection. That is, each of the 17 groups was assigned one clinical data question, one or two equipment questions, and three or four therapeutic procedure questions. The questions were assigned in the order that they appeared in the examination. We then used the scores for each group to compute the alpha for the SAE. Theoretically, this allowed us to compute a more accurate assessment of reliability. For comparison purposes we also computed Cronbach's alpha without first splitting the test questions into groups.

Results

Two associate degree students did not complete the examination, resulting in a total of 58 subjects for data analysis. The mean score for the SAE was 60.5, with the subjects performing best on the clinical data subsection (see Table 2). The alpha coefficient that we computed after first splitting the questions into 17 groups was 0.79. Using the traditional method for computing Cronbach's alpha (i.e., not splitting the questions into groups) resulted in an alpha coefficient of 0.77.

Discussion

In general the subjects did not perform well on the SAE, with their poorest performance coming on the largest subsection of the examination, therapeutic procedures (see Table 2). We noticed a high variability in our subjects' scores between programs, possibly due to the fact that we drew our sample from two different levels of students at four different schools. Also, we did not explore how much time the subjects spent preparing for the SAE, so we cannot say whether or not they put as much effort into this

Table 1

Correlations Between Subsections of the Written Registry Self-Assessment Examination

Subsection	1	2	3
1. Clinical data	1.00	0.29	0.52
2. Equipment		1.00	0.44
3. Therapeutic procedures			1.00

Table 2
Written Registry Self-Assessment Examination Scores (n=58)

Subsection (# of Questions)	%	M	SD
Clinical data (17)	73.3	12.47	2.07
Equipment (20)	59.1	11.81	2.15
Therapeutic procedures (63)	57.5	36.24	6.71
All subsections (100)	60.52	60.52	9.09

examination as they will eventually exert for their credentialing examination. Since not all of the participating programs counted the SAE score as part of a course grade, it may be that the subjects did not exert a great deal of effort, resulting in lower scores.

The decision to divide the 100 questions on the test into groups before computing Cronbach's alpha was based on the low correlation between the three subsections of the SAE (see Table 1). These low correlations indicate that the subsections are in fact testing different content. Because the subsection items are not evenly distributed throughout the SAE, we formed groups that contained proportional representation of each subsection in order to preserve the parallel structure of the subsections used for the calculation of the alpha coefficient. Although this would seem to be important in theory, in practice the coefficient we computed using this technique was only slightly higher than the coefficient we found using the traditional method for computing Cronbach's alpha.

Alpha coefficients of 0.85 or higher are usually considered to be evidence of good reliability for competence tests (Swanson, Norcini, & Gross, 1987). The coefficient that we computed for the Written Registry SAE, 0.79, does approach this standard. However, our finding is limited to one form of the web-based examination. Also, since we used a convenience sample rather than a sample drawn randomly from all respiratory therapy students, our results may not be generalizable to the entire population.

Conclusion

The written registry SAE approaches good reliability for respiratory therapy students, and thus may meet one of the criteria for validity. We suggest that additional studies be conducted to establish the reliability of the other NBRC SAE's when they are used to determine the competence of students.

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SELECT CHARACTERISTICS OF SUCCESSFUL RESPIRATORY CARE EDUCATION PROGRAMS

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Abstract

The purpose of this study was to identify select characteristics of successful respiratory care education programs. To achieve this task, characteristics of program groups above and below a preset threshold level of success were compared. Successful programs were defined as those having exhibited 80% and higher pass rate on the 1997 Certification for Respiratory Therapy Technician Examination (CRTTE). A survey designed to obtain information representative of student, faculty, curriculum, financial resource and CRTTE results was administered to college-based respiratory therapist programs. All data were restricted to the 1997 academic year. Of 234 accredited college-based respiratory therapist programs surveyed, 101 (43%) returned usable questionnaires. Program data were organized to compare variables of programs with 80% and higher pass rates to those of programs below the threshold level. One sample *t*-tests were used to compare student, faculty, curriculum, program expenditures and CRTTE variables between the two levels of performance. The level of significance for all tests was $p = 0.05$. Significant differences were observed between the two groups of programs. The mean for programs with 80% and higher pass rate was 93% (n = 82) compared to programs below the threshold (mean = 61%, n = 9). For programs exhibiting pass rates of 80% and higher, class enrollment, grade point averages (GPA) of graduates, credentials and scholarly productivity of faculty, number of semester credit hours of general education, and financial expenditures significantly exceeded that of programs below the threshold level. Programs performing below the threshold level required less clinical contact hours than their counterparts. There was no significant difference in GPA of graduates on admission into programs. Differences in CRTTE pass rates above and below the threshold coincided differences exhibited by student, faculty, curriculum and financial component variables of programs. Inasmuch, the magnitude of program variables at and above the threshold level exemplified characteristics representative of successful programs. Identifying characteristics of successful programs is essential to establishing a reference point for curriculum development and program improvement. Further study is indicated in order to examine long-term effects of program characteristics and of how they relate to program performance.

Table 1
Results of One Sample T-test for Comparison Between Programs Above and Below 80% Pass Rate on the 1997 CRTTE

	n	Mean	S.D.	Mean Difference	*t*-value	*df*	*p* (2-Tailed)
Percent pass rate							
A	9	60.5	8.2				
				32.5	43.2	81	0.000
B	82	93.0	7.0				
1997 class enrollment							
A	82	10.3	15.3				
				5.0	6.98	81	0.000
B	82	15.3	10.3				
GPA of 1997 graduates							
A	9	3.04	0.17				
				0.11	3.57	63	0.001
B	64	3.15	0.25				
Number holding MS degrees							
A	9	0.222	0.60				
				0.66	4.35	78	0.000
B	79	0.883	1.35				

A = Programs with less than 80% pass rates on CRTTE
B = Programs with 80% or higher pass rates on CRTTE
Significance level 0.05
GPA = Grade point average

Table 2
One Sample T-test Comparisons Between Variables of Programs Above and Below 80% Pass Rate on the 1997 CRTTE

	n	Mean	Standard Deviation	t	df	p (2- Tailed)
Number of years of teaching						
A	9	21.0	10.1			
				3.66	75	0.000
B	76	30.4	22.5			
Number of scientific journal publications						
A	9	2.6	4.8			
				2.25	81	0.03
B	82	7.2	18.7			
Number of semester credit hours of gen. ed.						
A	9	23.9	9.2			
				4.58	76	0.000
B	77	33.9	19.2			
Total expenditures for 1997						
A	9	$130,621.00	$27,606.71			
				3.10	76	0.003
B	77	$178,079.00	$130,038.00			

A = Programs with less than 80% pass rates on CRTTE
B = Programs with 80% or higher pass rates on CRTTE
Significance level 0.05
Gen. Ed. = General education courses

IS THERE A RELATIONSHIP BETWEEN STUDENT PERFORMANCE ON THE WRITTEN SELF-ASSESSMENT EXAMINATION, AND TESTS OF CRITICAL THINKING SKILLS OR CRITICAL THINKING DISPOSITIONS?

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Abstract

Background: Respiratory Therapy programs, and undergraduate degree programs in general, are expected to produce graduates with well-developed skills in critical thinking. We sought to determine whether or not students with better skills in critical thinking, or a positive disposition toward critical thinking, performed better on the written respiratory therapy self-assessment examination (WRT). **Methodology:** Seventeen senior students in a baccalaureate respiratory therapy program took the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI). The CCTST is designed to measure the skills component of critical thinking and has five subscales (analysis, deduction, induction, evaluation, and inference.) The CCTDI is designed to test affective dimensions of critical thinking, or one's propensity toward thinking critically. The CCTDI has seven subscales (truth seeking, open mindedness, analyticity, systematicity, self-confidence, inquisitiveness, and maturity.) The content validity of each is derived from the definition of critical thinking developed by the American Philosophical Association and the California State University system. Approximately four months after completing the critical thinking instruments, the students took the on-line version of the WRT. The extent of the relationship between the CCTST and CCTDI scores, and the WRT score was determined by the Pearson's product-moment correlation coefficient (r), with level of significance set at 0.05. The correlation between the WRT and each of the CCTST and CCTDI subscales was also determined. **Findings:** There was little correlation between the total scores for the CCTST and the WRT, or the CCTDI and the WRT. None of the correlations were found to be statistically significant. **Conclusions:** The CCTDI, CCTST, and each of the individual subscores are not valid predictors of student performance on the WRT. Further research is necessary to determine whether other commercially available critical thinking tests are adequate predictors of future success on the written registry exam.

Table 1
Correlation Between the Written Registry Self Assessment Examination and the California Critical Thinking Skills Test

Scale or Subscale	Correlation Coeffcient (r)	P-Value
CCTST. total score	0.289	0.261
Analysis	0.142	0.586
Deduction	0.224	0.388
Induction	0.320	0.210
Evaluation	0.231	0.373
Inference	0.225	0.386

Table 2
Correlation Between the Written Registry Self Assessment Examination and the California Critical Thinking Disposition Inventory

Scale or Subscale	Correlation Coeffcient (r)	P-Value
CCTDI total score	0.275	0.285
Truth seeking	- 0.003	0.992
Open mindedness	0.204	0.204
Analyticity	0.103	0.695
Systematicity	0.172	0.508
Self-confidence	0.424	0.090
Inquisitiveness	0.420	0.420
Maturity	0.058	0.826

PREDICTORS OF STUDENT ATTRITION IN HIGHER EDUCATION

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Abstract

Health profession programs continue to grapple with the problem of reducing the attrition rate of students who enroll in these programs. Despite decades of research, educators can only explain limited amounts of the variance associated with attrition. In an attempt to explain more of the variance associated with attrition, this study examined several variables that provide insight as to how students adapt to the social and academic environment of college (Student Adaptation to College Questionnaire (Baker & Siryk, 1989) and Adaptive Style Inventory (Kolb, 1980)), how students perceive their ability to perform college level academic work (Academic Self-Efficacy Scale (Owen & Froman, 1988)), and whether or not a student's willingness to seek help (Help Seeking Inventory (Karabenick & Knapp, 1991)) to improve academic performance influenced persistence in college. Data were gathered from a sample of 142 traditional first year students (ages between 18-19) enrolled in either health professions or education, attending a private, four-year college in the northeast. Information was collected early in the academic year and again late in the academic year. Discriminant function analysis and analysis of variance were used to analyze the data. Results indicated that student attachment to the institution and students' perception of their academic performance were the most important variables for explaining the variance associated with persisting or not persisting (16% and 10% respectively). Results also indicated that complex and dynamic relationships among the variables modified students' feelings of attachment continuously during the academic year. The complex and dynamic nature of these relationships helped to explain why, given similar situations, some students persisted yet others did not. Results also indicate that the decision to persist or withdraw is a dynamic process, affected by multiple factors over the full academic year. These findings resulted in a revised model of the student attrition process. Finally, interventions that have been documented to improve retention are suggested, including clustering of several first year courses together, structuring first year courses to provide frequent feedback and close support to enhance student performance, close faculty advising, and the creation of a supportive social and academic environment (clubs, work groups, service learning).

THE EFFECT OF A ONE-DAY ASTHMA EDUCATION SEMINAR ON KNOWLEDGE OF PEAK EXPIRATORY FLOW RATE MEASUREMENT AND METERED DOSE INHALERS WITH SPACERS AMONG HEALTH CARE PROFESSIONALS

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Abstract

Background: Morbidity and mortality among asthma patients have been on the rise in recent years, while availability of health care dollars is declining. In today's managed care environment, it is important for health care professionals to effectively educate patients to better manage this chronic disease. **Objective:** To determine if a one-day asthma education seminar results in enhanced understanding of peak expiratory flow rate (PEFR) measurement and use of metered dose inhalers (MDIs) with spacers among members of the health care team. **Methods:** Physicians (MD; n=12), respiratory therapists (RT; n=13), registered nurses (RN; n=73), and licensed vocational nurses (LVN; n=27) were given a written true/false pre-test on use of peak flow meters and MDIs with spacers followed by a one-day asthma education seminar, consisting of six one-hour lectures and an asthma fair emphasizing use of medications and equipment. Following the seminar and fair the test was repeated; and scores within and between the four groups were compared using paired t-tests and ANOVA, with $p<0.05$ considered significant. **Results:** Mean scores (SD) are shown in Tables 1 and 2. There were no significant differences ($p>0.05$) between MDs, RTs, RNs, and LVNs on the pre-test or post-test. When grouped together, post-test scores for all participants (n=125) improved significantly over pre-test scores ($p<0.001$). When scores were compared by profession, however, only RNs showed an improvement in PEFR measurement test scores ($p=0.0001$), while all groups improved their scores on MDI/spacer use ($p<0.05$). **Conclusions:** All participants showed a significant improvement in knowledge of the proper use of MDIs and spacers following attendance at the asthma education seminar and fair, though only RNs showed improvement in the use of peak flow measurements. Participation by MDs, RTs, and nurses in a common asthma education seminar is expected to provide consistency in disease management strategies utilized by members of the health care team, resulting in more effective education of patients with asthma.

Table 1
Comparison of Pre- and Post-PEFR Test Scores by Profession

Group	N	Pre-Test Mean (SD)	Post-Test Mean (SD)	*p* value
All	125	77.44 (12.9)	83.32 (10.0)	<0.0001**
MD	12	77.92 (12.8)	81.25 (10.0)	0.1803
RT	13	82.69 (11.3)	88.46 (4.7)	0.1007
RN	73	77.40 (12.4)	83.49 (8.3)	0.0001**
LVN	27	74.82 (14.5)	82.04 (14.5)	0.0525
		p = 0.3498	*p* = 0.2203	

Table 2
Comparison of Pre- and Post-MDI/Spacer Scores by Profession

Group	N	Pre-Test Mean (SD)	Post-Test Mean (SD)	*p* value
All	125	73.57 (15.0)	84.65 (13.7)	<0.0001**
MD	12	73.2 (16.9)	83.83 (8.4)	0.0218*
RT	13	76.92 (15.9)	90.23 (8.9)	0.0236*
RN	73	73.78 (15.4)	84.94 (14.8)	<0.0001**
LVN	27	71.59 (12.8)	81.52 (14.1)	0.0032
		p = 0.7712	*p* = 0.3042	

Respiratory Care Education Annual

American Association for Respiratory Care
11030 Ables Lane
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Respiratory Care Education Annual is a publication
of the American Association for Respiratory Care