

Effect of Full-Time versus Part-Time School Nurses on Attendance of Elementary Students with Asthma

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ABSTRACT: Asthma, the most common chronic disease in children today, is the leading cause of absenteeism among students. It accounts for nearly 20 million lost school days annually. This study examined whether full-time (5 days per week) or part-time (2 days per week) school nurses would have a differential effect on the frequency of absences among elementary school students with asthma. This study found that students with asthma who were poor or who were African American and in schools with full-time nurses missed significantly fewer days (3 days, or 23% fewer missed days) than did their counterparts with asthma in schools with part-time nurses.

KEY WORDS: asthma, school nurses, health services, attendance, outcomes

INTRODUCTION

Asthma is a chronic inflammatory disease of the airways associated with a variety of environmental factors. It is the most common chronic disease among children today and is steadily increasing (CDC, 2000). In 1997, there were over 8 million children under the age of 14 who were told by a health professional that they had asthma, and by 2002 that number increased to almost 9 million children (American Lung Association, 2004). In 2001, over 3 million children under the age of 17 had at least one asthma attack, and 130 children between the ages of 1 and 14 years died as a result of asthma. Approximately 130 per 1,000 school-age children have asthma, which equates to about three students per classroom in the United States (American Lung Association, 2004). Research has

shown that African Americans are at a higher risk for asthma compared with Whites. In addition, asthma attacks, hospitalizations, and deaths from asthma are more common in African Americans than Whites and more common in girls than boys. African American children are also four to six times more likely to die of asthma. Poor children are more likely than non-poor children to receive emergency room care and to be hospitalized for their asthma (Mannino, Homa, Akintami, Moorman, Gwynn, & Redd, 2002).

There are physical, social, financial, and academic problems related to asthma. Children with asthma account for 3 million physician office visits, 500,000 emergency room visits, 164,000 hospitalizations, and 8.7 million prescriptions each year (Szilagyi, 1999). Socially, many children with asthma are restricted from participating in physical education and after-school physical activity/sport programs. This lack of participation can result in feelings of isolation and rejection (Rodehurst, 2003). The financial cost of asthma is also significant. In 1985, the cost of asthma for children and adults was \$4.5 billion, of which \$2.4 billion went toward direct medical expenditures and \$2.1 billion was for indirect costs (e.g., lost days from work and school) (Weiss, Gergen, & Hodgson, 1992). In 1994, the total cost for asthma rose to \$10.7 billion

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(Weiss, Sullivan, & Lyttle, 2000), and in 2002, it increased to \$14 billion (American Lung Association, 2004). It is estimated by 2020, the total cost for asthma will be \$18 billion (PEW Environmental Health Commission, 2000). From an academic standpoint, asthma is the leading cause of absenteeism among students. It accounts for nearly 20 million lost school days annually, or an average of 7.6 days per school year missed for each student with asthma (Rodehurst, 2003).

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REVIEW OF THE LITERATURE

School nurses are important in helping students manage their asthma. One study found that 56% of school nurses surveyed indicated they saw a child with asthma in their office at least weekly (Calabrese, Nanda, Huss, Winkelstein, Quartey, & Rand, 1999). Wagner and colleagues (1999) summarized five components of health care systems likely to be maximally responsive to the needs of patients with chronic illness. Two of the five components of maximally responsive care for students with asthma can be provided by the school nurse: improved patient education and timely availability of relevant expertise. If a school nurse is not present every day, the responsibility of attending to students with asthma falls on teachers, secretaries, and administrators (Price, Dake, Murnan, & Telljohann, 2003).

Healthy People 2010 includes the objective of reducing the number of school days missed by persons with asthma because of their asthma (U.S. Department of Health and Human Services, 2000). The purpose of this study was to determine whether employing full-time elementary school nurses could reduce the number of absences among students with asthma more than in schools with part-time nurses.

METHODS

Sixteen Midwestern elementary schools (K–6) from one large urban school district ($n = 37,000$ students) were selected for this study. The schools were randomly selected from a list of 43 elementary schools in this urban district. Only 16 schools (eight schools with full-time nurses and eight schools with part-time nurses) were selected because of limited funding for the salaries of full-time nurses (full-time nurses had been employed at eight schools for the previous 2 years).

All of the selected schools agreed to participate in this study. The schools employed either the services of a full-time (5 days per week) or a part-time (2 days per week) school nurse and were based on matched feeder patterns (to junior high schools and high schools) and on percentage of White versus non-White students.

The school nurses at each school identified students whose parents or caregivers had indicated on their emergency medical cards that their sons or daughters had asthma. There were 358 students identified with asthma in the eight schools with full-time nurses and 211 students identified in the eight schools with part-time nurses. Although there was a large difference in the number of students with asthma between groups, this was likely a result of differences in size of enrollment and socioeconomic status (as identified by free or reduced lunch status) between the groups (Newa-check & Halfon, 2000). The schools with full-time nurses had an average enrollment of 476, with 87% qualifying for free or reduced lunch, and the schools with part-time nurses had an average enrollment of 404, with 71% qualifying for free or reduced lunch.

Instrument

The school nurses in the 16 schools selected for this study were asked to complete a short form that indicated the grade, race, sex, school lunch status, and number of days missed during the 2002–2003 academic school year for each of the students identified as a student with asthma on their emergency medical cards. The school nurses reported aggregate data for their schools to the researchers at the end of the 2002–2003 academic school year. To maintain confidentiality, the school nurses did not identify the names of the students on the forms sent to the researchers.

Data Analysis

Data for this study were analyzed using SPSS 11.0. Independent sample *t*-tests and analyses of variance (ANOVAs) were used to calculate significant differences between groups. Chi-square analyses were calculated to assess any demographic differences between students in the full-time group compared to the in part-time group. Values for *p* were set at .05 for determining statistical significance.

RESULTS

Data were collected on a total of 569 students identified by their parents as having asthma. The schools with full-time school nurses enrolled 358 of these students. The majority of students in this group were male (57%), African American (81%), and received free school lunch (89%). The schools with part-time school nurses enrolled 211 students with asthma. As with the full-time group, the majority were male (62%), African American (57%), and received free school lunch (64%).

Demographic characteristics were analyzed to determine whether there were significant differences in student baseline characteristics between those with full-time nurses versus those with part-time nurses. Chi-square analyses found no significant differences between students with asthma who had full-time nurses versus students with asthma who had part-time nurses by grade ($\chi^2=4.18$, $p=.65$) or sex ($\chi^2=1.173$, $p=.28$). Significant differences were found between the two groups by race ($\chi^2=41.52$, $p\leq.05$) and by school lunch status ($\chi^2=66.68$, $p\leq.05$). Schools with full-time nurses had significantly more African American students and students who received free lunches. Further investigation found a statistically significant nonparametric correlation between race and school lunch status (Spearman's $\rho=0.32$, $p\leq.05$). However, because the strength of this association was not strong, it was decided that subsequent data analyses would be conducted separately by race and by lunch status.

School attendance is essential for a child's academic success. Unfortunately, children with asthma are at a greater academic risk because they have greater school absenteeism than children without asthma.

Students with full-time school nurses missed significantly fewer school days ($M=10.6$, $SD=9.2$) than students with part-time school nurses ($M=13.0$, $SD=11.6$) ($t=-2.68$, $DF=566$, $p\leq.05$). Investigation by sex found that males with full-time nurses missed significantly fewer days ($M=10.0$, $SD=8.3$) when compared to males with part-time nurses ($M=13.4$, $SD=12.4$; $t=-3.05$, $DF=332$, $p\leq.05$). This finding was not seen ($t=-.57$, $DF=232$, $p=.57$) for females who missed a similar number of days with full-time nurses ($M=11.5$, $SD=10.3$) compared to those with part-time nurses ($M=12.3$, $SD=10.2$).

The number of missed school days by race was also tabulated. African American students with full-time nurses ($M=9.9$, $SD=9.1$) missed significantly fewer days than those with part-time nurses ($M=13.0$, $SD=12.6$) ($t=-2.78$, $DF=409$, $p\leq.05$). There was no significant difference in number of missed days between White students with full-time nurses versus those with part-time nurses ($M=13.8$, $SD=8.9$ vs. $M=12.5$, $SD=10.2$, respectively; $t=0.66$, $DF=114$, $p=.51$) or students of other races or ethnicities ($M=13.3$, $SD=10.1$ vs. $M=14.3$, $SD=10.0$, respectively; $t=-0.31$, $DF=39$, $p=.76$).

Finally, analyses were conducted on the basis of whether students qualified for free or reduced lunches. Students who qualified for free lunches and had full-time nurses ($M=10.9$, $SD=9.5$) missed significantly

fewer days than the students who qualified for free lunches and had a part-time nurse ($M=14.6$, $SD=13.1$; $t=-3.36$, $DF=450$, $p\leq.05$). There was no significant difference in missed days between the full-time and part-time groups for reduced lunch recipients ($M=8.8$, $SD=7.9$ vs. $M=8.1$, $SD=7.7$, respectively; $t=0.30$, $DF=37$, $p=.76$) or for students who did not receive free or reduced lunches ($M=7.9$, $SD=5.7$ vs. $M=10.9$, $SD=7.9$, respectively; $t=0.13$, $DF=75$, $p=.16$).

DISCUSSION

School attendance is essential for a child's academic success. Unfortunately, children with asthma are at a greater academic risk because they have greater school absenteeism than children without asthma. This risk is even higher in students who are African American and who have a low socioeconomic status. The presence of school nurses should result in fewer missed school days by the students who have asthma because school nurses can improve patient education and provide timely care for students (Wagner et al., 1999).

This study had three potential limitations (Price & Murnan, 2004). First, all students whose parents or caregivers indicated on the school emergency medical card that their son or daughter had asthma were included in the study. Some of those students may not have been medically diagnosed with asthma. In addition, some students with asthma may not have been included in the study if their parent or caregiver did not accurately complete or return the emergency medical card indicating such status for the child. To the extent that these misclassifications occurred, this would be a threat to the internal validity of the results. Second, the school nurses counted all absences for the students with asthma. Some of the student absences may not have been related to asthma. The school district used for this study did not delineate the reasons for student absences (e.g., suspensions, illnesses, and unexcused absences). However, schools with full-time and part-time nurses collected the data the same way. Therefore, this limitation should not have differentially affected the attendance from these two groups of schools. Third, this study did not assess absenteeism in students during the years before this study. Thus, if the results are caused by a secular trend (e.g., continuation of a trend that was already occurring in the population) in reduced absenteeism in some schools, then this trend could not have been detected in this study.

IMPLICATIONS FOR SCHOOL NURSING PRACTICE

Healthy People 2010 recommends an increase in the number of the nation's elementary, middle, junior high, and senior high schools that have a nurse-to-student ratio of at least 1:750 (USDHHS, 2000). The National Association of School Nurses (NASN) also supports a nurse-to-student ratio of 1:750 for students

in the general student population and a nurse-to-student ratio of 1:225 for mainstreamed schools (NASN, 1995). It is their position that the delivery of quality school nursing services is affected by the nurse-to-student ratio. *Healthy People 2010* also recommends an “increase [in] the proportion of persons with asthma who receive formal patient education, including information about community and self-help resources, as an essential part of the management of their condition” and to “reduce the number of school or work days missed by persons with asthma due to asthma” (USDHHS, 2000) (p. 18).

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This study has shown that having full-time school nurses in schools can help to meet both of these objectives. Specifically, students with asthma who were poor (as determined by eligibility for the free lunch program) or who were African American and in schools with full-time nurses missed significantly fewer days (3 days, or 23% fewer missed days) than did similar students with asthma in schools with part-time nurses. This may be in part a result of the availability of school nurses to provide formal patient education. It may also be a result of the greater amount of time available for nurses to get to better know the students. Thus, students might be more willing to seek the help of the full-time school nurse. Full-time and part-time school nurses also may have differed in their strategies in dealing with students with asthma. This was not examined in this study. Further research is needed not only to explain that full-time school nurses make a difference in attendance but also to determine what they do that makes this difference.

REFERENCES

- American Lung Association. (2004). *Trends in asthma morbidity and mortality*. New York, NY: Epidemiology and Statistics Unit—Research and Scientific Affairs.
- Calabrese B. J., Nanda J. P., Huss K., Winkelstein M., Quartey R. I., & Rand C. S. (1999) Asthma knowledge, roles, functions, and educational needs of school nurses. *Journal of School Health, 69*, 233–238.
- Centers for Disease Control and Prevention (2000). Measuring childhood asthma prevalence before and after the 1997 redesign of the national health interview survey—United States. *MMWR, 49*, 908–911.
- Mannino D. M., Homa M., Akinbami L. J., Moorman J. E., Gwynn C., & Redd S. C. (2002). Surveillance for asthma—United States, 1980–1999, *Surveillance summaries: MMWR Surveillance Summaries/CDC, 51*, 1–13.
- National Association of School Nurses. (1995). *Ratio position National Association of School Nurses—Position statement: Caseload Assignments*. Retrieved December 12, 2002 from the World Wide Web: <http://nasn.org/positions/caseload.htm>.
- Newacheck P. W., & Halfon N. (2000) Prevalence, impact, and trends in childhood disability due to asthma. *Archives of Pediatric Adolescent Medicine, 154*, 287–293.
- PEW Environmental Health Commission (2000), *Attack asthma: Why America needs a public health defense system to battle environmental threats*. Philadelphia, PA: PEW Environmental Health Commission.
- Price, J. H., Dake, J. A., Murnan, J., & Telljohann, S. K. (2003). Elementary school secretaries' experiences and perceptions of administering prescription medication. *Journal of School Health, 73*, 373–379.
- Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. *American Journal of Health Education, 35*, 66–67.
- Rodehurst T. K. (2003). Rural elementary school teachers intent to manage children with asthma symptoms. *Pediatric Nursing, 29*, 184–192.
- Szilagyi P. (1999). Childhood asthma: We can do better! *Pediatric Annals, 28*, 16–17.
- U.S. Department of Health and Human Services. (2000). *Healthy People 2010: Understanding and improving health and objectives for improving health* (2nd ed., Vol. 1). Washington, DC: Government Printing Office.
- Wagner, E. H., Davis, C., Schaefer, J., Von Korff, M., & Austin, B. (1999). A survey of leading chronic disease management programs: Are they consistent with the literature? *Managed Care Quarterly, 7*, 56–66.
- Weiss K. B., Gergen P. J., & Hodgson T. A. (1992). An economic evaluation of asthma in the United States. *New England Journal of Medicine, 326*, 862–866.
- Weiss K. B., Sullivan S. D., & Lyttle C. S. (2000). Trends in the cost of illness for asthma in the United States, 1985–1994. *Journal of Allergy and Clinical Immunology, 106*, 493–500.