The Effect of a Patient Education Program on Emergency Room Use for Inner-City Children with Asthma

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Abstract: An educational program for children with asthma designed to reduce emergency room (ER) use enrolled all eligible children (n = 253 primarily low-income Black) within a health maintenance organization (HMO) who had used the hospital or ER for asthma during the pre-enrollment period and randomized them into two groups. Twenty-four of the experimental group patients had 55 ER visits and 18 of the control patients had 39 ER visits during the first 12 months post-intervention. This program did not achieve its goal. (*Am J Public Health* 1990; 80:36–38.)

Introduction

Asthma is a common disease that leads to considerable morbidity and expense.[1] Lethal asthma is a serious problem and continues to increase in frequency, especially for minority patients.[2] The years of potential life lost due to asthma almost doubled for minority males between 1979 and 1983.[3] One of the strategies to reduce morbidity, mortality, and expense of asthma has been patient education. The program evaluated in this paper was designed to improve patients' knowledge and behaviors related to asthma in order to improve their control of the disease, and thereby reduce emergency room (ER) use.

Methods

Subjects

Subjects were drawn from two facilities of an urban health maintenance organization (HMO) with a combined enrollment of over 50,000. Approximately 80 percent of these patients were Black and all had at least one working adult in the family. The median household income for the HMO service area was 6 percent below the overall city median. Patients were eligible for inclusion in the study if they were 18 years of age or younger and had at least one emergency room visit or hospitalization for asthma during the prior four-year period. A total of 253 subjects met eligibility requirements. All eligible patients were enrolled in the study.

Randomization

For randomization purposes, patients were listed in order of their past emergency room use and descending this list patients were allocated randomly using a table of random numbers to either experimental (n = 127) or control (n = 126) groups. The random assignment was balanced so that out of every 10 assignments, five were to the experimental group. The experimental and control groups were virtually identical on several measures as shown in Table 1.

Data Collection

The HMO collected information on hospital days, emergency room visits, and office visits including the related diagnoses during its normal course of business. Once a patient dropped out of the HMO, no further information was available. The enrollment and dropout of patients were monitored by the HMO. Utilization outside the HMO while a member was recorded because virtually all other emergency rooms and hospitals would have billed the HMO for their services.

TABLE 1—Profile of total Group [N = 253]

	Experimental Group	Control Group
Number of Patients	127	126
Mean Age (years)	8.5	9.0
Sex (% male)	61%	65%
ER Use before entry (# visits in 1 year)	1.2	1.2
Months in HMO before entry	20.5	21.2
Percent registered at largest HMO center	48.0	49.2
Percent with one or more hospital days for asthma in prior year†	18.2	23.6

†Percent shown for patients for whom data are available.

Educational Program

The program consisted of two components: classes conducted in group settings for patients and their parents, and telephone instruction by protocol to patients or parents by nurse clinicians to provide additional instruction and reinforcement. The classes and calls covered 23 instructional objectives grouped into four content areas: 1) prevention of asthma attacks, 2) medication management, 3) intervention during asthma attacks, and 4) utilization of health care resources. Instruction dealt with knowledge, skills, and behavior. Four classes were offered to each patient and his or her parents on weekday evenings and Saturday mornings with make-up sessions scheduled periodically to accommodate patients who missed classes. Each class lasted 1.5 hours. Following classes, telephone instruction by protocol to patients and their parents was done at least each season. The calls typically lasted 30 minutes.

The program was offered to all 127 experimental group patients. Of the patients who remained in the HMO for 12 or more months, 38 percent attended one or more classes. Telephone instruction by protocol improved patient contact to 81 percent. The mean number of educational contacts (classes plus calls) was 4.4. The intervention increased the frequency of self-reported mastery on most of the instructional objectives. The post-intervention mastery of specific educational objectives varied from 80 percent of patients for avoidance of over-the-counter drugs, 75 percent of patients for quitting smoking, 35 percent of patients for recognition of

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the early signs of an asthma attack, to 30 percent of patients for using medicines correctly. Detailed descriptions of the program content, instructional techniques, and educational outcomes for these patients have been reported previously.[4,5]

Exposure of control group patients to the intervention was unlikely because the program was performed apart from the primary care providers and the program staff avoided routine contact with those providers. The control group continued to receive their usual medical care.

Results

Of the 253 patients who began the program, 205 remained within the HMO for the first 12 months and 194 remained within the HMO for the entire study period, up to 29 months. Dropouts were evenly distributed between experimental and control groups. Participants and dropouts were compared according to age, sex, and ER use before entry. The differences were small and not statistically significant.

There was no significant difference between experimental and control groups in post-intervention health care utilization for respiratory related illnesses for a one-year period as shown in Table 2. This analysis excludes dropouts and eliminates any seasonal bias, since each patient was enrolled for 12 continuous months. Hospital days and office visits also are compared. Further analysis (not shown in this table) revealed no differences in utilization for non-respiratory illnesses. The results were similar when this analysis was repeated for the total time period of the study with all dropouts included. The probability of a Type II error for a clinically significant difference was calculated and found to be negligible.

Discussion and Conclusions

The program did not achieve its goal of decreasing emergency room visits for children with asthma. This occurred despite careful program design, implementation by clinicians with expertise in pulmonary disease, and an average of $96 expended per patient per year (1984 dollars) for the asthma education.

Other authors have shown other programs to be effective with children with asthma through such outcome measures as reduced emergency room visits, hospital use, sick days, and days lost from school.[6–10] Why have these other interventions been successful while this program was not? The inability of this intervention to demonstrate a reduction in ER utilization does not appear to be due to any of the following methodological problems: randomization problems, dropouts, exposure of control patients to intervention, omission of traditional program content, or accuracy of outcome measures.

TABLE 2—Respiratory-Related Utilization for Patients Enrolled Entire 1st 12 Months [N = 205]

	Experimental Group	Control Group
Number of Patients	101	104
Patient months enrolled	1212	1248
Number of ER visits	55	39
Distribution of ER visits		
0	77	86
1–2	17	13
3 or more	7	5
Hospital Days		
mean	0.27	0.22
standard deviation	1.34	0.74
Office Visits		
mean	1.63	1.86
standard deviation	2.28	4.24

The program probably failed for two sets of reasons: failures of implementation, and failures of program effectiveness. The socioeconomic, educational, and racial profile of the patients probably contributed to problems with both program implementation and program effectiveness. Programs need to be tailored to their target populations. Furthermore, the program was difficult to implement because it was offered to all eligible children with asthma, not just volunteers. This undoubtedly accounted for some of the difficulties in obtaining participation in classes by patients and parents. Implementation was further hindered by the enrollment of many patients with moderate asthma who were probably less motivated and less likely to benefit than patients with more severe disease.[11]

Problems with program effectiveness took several forms. The behavioral component of this program was less intensive than that of other successful programs.[6] It has been demonstrated for asthma[12] and other diseases[13–15] that increases in patient knowledge alone, without instruction on how to change behavior, will not improve patient compliance or health outcomes. Although the importance of behavioral change was discussed with patients in this program, specific behavior modification techniques such as reinforcement and contingency contracting were not utilized. Secondly, less mastery of the educational material was attained by the patients than anticipated, even though considerable resources were used in the program. Less mastery occurred partially because class attendance was less than expected. Furthermore, although telephone instruction alone improved the rate of contact and increased the level of mastery of certain educational objectives, it did not lead to the level of mastery desired.[5] Thirdly, those instructional sessions with parents alone may not have been as effective as those sessions including the children.

Although this study did not show any impact on health care utilization, it is possible that the intervention had a positive impact on functional measures such as days lost from school or sick days. These measures should be included in future research.

This study identifies problems that must be addressed during the widespread implementation and funding of patient education for asthmatic patients. To the inexperienced, patient education seems deceptively simple. However, unless the complexity of patient education is appreciated, a program may fail and may have unintended outcomes. The findings of this study suggest that programs should: 1) include a strong behavioral component, 2) be targeted at key groups who will actively participate and benefit, 3) be monitored to assure that intermediate goals are reached, and 4) be validated for specific socioeconomic groups before implementation.

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New NCHS Report Gives Trends in Low Birthweight

The National Center for Health Statistics recently released its latest findings in vital and health statistics. The report—*Trends in Low Birthweight: United States, 1975–85*—analyzes national and regional trends in rates of low, moderately low, and very low birthweight, and examines the relative risk by maternal characteristics such as age, race, education, and marital status. Some of the findings:

- Low birthweight (LBW) which had been on the decline for the past two decades, increased 2 percent between 1985–87.
- Approximately 262,000 LBW babies were born in 1987 (69 per 1000 live births).
- Rates of LBW and very low birthweight (VLBW) are substantially higher for Black than for White births. In 1987, Blacks were almost three times as likely as Whites to have a VLBW infant and more than twice as likely to have an LBW baby.
- Rates of low, very low, and moderately low birthweight (MLBW) are lowest for mothers in their late twenties and rise as maternal age increases or decreases.
- All LBW rates are substantially higher for young women having a second or higher order birth than for first-time mothers, reflecting the close spacing of many second and subsequent births.
- More than half of all LBW and MLBW babies and 90 percent of VLBW babies are born before 37 weeks of gestation (preterm). Of LBW babies who were full term, only 3 percent weighed less than 1500 grams, but 27 percent of those born preterm weighed this little. For both preterm and full-term LBW babies, the proportion weighing less than 1500 grams is higher for Black than for White babies.
- For all characteristics examined, rates of LBW, MLBW, and VLBW are substantially higher for Black than for White births. The racial differential is most pronounced for VLBW. In 1985, the VLBW rate was 2.8 times as high for Black as for White babies, and rates of LBW and MLBW were 2.1–2.2 times as high for Blacks as for White births.

The NCHS report, by Selma Taffel, is: *Trends in Low Birthweight: United States, 1975–85*, Vital Health Statistics Series 21, No. 48, DHHS Pub. No. (PHS) 89-1926. For further information about this report, or for a list of titles of reports published in the Vital and Health Statistics series, contact: Scientific and Technical Information Branch, NCHS, Hyattsville, MD 20782, tel: (303) 436-8500.