Impact of a Health Literacy Intervention on Pediatric Emergency Department Use

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Objective: The aim of this study was to measure the impact of a simple parent health literacy intervention on emergency department and primary care clinic usage patterns.

Methods: Study participants consisted of parents who brought their children to the Harbor-UCLA Medical Center pediatric emergency department for nonurgent complaints. Study participants filled out questionnaires regarding their management of children's mild health complaints and where respondents first seek help when their children become sick. After completing the questionnaires, participants were educated about how to use the health aid book *What to Do When Your Child Gets Sick* and provided a free copy. After 6 months, telephone follow-up interviews were conducted to assess whether the health literacy intervention had influenced the participants' management of their children's mild health complaints and their health care resource usage patterns.

Results: One hundred thirteen parents were enrolled in the preintervention phase, and 61 were successfully interviewed at 6 months by telephone. Before and after comparisons demonstrated a 13% reduction in the percentage of respondents who stated they would go to the emergency department first if their child became sick. In addition, 30% fewer respondents reported actual visits to the emergency department in the previous 6 months. Regarding specific low-acuity scenarios, significantly fewer participants would take their child to the emergency department for a low-grade fever with a temperature of 99.5°F and for vomiting for 1 day. There was no significant change in the proportion of parents who would take their child to the emergency department for earache or cough.

Conclusions: Health literacy interventions may reduce nonurgent emergency department visits and help mitigate emergency department overcrowding and the rising costs of health care.

Key Words: ED overuse, health literacy, patient education

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Overcrowded hospital emergency departments (EDs) have become a serious national problem while the use of EDs continues to rise.[1] Emergency department overcrowding negatively affects patient care and is associated with poor patient outcomes, including prolonged patient pain and suffering, decreased physician productivity, and increased frustration for both patients and medical personnel.[2] Emergency department overuse by patients with mild illness contributes to ED overcrowding and has been implicated as a major contributor to the rising costs of health care spending in the United States. Although most patients visiting the ED are treated for acute medical problems and injuries, the ED also serves as a safety net for those patients who lack access to primary health care. The use of ED resources for nonemergent complaints such as cold symptoms and low-grade fevers is considered a major contributor to the rising number of ED visits and is an especially common phenomenon in the pediatric population.[3] In addition, costs of ED visits may be 2 to 3 times the cost of a regular physician's office or clinic visit.[3,4]

Emergency department visits increased from 93.4 million in 1994 to 110.2 million in 2004.[5] At the same time, many EDs closed, and there were 12.4% fewer EDs overall in 2004 than in 1994. Of those 110.2 million ED visits in 2004, roughly 13.6 million (12.5%) visits were for nonurgent complaints.[5] In the same year, children younger than the age of 15 years made almost 23 million visits to the ED, and 3.3 million (14.5%) of these visits were classified as nonurgent. One study found that 33.6% of 251 caretakers who had brought their insured children to an ED for a nonurgent complaint thought that there was a true emergency and that only 38.7% had been educated by their insurance carriers as to what constitutes a true emergency.[6] Another study of 268 ED patients triaged as nonurgent found that 82% of them considered their condition urgent.[7] Clearly, there may be a disconnect between a patient or parent's perception of what constitutes a medical emergency and the health care community's definition.

Health literacy is defined as the "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."[8] Examples of low health literacy include the patient who walks out of the physician's office unsure of how to use their prescription medications or the parent who takes their child to the ED because they are unable to differentiate an urgent condition from a routine child health problem. It is estimated that 26% of patients have low health literacy, and another 20% have marginal health literacy.[9]

Health literacy has increasingly become a focus as a means for decreasing ED overuse.[10] Interventions to improve health literacy aim to increase patients' and parents' abilities to use printed and written materials to address a host of health and social needs. A previous study of a simple intervention, giving a low-literate self-help book on child health problems to families in Head Start programs, demonstrated a 48% reduction in ED visits and a 37.5% reduction in clinic visits on a 6-month follow-up.[3] It is possible that the success of the intervention was attributable to the overall Head Start program, however, which includes parent education and support, and to the fact that Head Start families may be self-selected and particularly motivated to improve their health literacy.

Building on this initial study, the University of California, Los Angeles (UCLA)/Johnson & Johnson Health Care Institute

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was established in 2001 at the UCLA Anderson School of Management. It was created to help educate and empower Head Start parents so that they can properly manage the health care needs of their children and improve their overall parenting skills. Tracking 9240 Head Start families enrolled in a health literacy program and impacting nearly 20,000 children in 35 states, researchers found that visits to a hospital ED or clinic dropped by 58% or 42%, respectively, as parents opted to treat their children's fevers, colds, and earaches at home.[11] This added up to a potential annual savings to Medicaid of $554 per family in direct costs associated with such visits or approximately $5.1 million annually.

Moreover, parents' being better informed approximately handling their children's health needs translated to a 42% drop in the mean number of days lost at work (from 6.7–3.8) and 29% drop in days children lost at school (from 13.3–9.5). Parents also reported feeling more confident in making health care decisions and in sharing knowledge with others in their families and communities.

We designed the current study to assess the impact of this health literacy intervention, provision of a fourth-grade reading level self-help book on child health problems to parents of children brought to an urban pediatric ED for nonurgent complaints, on subsequent ED and outpatient clinic resource use after 6 months of follow-up. The ED population is similar to the Head Start population in demographics but is not benefiting from the Head Start program simultaneously to the intervention.

METHODS

A convenience sample was enrolled in the pediatric ED (PED) of Harbor-UCLA Medical Center when study investigators were available in September 2004. The Harbor-UCLA Medical Center PED is located in an urban public hospital, has an annual census of approximately 20,000 visits per year, and serves a predominantly low-income minority population. All patients younger than 18 years are seen in the PED.

Potential study participants were identified based on the triage nurse's categorization of the degree of urgency of the patient's medical needs. Patients brought into the PED for obviously emergent conditions (eg, loss of consciousness, motor vehicle crashes, etc) were excluded from the study. All other patients were first seen by the triage nurse to determine the patient's level of urgency and categorized using a 5-level triage system. Children deemed by the triage nurse as needing emergent or urgent medical attention (level 2 or 3) were also excluded. Only parents, legal guardians, and primary caretakers (heretofore referred to as *parents*) were eligible for the health literacy intervention; if the child was accompanied by an adult that did not meet this criterion, the child was excluded. Parents that did not speak English or Spanish and parents who could not read at all were excluded.

Parents were approached for consent for participation in the triage area or waiting room of the PED. This study was reviewed and approved by the institutional review board of our institution. Consent was obtained by study investigators. Parents that gave consent to be included in the study were asked to provide their name, child's name, and telephone number for follow-up. Parents were interviewed in a private area, in accordance with HIPAA regulations. Afterward, parents were given a 10-minute questionnaire to fill out individually in the waiting room area or in the examination room while they were waiting to be seen by medical personnel. Questionnaires were available in both English and Spanish. Responses to the preintervention questionnaires served as the study's comparison data.

Preintervention questionnaires aimed to identify the child's primary source of health care and the frequency with which parents use health care resources for their child. They also assessed parent confidence in managing common low-acuity pediatric conditions (eg, low-grade fever, vomiting for 1 day, earache, and cough) and their usual source of health care for these complaints.

After completion of the preintervention questionnaire, parents underwent an educational intervention during which they were instructed on how to use the children's health aid book *What to Do When Your Child Gets Sick*, by Gloria Mayer, RN, and Ann Kuklierus, RN.[12] The book is written at a third- through fifth-grade reading level and is available in English, Spanish, Chinese, Vietnamese, and Korean versions. The book offers information on more than 50 common childhood medical problems in an easy-to-read and easy-to-understand format. The UCLA Health Care Institute results found that 96% of parents rated the book as "very easy to understand."[3] Parents were instructed and quizzed on how to use this health reference book as an aid for managing their child's health care needs (eg, how to locate book sections covering cough, vomiting, headache, or any other health-related complaints). The educational intervention lasted approximately 5 to 10 minutes and was conducted by study investigators in English or Spanish, depending on the parent's language preference. After the intervention, study participants were given a complimentary copy of the book to

TABLE 1. Demographics of the Study Participants

Demographic	Preintervention (n = 113)	Postintervention (n = 61)
Median age of child, interquartile range, mo	48, 12–108	48, 24–108
Parent interviewed		
Mother	101/113, 89%	54/61, 89%
Father	8/113, 7%	4/61, 7%
Other	4/113, 4%	3/61, 4%
Parent interviewed is a primary health care decision maker	106/113, 95%	58/61, 95%
Has insurance	93/113, 82%	52/61, 82%
Insurance type		
Private	5/93, 5%	3/52, 6%
HMO	6/93, 6%	4/52, 8%
Medicare	6/93, 6%	4/52, 8%
Medicaid	76/93, 83%	41/52, 79%
Ethnicity		
Hispanic	84/111, 76%	49/61, 80%
African American	15/111, 13%	8/61, 13%
Non-Hispanic white	4/111, 4%	2/61, 3%
Asian/Pacific Islander	6/111, 5%	2/61, 3%
Other	2/111, 2%	0
Primary language		
Spanish	54/111, 49%	40/61, 66%
English	38/111, 34%	20/61, 33%
Spanish and English	16/111, 14%	0
Other	3/111, 3%	1/111, 1%
Has a regular primary care physician or clinic	91/111, 82%	47/61, 77%
Has an underlying medical problem	24/111, 22%	15/60, 25%

take home with them to use the next time any of their children became sick.

After a 6-month period, study participants were contacted by telephone and asked to complete a second 10-minute questionnaire. Postintervention interviewers were blinded to the preintervention responses of the participants. The postintervention questionnaire contained questions that were virtually identical to the preintervention questionnaire regarding health care resource usage and parent confidence. Preintervention and postintervention questionnaire results were compared to assess the effect of the book provision and health literacy training.

RESULTS

One hundred thirteen parents were enrolled in the preintervention phase. Most study participants were Latina (76%) and mothers (89%) who spoke primarily Spanish (49%) at home with their children. In addition, 89% of the study participants reported having public health insurance coverage (Medicaid or Medicare). Eighty-two percent reported having a regular primary medical physician or clinic. The median age of the children was 48 months, and 78% were healthy with no chronic medical problems. Table 1 provides a summary of the demographic data.

Parent responses to preintervention questionnaires indicated that 89% always felt capable of taking care of their children when they became sick. However, most of the same parents also stated that their first course of action would be to call the physician's office (46%) or take their child to the ED (34%) when their child gets sick (Table 2). Only 15% of parents had a children's health aid book at home, and more than half (58%) stated that they get information about their child's health primarily from the physician's office or clinic.

Of the 113 parents interviewed, 110 gave data on recent health care visits. In the 6 months before the preintervention questionnaire, 73% of the respondents had visited the ED at least once and 36% had visited the ED 2 or more times (Table 3). In the same 6-month time frame, 83% of the respondents had visited a physician's office or clinic for their child and half (50%) had been to a physician's office or clinic 2 or more times.

TABLE 2. Preintervention and Postintervention Parent Sources of Health Information and Care

	Preintervention (n = 113), %	Postintervention (n = 61), %
Where do you get information about your child's health?		
I look in a health book or magazine	3	25
I find it on TV	0	2
I ask my family or friends	22	33
I get information from the physician or clinic	58	33
I just know how to take care of my child	11	7
Combinations of the above	6	0
When your child is sick, where do you first go to get help?		
I do not get help	5	0
I look in a health book	1	16
I call family or friends	12	18
I call my child's regular physician or health phone line	46	44
I call 911	0	0
I take my child to the ED	34	21
Combinations of the above	2	0

TABLE 3. Health Care Resource Usage in the Previous 6 Months

Usage	Preintervention (n = 110), %	Postintervention (n = 61), %	*P*
Made at least 1 call to a health care provider for advice	53	No data	
Called 911	7	No data	
Visited the ED	73	43	<0.0001
Visited the ED more than 1 time	36	26	0.19
Child missed 1 or more days of school for illness	34	44	0.25
You missed 1 or more days of work for your child's illness	35	20	0.05

Parents were presented with hypothetical low-acuity medical scenarios and asked what they would do in these situations (Table 4). Depending on the specific scenario, 44% to 82% would take their child to a physician's office or clinic, and 3% to 16% would take their child to the ED.

Sixty-one parents (54% of the original sample) were successfully contacted by telephone at 6 months after enrollment and completed questionnaires for the postintervention study phase. Of the original 113 participants, 52 were lost to follow-up either because of disconnected or wrong telephone numbers or failure to contact participants after 4 rounds of calling to each of the phone numbers provided. There were no significant demographic differences between the preintervention and postintervention groups (Table 1).

After the intervention, 16% of the respondents stated that their first course of action when their child becomes sick would be to consult a health book (up from 1%), whereas 44% would go to the physician's office or clinic and 21% (decreased from 34%) would go to the ED (Table 2). In addition, 25% (increased from 3% preintervention) of the respondents stated that they get information about their child's health from books and magazines; and 33%, from a physician or clinic (decreased from 58%).

In the 6 months after the health care literacy intervention, the number of participants who had been to the ED at least once dropped to 43%, with only 26% visiting 2 or more times (Table 3). In the same time frame, 85% reported having visited a physician's office or clinic, whereas 69% said they had been to a physician's clinic 2 or more times.

When asked again about the low-acuity child health scenarios, there was a reduction in the proportion who would visit a physician's office or clinic for each complaint and also a significant reduction in the proportion that would go to the ED for a low-grade fever and for vomiting for 1 day (Table 4).

Ninety-three percent (57/61) had used the health care book provided at least once, and of 19 respondents queried, 89% found the book very easy to use, 95% found it very useful, and 94% were more confident in caring for their children.

DISCUSSION

These results are encouraging regarding the potential impact that improved health literacy can have on reducing ED

TABLE 4. Parent Hypothetical Responses to Low-Acuity Child Medical Problems

Scenario	Do Nothing and Wait, %	Look in a Health Book, %	Talk to Family or Friends, %	Visit a Physician's Office or Clinic, %	Go to the ED, %	Do Not Know, %	Difference, Preintervention and Postintervention, *P*
Temperature of 99.5°F (pre)	26	5	6	44	16	3	
Temperature of 99.5°F (post)	31	27	5	31	7	0	0.0002
Vomiting for 1 day (pre)	14	1	7	65	12	1	
Vomiting for 1 day (post)	10	20	10	55	5	0	0.0025
Earache (pre)	4	2	3	82	7	1	
Earache (post)	7	25	3	61	5	0	0.0469
Cough (pre)	20	7	7	61	3	1	
Cough (post)	34	31	3	29	2	0	0.0171

Pre indicates preintervention responses; post, postintervention responses.

overcrowding and health care costs. Our data confirm previous findings that after receiving and being instructed on how to use a health aid book, study participants report that they are less likely to go to the ED or physician's office as a first response whenever their child becomes sick.[3,10] This had previously been shown in a study of Head Start families[3] and in another study of members of a health maintenance organization (HMO) that primarily serves low-income Medicaid-insured patients.[10] Our study confirmed these findings in an unselected PED population rather than in a self-selected Head Start family population or an HMO population with better organized access to care.

When looking at the number of actual ED visits reported by study participants, there was a 30% reduction after the education intervention. A 30% reduction nationwide in the number of nonurgent pediatric ED visits would translate to a potential cost saving of $300 million in ED health care expenditures based on an estimated cost of $314 per ED visit.[4] The proportional reductions in the actual visits reported must be interpreted with the caveat that the season for reporting visits differed between the preintervention and the postintervention questionnaires. However, the preintervention reporting period included the summer months, during which children typically sustain fewer acute illnesses, compared with the winter months included in the postintervention time frame.

One of the most difficult results to measure and quantify is the positive psychologic impact that interventions to improve health literacy have on parents. Anecdotally, we found that during the postintervention telephone interviews, parents regularly commented on how much they enjoyed reading the book and that they had loaned the book to friends and family. Some parents even commented that they had spent their free time reading the book in its entirety (one person said she read it twice) to learn more and to increase their confidence in caring for their children. Past surveys of this and other Institute for Healthcare Advancement[13] books validate the satisfaction reported by the study participants, with 1 survey noting that 5.1% of book users reported that the book had "saved them a trip to the physician's office."

Several studies have explored predictors for overuse of the ED.[14–16] Those who use the ED for nonurgent complaints tend to have younger children and lower caregiver education and income, are less likely to have a regular primary care provider, have more difficulty accessing their primary care provider if they do have one,[14] are more likely to be Medicaid-insured,[15,16] and are more likely to have been taken to the ED themselves as children.[15]

One of the studies found that 23% of participants stated that they would take their child to the ED if the child had a cold and that use of the ED was associated with Medicaid insurance, history of child wheezing, and misconceptions about colds (eg, belief that antibiotics are required for the treatment of colds).[16] The association between misconceptions and ED overuse is important because it is a clear demonstration of how low health literacy directly leads to ED overuse.

People with lower health literacy are less likely to get health care information from written sources on their own.[8] It may be particularly valuable for targeted high-risk populations such as Medicaid-insured children with no or poor primary care provider access to receive an intervention such as ours, along with instruction and encouragement to use it. Pediatric EDs may represent an excellent opportunity to identify high-risk parents most likely to benefit from the intervention. Currently, the book is being distributed by Molina Healthcare HMO, among other organizations, and by the states of California and South Dakota as part of new parent kits.[17]

Limitations of this study include the use of a nonrandomized uncontrolled sample, potential recall bias by parents as to the actual number of clinic and ED visits, and a low follow-up rate. Study investigators did not wish to withhold the free health care book from any study patients, leading to the decision to not include a control group. The major outcomes were drawn from data based on unconfirmed parent self-reports and may have been subject to recall and reporting bias. While the follow-up rate was low, we did not find demographic differences between those who were contacted successfully for follow-up and those who were not. In addition, this study was performed within an urban public health care system that serves a predominantly low income, publicly insured, minority population, and the positive study results we demonstrated may be limited to EDs serving similar patient populations. Hence, although the preliminary results from our study are promising, further research is needed to determine whether similar health literacy interventions significantly reduce nonurgent ED visits, decrease ED overcrowding, and lead to significant savings for the health care system.

CONCLUSIONS

A simple health literacy intervention program may help reduce ED overcrowding and health care expenditures. Potential benefits include reduction in the number and associated costs of visits to the physician's office and ED, improved parent

self-confidence about taking care of their children's medical issues at home, and redirection of important health care resources toward more patients with critical illnesses.

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