Effects of Improved Access to Safety Counseling, Products, and Home Visits on Parents’ Safety Practices

Results of a Randomized Trial

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Objective: To present the results of an intervention trial to enhance parents’ home-safety practices through pediatric safety counseling, home visits, and an on-site children’s safety center where parents receive personalized education and can purchase reduced-cost products.

Design: Pediatricians were randomized to a standard- or an enhanced-intervention group. Parents of their patients were enrolled when the patient was 6 months or younger and observed until 12 to 18 months of age.

Setting: A hospital-based pediatric resident continuity clinic that serves families living in low-income, inner-city neighborhoods.

Participants: First- and second-year pediatric residents and their patient-parent dyads.

Interventions: Parents in the standard-intervention group received safety counseling and referral to the children’s safety center from their pediatrician. Parents in the enhanced-intervention group received the standard services plus a home-safety visit by a community health worker.

Outcomes: Home observers assessed the following safety practices: reduction of hot-water temperature, poison storage, and presence of smoke alarms, safety gates for stairs, and ipecac syrup.

Results: The prevalence of safety practices ranged from 11% of parents who stored poisons safely to 82% who had a working smoke alarm. No significant differences in safety practices were found between study groups. However, families who visited the children’s safety center compared with those who did not had a significantly greater number of safety practices (34% vs 17% had ≥3).

Conclusions: Home visiting was not effective in improving parents’ safety practices. Counseling coupled with convenient access to reduced-cost products appears to be an effective strategy for promoting children’s home safety.


HOME INJURIES are a substantial health problem for young children. An estimated 1 in 4 children experiences a medically attended injury every year. Children at increased risk for injuries include those who are younger than 4 years, members of a minority ethnic group, and those living in poverty. An estimated one half of all unintentional, nonfatal injuries occur in the home environment.

Home safety can be enhanced by a number of modifications that are supported by scientific research and professional practice guidelines. Mallonee et al demonstrated that distributing smoke alarms in high-risk neighborhoods significantly reduced the fire-related deaths and injuries. Erdmann and colleagues found that lowering the temperature on hot-water heaters was associated with a reduction in hospital admission rates for children due to tap-water scald burns. For other safety practices, policy-making organizations such as the American Academy of Pediatrics and other experts have made specific recommendations about what safety practices should be included in anticipatory guidance. The Injury Prevention Program of the American Academy of Pediatrics recommends that anticipatory guidance promote the safe storage of poisonous substances and the use of smoke alarms, ipecac syrup, safety gates for stairs, and safe tap-water temperatures.
SUBJECTS AND METHODS

STUDY DESIGN

This study was undertaken in a pediatric resident continuity clinic in a large, urban teaching hospital. A randomized design was used in which pediatric residents were randomly assigned to a standard- or an enhanced-intervention group (Figure). Parents (or guardians) of infants no older than 6 months who agreed to be in the study were assigned to the same study group as their pediatrician. Outcomes were assessed by means of a home observation when the patient was 12 to 18 months of age. Written informed consent was obtained from the pediatricians and the parents or guardians in accordance with the hospital's institutional review board, which approved the study. Families in the standard-intervention group received safety counseling and a referral to the CSC from their pediatrician. Families in the enhanced-intervention group received the same services as the standard-intervention group and the offer of a home-safety visit by a community health worker.

INTERVENTION CONTENT AND DELIVERY

Safety Counseling

Both groups of pediatric residents were invited to attend a 1-hour seminar on the problem of injuries that was offered annually by the director of general pediatrics, at which the American Academy of Pediatrics Injury Prevention Program materials were distributed. Both groups then received the 5-hour EAG training program. The EAG training was provided by pediatric and health education faculty for 2 sessions and included didactic material on childhood injuries and the role of pediatric counseling; hands-on training at safety-skills stations where products were demonstrated; and role-playing to learn the SAFE Communication Framework (Solicit Information, Advise, Focus on Risks and Barriers, Encourage Compliance) developed for this project.18 Residents who could not attend both sessions received the material they missed via videotaped sessions and hands-on experience at the CSC. Residents were then expected to provide the appropriate safety counseling to their patients' families at all well-infant and -child visits, which were monitored by means of audiotaping.

Children's Safety Center

The CSC was built in renovated space near the pediatric clinic. The goals of the CSC are (1) to increase the accessibility and affordability of home-safety supplies for low-income families; (2) to provide personalized education that reinforces and supplements pediatric advice; and (3) to elevate the priority given to injury prevention in medical care settings. The CSC is staffed by a professional health educator with special training in injury prevention. Safety products (eg, ipecac syrup, cabinet latches, safety gates, smoke alarms, batteries, and hot-water thermometers) are sold at 10% to 15% below retail cost in a homelike environment where their use can be demonstrated. Educational pamphlets produced specifically for low-literacy groups are also distributed. Pediatricians in both study-intervention groups received prescription forms to make referrals to the CSC for all patients, although the CSC is open to anyone, with or without a referral.

Home-Safety Visit

Community health workers received specific training from the investigators to conduct home visits with families in the enhanced-intervention group. The community health workers assessed injury hazards for falls, burns, and poisonings with the parent; made recommendations about the appropriate safety products and practices; and referred families to the CSC. The home-safety visit occurred between the patient's 6- and 9-month well-infant visits.

Sample Eligibility and Random Assignment. All first- and second-year pediatric residents (n = 43) were eligible to participate and received a letter of invitation from the study investigators; 39 (91%) agreed and provided signed consent. The project director (E.M.M.) used a table of random numbers to assign participating residents to the standard-(n = 20) or the enhanced-intervention group (n = 19). Parent-patient dyads of participating residents were then approached in the clinic waiting room by the study interviewer, who was in the clinic on a daily basis. The study interviewer obtained signed consent and enrolled participants into the same study group as their physician.

Based on sample size calculations for moderate-effect sizes, using = .05 and = .20, we sought to enroll 100 families in each study group. Eligibility criteria included infants 6 months or younger, free of serious medical problems, whose caretakers were English speaking and lived with the child. Of 305 families approached, 40 were ineligible (13 were non-English speakers, 12 were not the child's parent or guardian or did not live with the child, 8 had a sibling already enrolled, 3 had infants of the wrong age or were assigned to a nonparticipating physician, and 4 infants had medical problems). Of the remaining 265 eligible families, 78 (29%) refused and 187 (71%) were enrolled (93 in...

Many families are not adopting these recommended practices. LeBailey and colleagues10 found more hazards in inner-city homes compared with suburban homes. In a study of low-income, urban mothers of children younger than 3 years, many reported not using safety gates for stairs (59%) or smoke alarms (27%).11 A national survey found that having smoke alarms, the local Poison Control telephone number, and ipecac syrup and checking hot-water temperatures varied by ethnicity, education, and income.5 Families with fewer economic resources tend to be least likely to adopt these safety practices.3,11 Given the importance of increasing safety practices, the question of how best to accomplish this task needs to be answered, especially for low-income families. A systematic review of home-visit interventions by Roberts et al12 found support for their effectiveness overall, but not for those conducted in the first year of life. Health care workers who provided home-visiting services in Glasgow, Scotland, reported that it was difficult and probably ineffective to deliver safety education to families in their homes.31 In the United States, Schwarz et al32 demonstrated that an in-home intervention delivered by community outreach workers was effective in im-
the standard- and 94 in the enhanced-intervention group). Participating families were similar to those who refused in level of education, age, relationship to the infant, the infant’s age, and the infant’s previous injuries. A smaller proportion of those who refused were African American (64/78 [82%] vs 176/187 [94%]; P = .003).

Data Collection Protocol. A baseline interview was administered at the time of study enrollment to obtain sociodemographic characteristics and reported safety practices. Audiocassettes of scheduled clinic visits were obtained throughout the study to measure exposure to the pediatric counseling. Intake surveys completed by parents at each visit asked whether the parent had been to the CSC since their previous visit. A follow-up interview was completed at the child’s 12-month visit (or the 15- or 18-month visit if the 12-month visit was missed), and the home observation to assess safety practices was scheduled for a convenient time within 2 weeks. Families received $10 for each completed interview and for the home observation.

MEASURES

Safety Counseling

Two research assistants listened to the audiocassettes and coded every mention of any of the 5 safety practices under study and whether the physician made a specific referral to the CSC. We then tallied the number of mentions across all visits for each parent and for each safety practice. Binary variables were used to indicate receipt of any counseling for each safety practice and any referral to the CSC.

CSC Use

At each clinic visit and at the home observation, parents were asked whether they had visited the CSC since last contact, and if so, what they received or purchased. The number of visits ranged from 0 to 3, with only 10 families having made more than 1 visit during the study period; therefore, a binary variable was created to indicate any use (vs no use) of the CSC.

Safety Practices

Safety practices at baseline were analyzed as dichotomous (yes or no) variables based on parents’ responses to interview questions about (1) having a working smoke detector, (2) maintaining hot-water temperatures of less than 48.9°C, (3) planning to use a safety gate for stairs, (4) keeping poisons locked or latched, and (5) having ipecac syrup. Safety practices at the home observation were observed by research assistants specifically trained for this study who tested smoke alarms and tap-water temperatures and conducted detailed observations of the other safety practices and products. For analysis, each safety practice was treated as a dichotomous variable (safe or unsafe). The criteria for safe practices included any working smoke alarm, hot-water temperature of no greater than 48.9°C, all stairs protected by a safety gate or door, any poisons kept locked or latched, and at least 1 unexpired bottle of ipecac syrup. A total safety score variable was also constructed, counting the number of safe practices in each home.

SOCIODEMOGRAPHIC VARIABLES

The baseline interview included items assessing the respondent’s age, ethnicity, education, and employment; the number of children and adults living in the household; and whether the respondent’s child had ever experienced an injury that required medical attention.

ANALYSIS

Bivariate analyses, including t tests and χ² statistics, were used to compare the sociodemographic characteristics and baseline safety practices between the standard- and enhanced-intervention groups at the time of enrollment and home observation to identify potential sources of bias and adjustment variables. The proportions in each study group who received any safety counseling and a referral to the CSC from their pediatrician were also compared to examine the degree to which receipt of the intervention services was comparable between both intervention groups. We first used χ² analysis to evaluate the impact of the interventions on parents’ home-safety practices by comparing the proportion of families practicing each safety behavior and the total safety score between the standard- and enhanced-intervention study groups. We then examined the effect of the CSC by comparing safety practices between those families who visited the CSC and those who did not, using logistic regression analysis of individual safety practices and proportional odds analysis of total safety score. To examine and control for the effects of the other intervention components (ie, safety counseling and home visits), these variables were included in the logistic regression and proportional odds models. We also examined the models for potential confounding by the sociodemographic variables and for interaction between the intervention components; no significant confounders or interactions were found. Therefore, these variables were not included in the final models.

proving safety knowledge and reducing some hazards in an urban, African American community. A recent Canadian study found that a home-visit intervention (including education and discount coupons for products) was effective in reducing the number of reported child injuries and their associated costs, although few home-safety modifications were observed. When low-cost safety equipment was provided for families who received state benefits in a study based in Nottingham, England, no differences in injury outcomes were observed between families who received and did not receive the safety supplies. However, significant improvements in safety practices were found when access to low-cost safety products was coupled with advice from general practitioners.

In the first phase of the present study, we demonstrated that pediatricians who were trained in an Enhanced Anticipatory Guidance (EAG) program provided more safety counseling than did pediatricians in a control group. Parents whose children were treated by EAG-trained physicians were more satisfied with the safety information they received than were parents whose children were treated by control-group physicians, but their safety practices were no different. We concluded that fami-
lies needed additional interventions to enable them to follow their pediatricians’ advice. Our objective in the second phase of the study, presented herein, was to supplement the pediatric counseling with improved access to safety supplies through product distribution and home visits. In addition to the EAG safety counseling routinely provided in the clinic, an on-site children’s safety center (CSC) was established where parents could purchase safety supplies at reduced cost. A randomized, controlled trial was undertaken to compare home safety between families who were referred to the CSC only and those who were also offered a home visit. The safety topics and practices covered in this trial were fall prevention (use of safety gates), poison prevention (use of ipecac syrup and safe storage of poisons), and fire and burn prevention (use of smoke alarms and safe hot-water temperatures). These topics were selected because they represent leading injury hazards to low-income, urban children, and because the recommended safety practices are feasible. The conceptual framework for the interventions and their implementation are described in detail elsewhere. We tested the following hypotheses: (1) Families offered the CSC and a home visit will have safer homes than families offered only the CSC; and (2) families who visit the CSC will have safer homes than families who do not, adjusting for any differences that distinguish CSC visitors from nonvisitors.

RESULTS

SAMPLE

A total of 122 families completed the trial (ie, completed the home observation). Reasons for noncompletion are provided in the Figure. Among the total sample, 11 families became ineligible (eg, moved or changed guardianship), 15 families refused further contact, and 39 could not be contacted in time (ie, before the study ended or the child was too old), most often because of problems with telephone numbers or scheduling. Families who did not complete the study were compared with completers on sociodemographic characteristics and safety practices reported at baseline (Table 1). The 2 groups differed only in terms of marital status (Table 1). When these same analyses were conducted for the enhanced- and standard-intervention groups separately, only the following 2 statistically significant differences (P < .05) were found: in the enhanced-intervention group, noncompleters were more likely to be married (11 parents [34%] vs 9 [15%]; P = .03), and in the standard-intervention group, noncompleters were more likely to be employed (13 parents [41%] vs 10 [17%]; P = .01).

Participants were almost always the infant’s mother (98%) and most were African American (94%). Mothers’ mean age was 24 years and infants’ mean age was 3 months at the time of study enrollment. A small proportion of participants were married (13%), had more than a high school education (12%), and were employed (23%) (Table 1). The sample was generally low income, with 39% reporting household incomes of less than $5000 per year. Self-reported safety practices at baseline ranged from a low of 12% who said they had ipecac syrup to a high of 92% who reported having a working smoke alarm. None of the sociodemographic characteristics or baseline safety practices differed between the enhanced- and standard-intervention groups (data not shown). Both study groups made an average of 3.7 scheduled medical visits during the course of the study. A total of 451 medical visits were captured on the study intake forms and 205 (45%) of these visits were also audi-taped.

Rates of pediatrician counseling differed between the study-intervention groups only for receiving counseling about poison storage, ie, 46 families (76%) in the standard-intervention group vs 35 those in the enhanced-intervention group (57%) (P = .04). Rates of counseling about the other safety topics were 62% for smoke alarms,
COMPARISON OF OUTCOMES BETWEEN STUDY INTERVENTION GROUPS

There were no significant differences between the standard- and enhanced-intervention groups in the rates at which any of the safety practices were observed at home observation (Table 2). For the entire sample, the rates of safety practices were as follows: 47% had safe hot-water temperatures; 82% had a working smoke alarm; 25% had all of their stairs protected by a safety gate or door; 11% stored poisonous substances safely; and 29% had an unexpired bottle of ipecac syrup.

COMPARISON OF FAMILIES WHO VisITED AND DID NOT VISIT THE CSC

Families who visited the CSC (n = 75) were compared with those who did not (n = 47) on sociodemographic characteristics and exposure to safety counseling and the home visit (Table 3). Families who visited the CSC were significantly more likely to have fewer than 5 people living in the home, higher household incomes, more education, and more well-infant and -child visits to the pediatrician than did families who did not visit the CSC. There were no differences between these 2 groups on their receipt of pediatrician safety counseling, referral to the CSC, or whether they were in the standard- or enhanced-intervention study group. The rates of pediatrician counseling varied from a low of 34% (n = 23) who received counseling about hot water to a high of 70% (n = 47) who received counseling about poison storage; 77% (n = 26) of CSC users and 79% (n = 53) of nonusers received a specific referral to the CSC.

COMPARISON OF OUTCOMES BETWEEN FAMILIES WHO VISITED AND DID NOT VISIT THE CSC

Families who visited the CSC had higher rates for all safety practices except for smoke alarms; more than 80% of both groups had at least 1 working smoke alarm (Table 4). In the regression analysis, we adjusted these comparisons for exposure to safety counseling and a home visit, although neither of these variables was statistically significant in any of the models. The adjusted odds ratios for having at least 1 safety gate for stairs and storing poisons safely were greater than 2 for CSC visitors compared with families who did not visit the CSC. The adjusted odds ratio for having ipecac syrup was 11.63 (P = .002) for CSC visitors compared with those who did not visit the CSC.

When we summed the total number of safety practices observed, the distributions were significantly different between the CSC visitors and nonvisitors. Three or more safety practices were observed for 34% of the CSC visitors compared with 17% of the nonvisitors, and 2 safety practices were observed by 42% of CSC visitors compared with 29% of nonvisitors (Table 5).

The proportional odds regression analysis of total safety score indicated that CSC visitors had a 3.39 times higher odds for having ipecac syrup was 11.63 (P = .002) for CSC visitors compared with those who did not visit the CSC.

Table 2. Observed Safety Practices at Follow-up by Study Group*

<table>
<thead>
<tr>
<th>Observed Safety Practices†</th>
<th>Standard-Intervention Group</th>
<th>Enhanced-Intervention Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot-water temperature ≤48.9°C (N = 115)</td>
<td>27 (47)</td>
<td>27 (47)</td>
</tr>
<tr>
<td>Working smoke alarm (N = 114)</td>
<td>47 (84)</td>
<td>47 (81)</td>
</tr>
<tr>
<td>Stairs protected by gate or door (N = 96)</td>
<td>11 (23)</td>
<td>13 (27)</td>
</tr>
<tr>
<td>Poisons kept locked (N = 121)</td>
<td>7 (12)</td>
<td>6 (10)</td>
</tr>
<tr>
<td>Ipecac syrup (N = 121)</td>
<td>16 (27)</td>
<td>19 (31)</td>
</tr>
<tr>
<td>Total safety score (N = 89)</td>
<td>0</td>
<td>2 (5)</td>
</tr>
<tr>
<td>1</td>
<td>22 (51)</td>
<td>22 (48)</td>
</tr>
<tr>
<td>2</td>
<td>13 (30)</td>
<td>14 (30)</td>
</tr>
<tr>
<td>≥3</td>
<td>6 (14)</td>
<td>6 (13)</td>
</tr>
</tbody>
</table>

*Data are given as number (percentage). Groups are described in the “Intervention Content and Delivery” subsection of the “Subjects and Methods” section.
†Total number of parents varies because of missing observations and homes without stairs.

Table 3. Characteristics of Families by Use of Children’s Safety Center*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Visited the CSC (n = 75)</th>
<th>Did Not Visit the CSC (n = 47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age of mother, y</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Mean infant age, mo</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Only 1 child younger than 5 y</td>
<td>52 (69)</td>
<td>29 (62)</td>
</tr>
<tr>
<td>Previous child injury</td>
<td>4 (5)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Income &lt;$5000/y†</td>
<td>26 (35)</td>
<td>28 (60)</td>
</tr>
<tr>
<td>Married</td>
<td>11 (15)</td>
<td>5 (11)</td>
</tr>
<tr>
<td>More than high school education‡</td>
<td>15 (20)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Mean No. of well-infant and -child visits per person§</td>
<td>3.7</td>
<td>2.9</td>
</tr>
<tr>
<td>Enhanced-intervention (home-visit) study group§</td>
<td>40 (53)</td>
<td>22 (47)</td>
</tr>
</tbody>
</table>

*SC indicates the children’s safety center. Unless otherwise indicated, data are given as number (percentage) of families.
†P<.05.
‡P<.01.
§Interventions are described in the “Intervention Content and Delivery” subsection of the “Subjects and Methods” section.
| Includes 67 families who visited the CSC and 34 who did not. |
higher likelihood of having more safety practices observed compared with those who did not visit the CSC (P = .01) (Table 5). Although the model included variables indicating whether the families had received safety counseling or a home visit, neither of these differences was statistically significant.

This intervention trial was designed to evaluate the impact of a combination of injury prevention services delivered through a pediatric resident clinic. Our results suggest that coupling pediatric counseling with convenient access to low-cost safety supplies and personalized information is necessary to meet the needs of low-income urban families. Families who visited our on-site safety resource center had more safety practices observed in their homes than families who did not, even after we controlled for their having received pediatric safety counseling. We found no support for our hypothesis that home visits would be a necessary additional intervention. This finding is consistent with the assessment of the health care workers in the study by Ehiri and Watt13 in Scotland, who reported that as a safety intervention, home visits were difficult and ineffective. We did not find the home-visit protocol difficult to implement, and we were successful in gaining access to 76% of the homes, but it was a very resource-intensive intervention. The existing literature is inconclusive on the benefits of home visits for behavior change14,15 and injury reduction.6,12,13 Combined with our results, these studies suggest that the effectiveness of home visits may be situation specific, ie, working well for certain audiences and injury topics, but not for others. One caveat to our conclusions is that we were unable to install the safety products because of concerns about liability, which may have been responsible for our finding of no effect. Since the time that this study was in the field, we have learned of other home-safety programs that address this issue by obtaining liability waivers. Other research studies have demonstrated success in installing safety products and making home-safety modifications.6,13 More than 1 home visit might have had a greater impact, but this was not feasible in the present study because of resource constraints.

By contrast, the data supported our hypothesis that families who used the services of the CSC would have safer homes than those who did not use the CSC. The difference in the total number of safety practices—34% vs 17% had 3 or more—was statistically significant. Also, the odds ratios for all but one of the individual safety practices (smoke alarms) were in the expected direction and were statistically significant for ipecac syrup. Our final sample size was smaller than anticipated in our original sample-size calculations, which limited our power to detect statistical significance. For example, the rate of storing poisons safely was more than doubled among the CSC visitors compared with the nonvisitors (13% vs 6%), as were the rates for stair gates (27% vs 13%) and protected stairs (32% vs 15%). The frequency of visits to the CSC during the study period was too small to allow an analysis of any dose response. Since the end of the study, CSC use has continued to increase and families visit multiple times. A qualitative telephone survey with CSC visitors has also documented instances in which products obtained at the CSC have prevented potentially life-threatening injuries (A.C.G. E.M.M., M.E.H.W., J.R.S., and L.B. Triffiletto, MA, unpublished data, August 2001). We have also received numerous requests from service providers in clinical and community settings for information on the costs and procedures for establishing such a center, and a replication guide is in preparation. Future research should be directed to establishing the cost-effectiveness of these types of centers.

One of the goals of this project was to develop interventions that could be implemented in real-world settings. Applied research to evaluate service-oriented interventions in a busy urban clinic has inherent challenges that should be considered when interpreting the findings. For example, our measure of CSC use relied primarily on self-report. Although a checklist was available for CSC staff to assess and record whether the visitor was a study participant, there were many occasions

**Table 4. Observed Safety Practices at Follow-up by Use of Children’s Safety Center**

<table>
<thead>
<tr>
<th>Safety Practice</th>
<th>No. (%) Observed With Safety Practice</th>
<th>Adjusted Odds Ratio (95% CI)†‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot-water temperature ≤48.9°C (N = 115)</td>
<td>33 (48) 19 (40)</td>
<td>1.36 (0.57-3.27)</td>
</tr>
<tr>
<td>Working smoke alarm (N = 114)</td>
<td>57 (81) 37 (84)</td>
<td>0.98 (0.33-2.96)</td>
</tr>
<tr>
<td>All stairs protected by gate or door (N = 96)</td>
<td>18 (32) 6 (15)</td>
<td>1.82 (0.56-5.86)</td>
</tr>
<tr>
<td>At least 1 safety gate (N = 96)</td>
<td>21 (27) 5 (13)</td>
<td>2.64 (0.77-9.14)</td>
</tr>
<tr>
<td>Poisons kept latched or locked (N = 121)</td>
<td>10 (13) 3 (6)</td>
<td>2.59 (0.52-12.80)</td>
</tr>
<tr>
<td>Ipecac syrup (N = 121)</td>
<td>32 (43) 3 (6)</td>
<td>11.63 (2.55-53.05)</td>
</tr>
</tbody>
</table>

*CSC indicates children’s safety center; CI, confidence interval.
†Total number of parents varies because of missing observations and homes without stairs.
‡Adjusted for exposure to safety counseling and home visit.

**Table 5. Total Number of Observed Safety Practices at Follow-up by Use of Children’s Safety Center**

<table>
<thead>
<tr>
<th>Safety Practice</th>
<th>No. (%) Observed With Safety Practices</th>
<th>Adjusted Odds Ratio (95% CI)†‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of 5 safety practices:</td>
<td>0 0 4 (11)</td>
<td></td>
</tr>
<tr>
<td>hot water, smoke alarm,</td>
<td>1 12 (24) 15 (43)</td>
<td></td>
</tr>
<tr>
<td>all stairs protected,</td>
<td>2 21 (42) 10 (29)</td>
<td></td>
</tr>
<tr>
<td>poison storage, ipecac</td>
<td>3 17 (34) 6 (17)</td>
<td></td>
</tr>
</tbody>
</table>

*CSC indicates children’s safety center. Proportional odds ratio adjusted for exposure to safety counseling and home visit was 3.39 (95% confidence interval, 1.30-8.82).
†Safety score is described in the “Measures” subsection of the “Subjects and Methods” section.
when it could not be completed (eg, multiple visitors at the same time, fussy infants, and other parent distractions). We are reassured, however, because 55 of the 75 participants who reported visiting the CSC had corroborating evidence of a visit (ie, a completed checklist and/or a specific purchase reported). We were limited in the resources available to support the interventions and the evaluation, so we restricted the evaluation to English-speaking families in the clinic, which limits our ability to generalize our results to other audiences (eg, non-English-speaking, suburban, and rural). Tracking participants over time was also challenging because of frequent moves and telephone changes among our families. Although this reduced the size of our analytic sample, there were no dramatic differences between completers and noncompleters, which strengthens our conclusions.

Another limitation is that we do not know the impact of the improved safety practices on injury reduction. We chose to treat each of our safety practices as if they are of equal value in the analysis of total number of safety practices observed. We are unaware of any evidence with which to assign a more precise weighting to each of these practices, so we must be content to believe that more is better and to know that the selected safety practices are widely recommended at present by pediatricians and injury professionals.

The pediatrician counseling was an important intervention component, with more than 50% of the families receiving injury-prevention counseling on all but one of the topics (ipecac syrup) and 78% receiving a referral to the CSC from their pediatrician. Audiotaping medical visits to document the counseling is a strength of the study, although it was not possible to tape every visit due to logistical constraints. Therefore, these proportions may actually underestimate the amount of counseling that took place. Our previous study that evaluated safety counseling before the CSC was built found that parents who received counseling were more satisfied but no more likely to have safer homes.18 In the present study, we found a significant positive effect on home safety when we added on-site access to low-cost safety products. These results are consistent with those of Clamp and Kendrick17 in their study in Nottingham. An urgent need to find ways to improve home safety for low-income families remains, as many of our observed rates were distressingly low. The present study suggests that home visiting is not the answer, although on-site access to safety resources and personalized education that reinforces pediatrician counseling appear promising.

We found that families who visited the CSC were somewhat more advantaged (eg, higher income, smaller families, better educated) compared with those who did not, even among this sample of generally low-income families. Although these variables were not significant in the multivariate analyses of safety practices, an unavoidable limitation of our analysis is self-selection. Other unmeasured differences between CSC visitors and nonvisitors might account for our finding significant positive associations with use of CSC services. Random assignment to the CSC, which would address the self-selection bias, was not possible in the present situation. Once the CSC was opened, we could not restrict access to its services. Future research could examine similar populations in facilities with and without a resource center, although potential biases that would be difficult to control remain in such a design.

Substantial strengths of this study also exist. For example, the home-visit intervention was randomly assigned. All interventions were well-implemented, with most participants being exposed to the counseling and receiving a referral to the CSC. Also, the outcome variables were assessed using home observation rather than self-report.

One appealing element of having a CSC in the medical care setting is that it communicates to families the importance of child safety as a health issue. The CSC can be thought of as the equivalent of a pharmacy for injury prevention. The physician's endorsement of this notion by making referrals positions the CSC and its staff as partners in the health care team, which helps boost the credibility of the CSC and its services. The CSC also addresses a major barrier to preventive counseling by physicians, ie, time. With the CSC as a resource, pediatricians' anticipatory guidance may be more efficiently delivered because they can refer parents to the CSC not just for reasonably priced safety supplies, but for more information as well. The CSC staff can spend time educating parents about injury risks and prevention strategies, explaining the variety of safety products, and teaching parents how to use products correctly. A remaining challenge is to ensure that all families, regardless of their personal resources, can take advantage of this potentially lifesaving service.

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