Introduction of a Recorded Health Information Line Into a Pediatric Practice

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Objective: To examine the utilization, satisfaction, and parental health-seeking behavior associated with the introduction of the Parent Advice Line (PAL), a collection of 278 recorded health-related messages accessible by telephone, into a private practice.

Design: Booklets listing PAL topics were mailed to eligible families, and utilization data were collected for all incoming PAL calls from June to August 1996. Satisfaction and effect on health-seeking behavior were assessed using a recorded questionnaire appended to each call (n = 561) and a randomized telephone questionnaire (n = 821).

Setting: A suburban, 7-pediatrician practice in Colorado.

Patients: Families with children younger than 12 years seen in the practice within 2 years (N = 8365).

Results: Of families who reported receiving the mailed PAL booklet, 32% used PAL. Sixty percent of PAL calls were placed during office hours, 21% from 5 PM to 9 PM, and 8% after midnight; call volume was higher on weekdays than on weekend days (25 calls per day vs 10 calls per day, respectively; P<.05 by χ² test). The 5 most commonly requested topic categories were toilet training, sexual development, discipline problems, sleep problems, and teenage behavior. Preventive care topics predominated in infants, behavioral topics in preschool children, and acute illness topics in school-aged children. Of users, 88% were satisfied or very satisfied and 98% said that they would use PAL again. Respondents to the 2 questionnaires reported that use of PAL made a call or visit to their child’s physician unnecessary 58% to 69% and 61% to 70% of the time, respectively.

Conclusions: The PAL was used primarily to access information about behavioral and developmental issues during office hours. Its use was associated with high rates of satisfaction and, by parental report, decreased calls or visits to a physician.

METHODS

THE PARENT ADVICE LINE

The PAL messages were written by Barton Schmitt, MD, and based on developmental, behavioral, and preventive health advice previously published in Your Child's Health and acute illness advice in Pediatric Telephone Protocols. Topics include commonly asked questions about behavior and development, minor childhood illnesses that do not generally require triage, topics that generate anxiety that might be alleviated with education (eg, fever phobia or masturbation), specific factual information (eg, dosages of over-the-counter medications), or anticipatory guidance topics (eg, safety or immunization schedule information). The length of each message is 1 to 2 minutes, with most being less than 1 1/2 minutes. The messages are simply worded and written to be understood at a fourth- to sixth-grade educational level. They begin with a brief informational message about the problem and then 3 to 4 tips or pieces of advice about dealing with the symptom or behavior at home. Two female voices were used in recording the messages, chosen for being easy to understand and having a competent and supportive tone.

PAL was not designed for diagnosis or triage of acute problems, as the introductory statement to callers reinforces:

Hello and welcome to the Parent Advice Line. The Parent Advice Line is not meant to be used to diagnose a health-related problem and is not meant to be a substitute for medical care. If this is an emergency or if your child is seriously ill, please hang up and dial 911 or your child's health care provider. The purpose of the Parent Advice Line is to increase your awareness and knowledge related to your child's health.

At the conclusion of each message, parents are also advised to consult their health care provider if they have additional questions or if they think their child may need to be seen. In the illness messages, specific indications for needing to seek care are included.

The cost to a hospital of purchasing the specific hardware and software used in this study ranges from $20 000 to $60 000 (Susan McGarity, RN, oral communication, 1998), depending on the size of the hospital. The system can be rented to a practice for $2000 per year. Other start-up costs include telephone lines (generally 2 to 4 per practice) and the cost of the PAL booklets (ranging from $0.35 to $1.50); the major ongoing costs being telephone bills.

DESIGN

At the end of April 1996, a booklet explaining the use of PAL, which included a directory of topics, was mailed to families meeting specified criteria in a suburban, 7-pediatrician private practice in Littleton, Colo. Office billing data were used to identify families who were considered eligible if they had children younger than 12 years who had been seen at the practice within 2 years of April 1996 (N = 8363). In addition to the mailing, posters were displayed in the waiting rooms, and nurses and receptionists were asked to remind patients about the service when they called for advice and at the time of visits. The service was provided to the practice and to the patients at no cost.

In the mailed directory, families were instructed regarding how to access PAL by entering the personal identification number provided in the directory, followed by a code corresponding to a topic listed in the directory. A caller may access up to 5 consecutive topics during each telephone call. Data regarding the name of the caller's pediatric practice, the topics accessed, and timing of calls received are automatically collected and stored in a centralized computerized database. A listing of the PAL subject areas is provided in Table 1.

DATA SOURCES AND STUDY OUTCOMES

CENTRALIZED COMPUTERIZED DATABASE

Computerized records, including the date, time of day, topics accessed per call, and the name of the practice to which the caller belongs, are automatically generated for each call to PAL. Computerized utilization data were reviewed for June 1, 1996, to August 1, 1996 (1 to 3 months after mailed booklets should have been received). During this 8-week period, there were 1100 separate calls to PAL. In examining the

Continued on next page
frequency of topics accessed, we looked at both individual topics and topics grouped by subject area. The 278 topics fall into 3 major topic groupings, “sick children,” “healthy children,” and “behavior,” and are further subdivided into 31 subject areas. Because the number of individual topics varies for each subject area, a subject area–weighted score was calculated by dividing the number of times a subject area was accessed by the number of topics in the subject area. This weighted score allowed subject areas to be compared despite differences in the number of topics in each subject area.

Postmessage Taped Questionnaire

On June 1, 1996 (1 month after booklets should have been received), a taped questionnaire was appended to the end of the first topic accessed for each call that included the following:

Your feedback about the Parent Advice Line is very important in helping us make this service as useful as possible to you. Please stay on the line to answer a few short questions about whether the Parent Advice Line has been helpful to you. Your answers will remain anonymous.

(a) Please enter the age, in years, of the child about whom you were calling for advice. Please use 0 for a child less than 1 year of age. (For example, for a 9 1/2-year-old, press 9.)
(b) Did the message answer the question about which you called? (Press 1 for yes and 2 for no.)
(c) Did the message provide information that will be helpful to you? (Press 1 for yes and 2 for no.)
(d) Did the information you received about the topic make a phone call to a nurse or a doctor unnecessary? (Press 1 for yes and 2 for no.)
(e) Did the information you received make a visit to your doctor unnecessary? (Press 1 for yes and 2 for no.)
(f) Will you call the Parent Advice Line again? (Press 1 for yes and 2 for no.)

Data from this postmessage questionnaire were collected for June 1, 1996, to August 1, 1996. The response rate was 51.0% (n = 561).

Randomized Telephone Questionnaire

To collect data about nonusers as well as users and because of potential respondent selection bias of the postmessage questionnaire, we also administered a subsequent telephone questionnaire to a subgroup of the families to whom a booklet had been mailed. All surveys were conducted approximately 6 months (range, 5-9 months) after the PAL directory was sent to the household, during October 1, 1996, to February 1, 1997. The questionnaire collected information regarding family demographics, health-seeking behaviors and attitudes, perception of own health, and presence of children with chronic illness in the family. It was adapted from portions of the Medical Outcomes Survey 36-Item Short-Form,13 the Behavioral Risk Factor Survey,16 and the Fresno Composite International Diagnostic Instrument.17 For the subset of respondents who reported using PAL, we also collected data regarding satisfaction with PAL and the effect of PAL on health-seeking behavior. The survey was administered by experienced interviewers who had undergone a 2-day training period that included videotape training of interviewing skills, role-playing with mock interviews, and didactic review of the paper instrument. Before the study, interviewers demonstrated 99% accuracy in reading questions, recording answers, and following interview instructions.

Based on an initial pilot study of the telephone questionnaire, we estimated a PAL user rate of 20% to 25%. Therefore, every 10th family was selected from an alphabetized listing of the families to whom booklets were sent to yield a sample of 836 families, from which we hoped to collect data on 150 to 200 users of the PAL system. Initial calls determined that 194 (23.2%) of this sample could not be interviewed for the following reasons: 148 (17.7%) had moved or had incorrect or disconnected telephone numbers, 33 (3.9%) denied being seen in the practice within 2 years, 11 (1.3%) had no children younger than 12 years, 1 family did not speak English, and 1 respondent was affiliated with The Children's Hospital, Denver, Colo. Of the remaining 642 families, interviews were completed for 449 (69.9%), with 117 families (18.2%) unreachable by telephone after 5 attempts, 69 families (10.7%) refusing interview, and 7 interviews (1.1%) not completed. The protocol and consent forms used in this study were reviewed and approved by the Colorado Multiple Institutional Review Board.

99.3% reported their children’s immunizations were up-to-date. Nineteen percent reported a child with a chronic illness or special medical needs.

UTILIZATION OF PAL

Despite the fact that the PAL directory was mailed to all eligible families in the practice, only 137 (30.5%) of the 449 families interviewed in the telephone survey of the practice remembered receiving the booklet. Of these, 44 (32.1%) reported using PAL at least once. The total volume of calls in the computer database during the 8-week period of study was 1100, with an average of 1.9 topics accessed per call. As Figure 1 demonstrates, utilization was highest during office hours, with 60% of calls placed between 8 AM and 5 PM, 21% of calls from 5 PM to 9 PM, 11% between 9 PM and midnight, and 8% after midnight. The volume of calls was higher on weekdays (mean of 25 calls per day) than on weekends (mean of 10 calls per day), and the weekday and weekend rates differed significantly ($P<.05$ by $x^2$ test). Forty-four percent of calls were made regarding children 2 years or younger, 27% of calls for children 3 to 5 years of age, 12% for children 6 to 8 years of age, 12% for children 9 to 11 years of age, and 6% for children older than 12 years. Table 2 shows the most commonly accessed subject areas during the study period. Developmental issues, primarily related to toilet training, sexuality, and discipline, dominate the list. Figure 2 shows the 3 major groupings of topics by age of the child, demonstrating a predominance of questions about preventive health care in children for infants younger than 1 year, behavioral and developmental topics in children 1 to 6 years of age, and acute illness topics in children 6 to 11 years of age.

USER SATISFACTION

User satisfaction as assessed by the telephone survey of the practice (n = 44 users) was high, with 86.3% reporting they were satisfied or very satisfied and less than 5%...
reporting they were dissatisfied or very dissatisfied. Responses to the audiotaped survey of users (n = 561) indicated that 86.5% of respondents believed that PAL had answered their questions and 97.9% would use the line again.

**Satisfaction Level Users, No. (%)**

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Users, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>17 (38.6)</td>
</tr>
<tr>
<td>Satisfied</td>
<td>21 (47.7)</td>
</tr>
<tr>
<td>Neither</td>
<td>3 (6.8)</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>2 (4.5)</td>
</tr>
<tr>
<td>Missing</td>
<td>1 (2.3)</td>
</tr>
</tbody>
</table>

**FACTORS CONTRIBUTING TO USE OR NONUSE OF PAL**

Users and nonusers of PAL identified by telephone survey of the practice did not differ significantly with respect to demographic variables, education, employment status, income, health behaviors, number of children, or presence of children with chronic illness. However, there were not a sufficient number of users interviewed to make meaningful statistical comparisons. The major factors facilitating use, examined in users (n = 44), are shown in Table 3: the top 5 were convenience of use (97.7%), ease of use (95.4%), 24-hour availability (93.1%), lack of any fee (84.0%), and not having to go into the office to have questions answered (79.5%). The major factors contributing to nonuse, asked of nonusers (n = 93), included wanting to talk directly to the health care provider (44.0%), losing the PAL instruction booklet (32.2%), having no need for help (22.5%), thinking the problem would get better by itself (21.5%), and did not think using PAL would help (21.2%).

**EFFECT ON HEALTH-SEEKING BEHAVIOR**

The effect on health-seeking behavior was assessed by the audiotaped survey of users (n = 561) and the randomized telephone questionnaire (n = 43). Respondents to the 2 surveys (audiotaped survey of users and telephone survey of the practice) reported that use of PAL had made a call to the child’s physician unnecessary 69.3% and 57.5% of the time, respectively. Similarly, respondents in the audiotaped survey and the telephone survey reported 70.0% and 61.0% of the time, respectively, that calling PAL had made a visit to their physician unnecessary.
Although previous studies have indicated that pediatricians spend up to 30% of their total practice time on the telephone, a high proportion of calls to a pediatric practice are routine questions that do not require triage and could potentially be answered without involving a health care provider. In the year 2000, it is anticipated that managed care and capitation will represent a large portion of the pediatrician’s practice, providing strong incentives to the practitioner for increasing the role of the telephone in triaging acute patient needs, managing chronic problems, and, potentially, educating families. PAL was developed to provide families with ready access to information about common acute illnesses, preventive health care, symptoms that frequently worry parents, and behavioral and developmental issues in childhood. The intent of PAL was to increase parents’ ability to self-manage uncomplicated problems and to encourage positive changes in health behaviors. Data from the present study showed that in an affluent and educated patient population, PAL was used by about one third of families who remembered receiving the booklet. Parents used the line primarily to obtain information about behavioral and developmental issues in younger children and information about acute illness in the school-aged child. Users reported a high rate of satisfaction with the line, and almost all reported they would use PAL again. By parental report in 2 surveys, calling PAL made a call or visit to a physician unnecessary in 60% to 70% of cases.

The telephone holds enormous potential not only as a method of triaging patient needs but also as a means of delivery of health care education and of more efficiently providing case management for chronic health problems. Patient management by telephone has been most extensively used in the management of adults with chronic illnesses. Increased numbers of clinician-initiated telephone calls in adults with chronic problems have been associated with utilization of significantly less medical services, lower expenditures per patient, and improvements in physical function and mortality. In addition, in adults, telephones have been successfully used to administer health status questionnaires as an outreach tool to provide support for smoking cessation and to identify the unmet needs of adult patients with cancer who were receiving chemotherapy.

In the pediatric literature, telephone care has been used primarily as a tool for triaging acute problems and for generating reminder calls to increase compliance. Pediatric studies have demonstrated that computer-generated telephone messages can be used successfully to increase immunization rates among preschool children and reminder calls to Medicaid families have been shown to increase well-child screening and to be cost-effective. In addition, follow-up calls in a clinic setting or after emergency department visits have been shown to increase compliance with discharge instructions and follow-up appointments.

Prerecorded educational telephone messages that are accessible from home on a wide variety of subjects have not, to our knowledge, been previously studied as a triage or educational tool. Educational efforts in pediatrics have most commonly focused on direct verbal transmission by the physician or written handouts, and ample evidence exists that these methods can increase knowledge and alter health-related behavior. Practice-based group education and school-based training programs have also been reported to be effective educational tools in pediatrics that may not require as much of a physician’s time. Other innovative methods that do not require the involvement of a provider such as lending libraries or videotapes are also being used in general pediatric practice, and videotapes geared toward educating children with specific chronic diseases have been developed.

The Parent Advice Line was designed to provide information and self-care guidance in a manner that was accessible at any time of the day or week without the waiting time required for a nurse to call back or lost time on the part of a physician. The topics include illnesses and behaviors that occur frequently and are the subject of many calls to health care practitioners, and anticipatory guidance topics that are important for preventive care.

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**Table 3. Factors Influencing Use or Nonuse of Parent Advice Line (PAL)**

<table>
<thead>
<tr>
<th>Factors Influencing Use</th>
<th>Affirmative Responses, %</th>
<th>Factors Influencing Nonuse</th>
<th>Affirmative Responses, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of access/convenient</td>
<td>97.7</td>
<td>I wanted to talk to my health care provider in person</td>
<td>44.0</td>
</tr>
<tr>
<td>Easy to use</td>
<td>95.4</td>
<td>I lost the directory</td>
<td>32.2</td>
</tr>
<tr>
<td>Available 24 h per day</td>
<td>93.1</td>
<td>No need for help</td>
<td>22.5</td>
</tr>
<tr>
<td>Free</td>
<td>84.0</td>
<td>I thought the problem would get better by itself</td>
<td>21.5</td>
</tr>
<tr>
<td>Didn’t have to go into office</td>
<td>79.5</td>
<td>I didn’t think using PAL would help</td>
<td>21.2</td>
</tr>
<tr>
<td>Didn’t have to spend much time</td>
<td>79.5</td>
<td>I wanted to solve the problem on my own</td>
<td>19.7</td>
</tr>
<tr>
<td>Curious</td>
<td>75.0</td>
<td>Not used to getting help in this way</td>
<td>18.1</td>
</tr>
<tr>
<td>Didn’t have to wait for call back</td>
<td>68.1</td>
<td>Other sources of information available</td>
<td>11.8</td>
</tr>
<tr>
<td>Didn’t have to arrange for transportation</td>
<td>38.6</td>
<td>PAL requires a telephone</td>
<td>10.9</td>
</tr>
<tr>
<td>Didn’t have to arrange for child care</td>
<td>20.4</td>
<td>I was unsure how to use PAL</td>
<td>10.9</td>
</tr>
<tr>
<td>Didn’t want to talk to physician about problem</td>
<td>18.1</td>
<td>I thought it would take too much time</td>
<td>10.2</td>
</tr>
<tr>
<td>Problem not serious</td>
<td>0.04</td>
<td>Experienced parent</td>
<td>0.05</td>
</tr>
<tr>
<td>Seeking information/education</td>
<td>0.04</td>
<td>Used other help line</td>
<td>0.04</td>
</tr>
<tr>
<td>Missing</td>
<td>0.02</td>
<td>Expect to be seen by physician</td>
<td>0.04</td>
</tr>
</tbody>
</table>

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Since callers do not identify themselves, we hoped that the system might also make available sensitive information about which a parent might be reluctant to ask. Although the need for a telephone to access the system may pose a barrier in a portion of some populations, the number of families with a telephone has increased to greater than 95%, even among poor families, and the remaining 5% have relatively easy access to a telephone. In addition, an auditory information system such as PAL may be more useful for the approximately 20% of parents whose reading abilities are below the fourth-grade level and who are incapable of reading most written patient handouts and for families using the public health system, where a substantially higher proportion of adults are functionally illiterate. Although the PAL messages conform to recommendations intended to improve comprehension for patients with low literacy skills, it is possible that the method of accessing messages described in this article may prove difficult for this population. Ease of access to such systems and comprehensibility of prerecorded health messages in populations with low literacy skills will require further evaluation.

Although this study shows promising results in families who used PAL, there are important limitations to the data presented. Our data regarding health-seeking behavior were based on self-report rather than documentation of actual change in behavior on the part of parents or changes in the quantity of calls or visits to the practice after introduction of PAL. Because of coincidental changes in managed care and capitaled reimbursement rates and the provider panel during the year preceding the study, meaningful comparisons of the volume of calls to the office during the study period and during the same period the year before could not be made. In addition, our data provide no information about clinical outcomes of patients whose parents used the line. Although the introductory message states that PAL should not be used for diagnosis or as a substitute for medical care, it is possible that some patients who would have benefited from a visit to their physician were not seen because their parents used the PAL service. Our study population was also highly educated and economically advantaged, and our results may not be generalizable to patient populations with a different sociodemographic profile. Because data were collected during the summer only, topic selection and utilization patterns may not be generalizable to other seasons. For example, acute illness topics might make up a larger percentage of calls, and utilization of PAL might be substantially higher during the winter. In addition, although utilization and satisfaction were high in families that remembered receiving the PAL booklet, the rate of use overall was disappointing. Despite introducing the system in a uniform manner throughout the practice, with a mailing to all eligible families, results of the randomized telephone survey indicated that two thirds of the families did not remember receiving a booklet 3 months later. Clearly, to reach a larger portion of the practice, this method of introduction of the system would need to be supplemented or replaced with other approaches. Although the present study did not address optimal methods of introduction of PAL, data from other studies would indicate that approaches involving the primary care provider and those that correlate providing information at a time when the family is most receptive, the “teachable moment,” would be most successful. Handing out lists of targeted age-appropriate topics at well-child visits or referring caregivers of patients to specific acute care topics at the time their child is ill are methods that are currently being piloted at our center as adjuncts to providing complete listings of topics for all patients in a practice.

Results of this study suggest that a system of recorded health information messages about health maintenance, behavioral and developmental issues, and acute illness that can be accessed at any time by telephone was used primarily to access information about behavioral and developmental issues in preschool children. Its use was associated with high rates of satisfaction and, by parental report, decreased use of calls or visits to a physician. Our results also indicate that more effective methods of distribution and promotion are needed to encourage its use, probably involving the clinicians in encouraging its use and timely reminders to parents around health messages of current interest. The cost of purchasing a system such as PAL is substantial. Ideally, it should be purchased by a hospital, health maintenance organization, or group of practices, with the initial capital costs amortized over several years and practices paying monthly fees. Alternatively, rental of an existing system or de novo creation of prerecorded health messages by health care providers in a practice may be less expensive alternatives. Further study is needed to examine methods to improve use, the effectiveness of prerecorded messages in effecting actual change in health-promoting and health-seeking behavior, costs and benefits, and the usefulness of such a system in different patient populations.

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REFERENCES
