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Controlled Clinical Trial of Pediatric Telephone Protocols

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ABSTRACT. A randomized clinical trial of pediatric protocols administered by health assistants demonstrated an alternate method of handling telephone complaints in a large emergency room. The new system advised a higher medical examination rate than the current system in the emergency room probably because the current system has deficits with respect to collecting necessary information and making explicit decisions. This higher rate of recommended visits demonstrated in the emergency room was not confirmed in the two pediatric primary-care settings in which the protocol system was also tested. In addition to this use, the telephone protocols may also be useful in training medical and nursing students, in handling telephone complaints similar to a poison control center, in triaging problems in a rural or emergency medical service, and in providing a record of the telephone call. *Pediatrics* 64:553-557, 1979; *randomized trial, pediatric protocols.*

Numerous observers have documented a need to improve the quality of medical transactions that occur by telephone.[1-4] Management of children's health problems by telephone deserves special attention since almost one-third of the encounters between pediatricians and parents occur by telephone.[5] Unfortunately, medical and nursing training place little emphasis on telephone care, and only very general guidelines for such care exist.[3, 4, 6]

We developed protocols (algorithms)[7] and standardized medical advice for 28 common pediatric complaints.[8] (Copies of the training manual will be available from Patient Care Publications, Inc, Book Division, 16 Thorndal Circle, Darien, CT 06820.) These collectively encompass more than half of the calls about symptomatic children received at locations of three different types of pediatric practice (determined in a preliminary study). After field testing these protocols for safety and acceptability, we conducted a controlled clinical trial of the protocol system used by nonprofessional personnel (health assistants) in the emergency room of the Children's Hospital Medical Center, Boston.

The study demonstrates that parents are satisfied with the experimental method of handling pediatric problems by telephone. However, the experimental system suggested that more patients be examined by a health provider (60%) than did the control

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system (44%) and that the parents were slightly less likely to comply with the suggestions of the experimental system (10% difference). The data suggest that the higher rate of on-site examination induced by the experimental system is probably medically indicated in the emergency room setting. Further uses of the protocol system for handling pediatric telephone complaints are discussed.

METHODS

The controlled trial was conducted for 29 weeks (September 1976 to April 1977). In-coming calls during usual business hours were allocated to the treatment group (health assistants who used protocols) or the control group (physicians or nurses in the emergency room) in alternate weeks. The providers (secretaries, nurses, and physicians) were unaware of the weeks of the experiment since all calls during the study period were initially handled by the research staff in order to obtain verbal informed consent from the caller and to determine whether the call could be handled by one of the 28 protocols and the research staff members were located physically at some distance from the providers. The providers in the emergency room had consented to be monitored throughout the clinical trial, but did not know which individual calls were studied.

During the "treatment" weeks the health assistant requested permission to tape-record the call and answer the caller's questions (99% consented). The protocol for the particular problem dictated the series of questions which the health assistant asked. Depending on the responses, the health assistant advised the caller to bring the child to a medical facility, consulted with a physician for assistance in disposition, or advised the caller how to treat the child at home.

During the "control" weeks a research assistant asked for the caller's consent to listen to the call (100% consented) and then paged a doctor or nurse. The remainder of the telephone encounter was determined by the often nonsystematic questions of the provider and answers of the caller.

The weekly alternation of calls between the treatment group and the control group insured a similar mix of chief complaints in the two groups (Table 1). The age groups were similar although one-sixth of the control group had no age recorded because the provider did not ask the child's age and the parent did not volunteer it! We inferred from the transcripts of these conversations that most of these children were more than 2½ years old. One-half of the children in each group were younger than 2½ years of age. Other information available on each call (whether in study or control group) included the content (or process) of the call, the disposition, and the advice given, if any.

TABLE 1. Chief Complaint of Caller by Group in Controlled Clinical Trial of Telephone Protocols, Children's Hospital Medical Center, 1976–1977

Chief Complaint	Treatment Group		Control Group	
	No.	%	No.	%
Respiratory and fever	78	48	76	43
Gastrointestinal	32	20	44	25
Trauma	27	17	34	19
Skin and infectious disease	8	5	12	7
Miscellaneous	16	10	11	6
Total	161	100	177	100

The daily log of the emergency room visits was reviewed to identify all callers in either group who came into the emergency room within two days of the telephone call, whether advised to come in or not. For each such visit, an abstract of medical record data was reviewed independently by three practicing pediatricians to judge whether the child's medical condition had warranted a visit to a medical facility. The reviews were conducted without knowledge of the experimental or control status of the child.

Between one and three days after the index call to the emergency room another research assistant telephoned half of the callers in each group and queried each parent about the content of the first call, the parent's satisfaction, the action taken by the parent, and the child's health. The interview was conducted and coded without knowing whether the call was in the experimental or the control group (when not revealed by the parent).

RESULTS

Disposition

Most telephone encounters were concluded by advising the caller to bring the child to a medical facility, or to treat the child's illness at home unless the symptoms changed, or, rarely, to see a specialist. More of the parents in the control group than in the treatment group were advised to treat their children at home (Table 2). This difference, 16% overall, varied according to the age of the child. Among children less than 2½ years old, 39% of the treatment group and 60% of the control group were recommended for home treatment. Among the older children, 37% and 50%, respectively, were recommended for home treatment. Medication was recommended to one-sixth of the callers in both groups.

TABLE 2. Advice Given to Caller by Group in Controlled Clinical Trial of Telephone Protocols, Children's Hospital Medical Center, 1976–1977

Advice Given	Treatment Group		Control Group	
	No.	%	No.	%
Come in*	97	60	78	44
Stay home†	61	38	95	54
Referred	3	2	4	2
Total	161	100	177	100

* Bring child to medical facility.
† Treat at home unless condition worsens.

TABLE 3. Information Not Ascertained in Control Calls According to Academy Guidelines[6] in Controlled Clinical Trial of Telephone Protocols, Children's Hospital Medical Center, 1976–1977

Question	Not Ascertained	
	No.	%
Trauma-related calls (N = 34)		
Age of child?	10	29
When it happened?	8	24
Where in body?	5	15
Tetanus shots?*	25	74
Illness-related calls (N = 208)		
Age of child?	33	16
How long ill?	41	20
Fever?	81	39
Other symptoms?	50	24
How is child acting?	116	56
Is anyone else sick?	177	85
What has been done so far?	58	28
What is usual health?	146	70

* Only if dog bite, laceration, or burn (N = 19).

Content of Calls

From the American Academy of Pediatrics Guidelines for Telephone Care, we chose four basic questions that should be asked about any recent trauma and eight questions that should be asked about any current medical illness.[6] Since all of these questions had been incorporated into the protocols, they were asked of every caller in the treatment group. By contrast, important information was often not collected from callers in the control groups, as an analysis of transcripts of the control calls showed (Table 3). In addition, when we examined the relatively homogenous group of calls pertaining to upper respiratory infections, we still found that key questions were frequently omitted. Of the 76 calls about upper respiratory infections (URIs), 19% omitted mention of the presence or absence of fever, 21% the duration of symptoms, 11% the age of the child, and 79% information about the presence of other medical problems.

Review of Medical Visits

The search of the emergency room log disclosed 75 visits made by callers within 48 hours of the telephone call to the hospital (37 from the treatment group and 38 from the control group). Of the 75 children seen, 60 had been advised to come in and were judged to have had a medical condition warranting examination. The remaining 15 were either advised to stay home but came in with a condition warranting attention or were advised to come in but had a condition that did not require attention. The telephone calls that preceded these 15 "unnecessary" visits were investigated in detail, to determine why the initial telephone triage, whether in the experimental or control group, had failed to identify whether the child's condition warranted medical attention (according to our reviewers). The protocol system appeared to err somewhat more often by unnecessarily bringing children in; the control or usual system, by improperly leaving them at home. It is possible that the protocols achieved their safety at the expense of efficiency. The efficiency of the usual emergency room system, however, may be illusory. More callers in the control group were advised to treat the children at home but later brought them to the emergency room with a condition requiring medical attention (four in the control group compared to two in the experimental). Furthermore, we learned of one child whom the usual system left at home but who was admitted to another hospital with pneumonia. The usual system thus may achieve its efficiency only by advising home treatment, thus deferring or deflecting medically necessary visits too often.

Data from the follow-up interviews indicated that callers in the treatment group were as likely as those in the control group to understand correctly the advice they had been given (92% vs 91%). However, the callers in the treatment group were less likely to comply with the advice given (79% vs 89%).

This difference warrants cautious interpretation since the callers in the treatment group were told that this was an experiment using less highly trained personnel. In the treatment group and in the control group, callers were more likely to comply with advice to come in than with advice to stay home.

Results in Two Primary-Care Settings

Further documentation of the usefulness of the protocol system was obtained by repeating the trial in two other sites—a health maintenance organization (Harvard Community Health Plan) and in a primary care clinic (Comprehensive Child Health Program). In contrast to the experience of imple-

menting the new system in the emergency room, use of the protocols resulted in advice for home treatment about as often as the usual providers did (Table 4). In the health maintenance organization, we assessed satisfaction with the same methods as in the emergency room and found it to be equally high in the control and treatment groups. This corollary trial suggests that the utility of protocols is not limited to emergency rooms and further documents their efficiency when compared to existing systems of handling telephone calls in settings that are not as hectic and nonsystematic as a busy emergency room. Comparable rates of disposition between the protocol system and usual procedures in two additional settings suggests that the lower rate of referral for medical evaluation that occurred in the emergency room may be inappropriately low.

Callers in both groups registered high satisfaction. In response to nine of the ten questions asked, slightly higher satisfaction was registered in the treatment group. Use of the protocols resulted in increasing the length of conversations slightly, as anticipated (median length of 3.6 vs 2.2 minutes) but this had no impact on satisfaction: 96% of the treatment group and 92% of the control group felt they had had enough time to talk.

DISCUSSION

When introducing a new therapeutic modality, in this case the use of telephone protocols by health assistants, a randomized clinical trial is often suggested.[9, 10] Katz et al[11] described a triage mechanism of handling pediatric telephone complaints but did not use this method. In our study the experimental system was compared to the existing system by a modified randomized clinical trial. Our findings indicate that the health assistants using the protocols advise more visits to a medical facility than does the present system (60% and 44%, respectively). Although one could conclude from this data that the experimental system is inefficient, our interpretation is that the existing system creates the sense of false efficiency by its lack of consistency and its probable lack of safety.

The lack of accurate collection of information in the existing system documented in Table 3 has been demonstrated in other studies[1-4, 12] and could be further supported in our study by anecdotes. Inaccurate and incomplete information by itself is not necessarily bad if the provider makes a proper disposition of the telephone complaint. This aspect of our study (and others as well) of the problems presented by telephone is difficult to evaluate because most of the complaints are relatively minor with a benign natural history and a generally satisfied parent regardless of the intervention. In this study, the existing system seemed less safe than the experimental system (four were advised to stay home when the visit was considered medically necessary as compared to two in the experimental group). Furthermore, parents were slightly more satisfied with the new system.

There are several ways in which these protocols can now be used. The first is routine use by trained laymen in existing settings, essentially the use that occurred and was proved during this experiment. Several questions should be addressed when the protocols have had such routine use: Does the system reduce costs? What monitoring and retraining of health assistants are needed? How are medical professionals' roles changed? How are consumers' attitudes changed? The experiment showed the feasibility of substituting health assistants for more highly paid personnel, but it was not designed to measure the economic efficiency. The experiment also could not assess the long-term effects of the system on health assistants, medical professionals, or consumers.

Another potential use for the protocols is in training health professionals to use the telephone more effectively in pediatric care. A set of the protocols and the advice could be kept near the telephone for physicians and nurses to use in emergency rooms,

TABLE 4. Advice Given to Callers in Health Maintenance Organization (HMO) and in Comprehensive Child Health Clinic by Group, 1976–1977

Advice Given	HMO*				Clinic			
	Treatment		Control		Treatment		Control	
	No.	%	No.	%	No.	%	No.	%
Come in	60	32	496	33	31	48	34	51
Stay home	128	68	978	65	33	52	28	42
Other			30				5	
Total	188	100	1,504	100	64	100	67	100

* Larger numbers in control group in the HMO resulted from the large number of incoming telephone lines that could be monitored, whereas the health assistant could handle only one call at a time.

clinics, group and private practices. It also may be a useful tool in the training of nursing and medical students.[12]

A third possible use for the protocols would be in new kinds of settings. For instance, telephone centers handling calls about poisoning could be expanded to handle the large volume of complaints covered by the protocols. Instead of a "poison control center," one could imagine a "pediatric problem control center." Similarly, staff in rural emergency services and dispatchers of emergency medical services could use the protocols to triage problems to the type of service needed, and the standardized advice could be used for treatment in emergencies and for less urgent cases.

In whatever manner the protocols are used, they offer three major advantages over existing practices. (1) They provide a check-list, so the user will not forget to ask for key information. (2) They make explicit guidelines for decisions regarding the management of a telephone problem. (3) They provide a record of the telephone call information that is often valuable and could be included in the medical record.

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