

# Patient Management by Telephone: A Training Exercise for Medical Students

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An instructional exercise in telephone management of medical problems using experiential and didactic techniques was designed for medical students taking a family medicine clerkship. The effectiveness of this curriculum was evaluated by comparing the students' proficiency against a standard established through the use of a Delphi group opinion technique.

This study indicates that formal training experiences for medical students in managing telephone complaints in a family practice setting can improve the students' performance.

The importance of the telephone in primary care in general, and family practice in particular, has been noted in a number of recent articles.<sup>1-3</sup> In a study of the telephone practice in four family practice settings in Connecticut, the authors observed that patients present a limited number of complaints which comprise the vast majority of telephone encounters (25 common chief complaints represent 80 percent of all medically related calls).<sup>4</sup>

While the telephone practice accounts for about 20 percent of contacts between a family physician and his or her patients and five percent of the physician's time,<sup>5</sup> very little educational effort has been expended to prepare future physicians to adequately handle this task.

Articles from the pediatric literature confirm the inadequacy of training in telephone manage-

ment by pediatric residents and practicing pediatricians. Nickerson et al<sup>6</sup> showed that 21 percent of children initially diagnosed over the telephone as having otitis media subsequently were found to have either no disease or another illness.

Ott et al studied the effectiveness of pediatric house staff in dealing with telephone conversations about fever, croup, drug ingestion, and poison-proofing a home.<sup>7</sup> Although the physicians were aware that they were being studied, they scored only 50 percent on a rating scale of questions asked and appropriateness of information given.

In a study by Brown, adequate telephone histories were taken in 20 to 80 percent of simulated telephone contacts between a pediatric resident and a patient with diarrhea, vomiting, rash, or cough.<sup>8</sup> In this study, the physicians were unaware that they were being studied.

Practicing pediatricians were examined by Greitzer et al<sup>9</sup> for the effectiveness of their telephone histories. They found that only three out of ten pediatricians asked about the difficulty with breathing when presented with a chief complaint of cough, and only four out of ten asked about hydration with a chief complaint of diarrhea.

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These studies indicate that inadequate telephone histories are taken both in a known test situation and in common pediatric practice.

In contrast, the quality of the history and appropriateness of the information given was greatly enhanced when non-physician personnel were used who had had formal training in telephone management.<sup>10</sup>

The purpose of this study was to design an instructional exercise in telephone management for medical students taking a family medicine clerkship and evaluate the effectiveness of this educational modality.

## Methods

Two common chief complaints presented by patients over the telephone in a family practice setting were selected from the list of 50 telephone generated complaints described in the authors' previous descriptive study.<sup>4</sup> Fever in a three-year-old child was selected to represent a pediatric case, and abdominal pain in a 52-year-old woman was selected to represent an adult case.

Consensus as to what represented essential or very important questions to ask when presented with each complaint was derived utilizing a Delphi technique.<sup>11</sup>

The panel of physicians utilized to derive a consensus regarding the pediatric case consisted of two full-time academic family physicians, two community based private family physicians, two full-time academic pediatricians, and two community based private pediatricians.

The panel for the adult case consisted of two full-time academic family physicians, two community based private family physicians, two full-time academic general internists, and two community based private general internists.

Using the Delphi questionnaire for two test rounds, a consensus was reached for 30 "essential" or "very important" questions to ask related to the pediatric case, and 23 such questions for the adult case.

Scripts were written for the two cases and actors posed as the simulated caller. The actor called the medical student at the model family practice unit, informed the student that the call was part of the telephone management exercise and recorded the subsequent conversation.

Fourteen third or fourth year medical students

participated in the study over the course of one year. Two students did not complete the exercise due to technical failure of the system or inability of the caller to reach them. Thus a total of 12 students completed the study and are included in the analysis.

At the beginning of the family medicine clerkship the students are told about the exercise and agree to participate. They are given no other information. All taped conversations are scored by the same individual (S.R.S.) to minimize any inter-observer discrepancies.

The items analyzed include the total number of questions asked, the total time of the interview, the number of "essential" and "very important" (positive) questions asked and omitted, the student's proficiency (positive questions asked ÷ total number of positive questions × 100), the student's efficiency (positive questions asked ÷ total number of questions asked × 100), disposition, problem identification, and questions related to the student's interviewing technique.

Each month the sequence in which the cases are presented is reversed. After the student completes the first case, the tape and score are reviewed within the next few days by the faculty supervisor (S.R.S.). The student and faculty supervisor discuss the student's performance and also talk about various logical approaches which might be used in dealing with a telephone complaint. One to two weeks after this discussion the student receives the second telephone call. The same items are analyzed. Students do not handle telephone calls from patients aside from this exercise, nor is there any other instruction on telephone management.

For statistical analysis, students acted as their own controls, and the before and after proficiency scores were compared using a one sided t test for paired observations. The null hypothesis was rejected at a five percent level of confidence if  $t > 1.80$ .

## Results

The range, mean, and standard deviation of the items analyzed in cases done before the discussion and after the teaching session are displayed in Table 1. The proficiency scores improved significantly between the first and the second case ( $P < 0.05$ ).

Table 1. Analysis of Test Items Before and After Teaching Session

Cases (N)	Data Analysis: Mean $\pm$ Standard Deviation (Range)							
	Total No. Questions Asked		Total Time of Interview		Proficiency		Efficiency	
<b>Adult Cases</b>								
Before (5)	19.4	$\pm 7.02$	(12-27)	5.71	$\pm 2.460$	(3.25-8.50)	38 $\pm 12.88$ (26-52)	47.4 $\pm 14.01$ (25-63)
After (7)	25.1	$\pm 8.90$	(14-38)	5.45	$\pm 3.092$	(1.83-9.50)	45.14 $\pm 12.86$ (30-65)	42.9 $\pm 8.47$ (33-57)
<b>Pediatric Cases</b>								
Before (7)	9	$\pm 6.137$	(1-21)	2.18	$\pm 1.370$	(0.92-4.50)	24 $\pm 19.36$ (3-63)	76.4 $\pm 19.14$ (42-100)
After (5)	20	$\pm 5.099$	(15-27)	3.45	$\pm 0.417$	(3.00-4.00)	44 $\pm 4.06$ (40-50)	66.8 $\pm 19.79$ (48-100)
<b>Overall</b>								
Before(12)	13.33	$\pm 8.195$	(1-27)	3.59	$\pm 2.93$	(0.92-8.50)	29.83 $\pm 17.80$ (3-63)	64.33 $\pm 22.24$ (25-100)
After (12)	23.00	$\pm 7.72$	(14-38)	4.62	$\pm 2.52$	(1.83-9.50)	44.67 $\pm 9.83$ (30-65)	52.8 $\pm 18.26$ (33-100)

Generally, the students appeared to be more skilled in handling telephone complaints dealing with adults, as indicated by the greater number of questions asked, longer interview time, and higher proficiency scores on the adult cases presented first compared to the pediatric cases presented first. These differences practically disappear when adult and pediatric cases presented second are compared.

Separate analysis was done on proficiency scores on the two subgroups of students depending upon the order in which the cases were presented. A statistically significant improvement was seen in those students who were first presented with the pediatric case ( $N=7$ ,  $t=2.65$ ,  $P<0.05$ ), but only a trend was seen in those students who were presented with the adult case first ( $N=5$ ,  $t=0.91$ ,  $P>0.05$ ).

While proficiency improved after the teaching session, efficiency decreased slightly, reflecting the increase in the total number of questions asked and the total time of the interview. The total time of the interview more than doubled from a mean of 2 minutes and 11 seconds during the first case to 4 minutes and 37 seconds for the second case.

The variance of the proficiency scores on the second case was also found to be significantly less than the variance of the proficiency scores on the first case ( $N_1=12$ ,  $N_2=12$ ,  $F=3.28$ ,  $P<0.05$ , Pearson's one sided test of hypotheses concerning two variances).

## Discussion

The process of telephone utilization received attention in Conrath's study of telephone and office contacts between a patient and physician.<sup>12</sup> A physician receiving a telephone call was noticed to act like a "decision theorist" who would ask questions and narrow down on a particular diagnosis. The physician seeing a patient in the office, on the other hand, employs a "gestalt" approach without factoring out the particular pieces of data.

Based upon the studies previously cited, it appears that physicians are not particularly skillful in acting like "decision theorists" when compared to non-physician health care professionals specifically trained to handle telephone complaints.

In this study a formal training exercise was designed to improve student proficiency in dealing with patients calling a physician with a specific complaint. The didactic learning focused on a systematic approach to decision making on the telephone. The student was encouraged to ask questions related to the caller's concern and then to focus upon specific questions that would tend to suggest the possibility of an emergent or life threatening diagnosis. For example, in the pediatric case used, the caller's concern was fever in a three-year-old girl. The student was expected to ask questions to rule in or out such possibilities as meningitis, severe dehydration, and seizures.

Having received enough information to feel



confident that no emergency existed, the student then was instructed to ask specific questions that would suggest that the problem was a benign, self-limited condition for which an office visit was unnecessary. Questions of this nature included inquiries relating to such points as the presence of a runny nose, cough, rash, and diarrhea.

If the student could not be confident that the problem was benign, then he or she was encouraged to instruct the caller to come in for an office visit.

Experiential learning was conducted by having an actor call the student with a rehearsed complaint and then tape recording the interview.

Analysis of students' performance showed significant improvement overall between the first case and the second case. During the first call, students generally were less organized in their approach, asked fewer questions, and were more apt to ask the caller to come in. This observation corresponds to one of the authors' (S.R.S.) impression of how family practice residents initially handle telephone complaints when they first begin to take night call for the model practice unit.

The greater initial proficiency with the adult case might be explained on the basis of greater exposure to adult medicine in the curriculum or might reflect an innately easier problem to handle. This question might be answered when a larger number of different adult and pediatric cases are employed.

Efficiency scores were found to be not a particularly useful measure. High efficiency scores were often associated with very poor proficiency. In those situations the student usually asked a few very important questions ("how high is the fever?"), then instructed the caller to come into the office without asking other important questions. As students became more proficient, they asked more questions. Some of these additional questions were relevant, but had not been determined to be "essential" or "very important" by a majority of the expert panel used in the Delphi technique.

Efficiency scores would seem to be appropriate to measure in refining a student or resident's technique once a minimally acceptable level of proficiency had been attained by the trainee. Prior to that, the teaching emphasis should be on the soundness of a decision based upon sufficient data, not on the quickness of a decision.

A question that is not answered by this study is the discreet effect of the didactic teaching compared to learning that might have occurred simply by repetition of the experience of receiving telephone complaints. It can be hypothesized that the teaching of a systematic approach is helpful considering the less than outstanding performance of experienced physicians when compared to trained paraprofessionals.

While the small numbers of cases studied require cautious interpretation, this study does seem to indicate that formal training experiences for medical students in managing telephone complaints in a family practice setting can improve the quality of the students' performance. Further study should be carried out to test a wider range of complaints and the effect of similar training on the performance of residents and practicing physicians.

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