

Use and Reported Effectiveness of Tel-Med: A Telephone Health Information System

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Abstract: In January 1977, a Telephone Information System (Tel-Med) was begun in Winston-Salem, North Carolina. A survey was conducted to determine how Tel-Med was meeting the community's need for health information and to see if program objectives were being met. Respondents in 3,005 randomly selected households were interviewed by telephone to determine user characteristics, user motivation, action taken, knowledge and information gained, and system improvements. A key finding indicated that larger per-

centages of adults with lower income and educational levels were not aware of the service than were the adults in upper income and educational levels. However, income and education are not related to use of Tel-Med among individuals who know of this service. This finding suggests that the poorer and lesser educated would use Tel-Med in a way similar to that of their more fortunate peers if efforts were made to inform them of the service. (*Am J Public Health* 70:229-234, 1980.)

Introduction

In our society, access to health care varies widely. It is influenced by such factors as income, age and educational level of the consumer, specialty and geographic distribution of providers, and cost of services.¹⁻⁴ Many visits to providers occur for health information and there has recently been a proliferation of medical self-care information in the popular press.⁵⁻⁷

Increasing attention has also been directed toward the worried-well and the significant demand that this group places upon limited health care resources. In recent years, the telephone has been used to facilitate access to health information for an information hungry public.⁸⁻¹¹ Since 1973, Tel-Med, a nationally franchised health-information system has provided medically-certified health information on a broad range of topics to telephone users. Information is provided free to callers who request specific tapes from a tape library. Most Tel-Med operations are open at least eight hours a day for five days per week. Call volume varies in

different systems depending upon community size and hours of operation. Most of these telephone information systems have been subject to only limited evaluation. Evaluation has generally consisted of analysis of call volume and topic popularity.^{12, 13}

One single-topic cancer telephone system, Can-Dial, has begun to evaluate some user characteristics in addition to volume.¹⁴⁻¹⁶ Can-Dial sponsors are now beginning a more comprehensive evaluation of user motivation, action taken, knowledge and information gained, and benefits derived from the system. However, no similar evaluation has been reported for Tel-Med. This report represents the first detailed study of Tel-Med, a franchised system that is now operating in over 100 communities in the United States.

In January 1977, a Tel-Med operation was begun in Winston-Salem, NC under the sponsorship of the Forsyth County Medical Society and the Greater Winston-Salem Chamber of Commerce Foundation. The system which was begun on a seven-day-week and 24-hour-per-day operation, was projected to receive 30,000 calls during the first year. The number of calls exceeded that expectation within the first few months of operation. From the high-call volume (204,905 in the first year)* it was apparent that the residents of Forsyth County and surrounding communities were anxious to ob-

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*343,000 calls were recorded at the end of two years (12/31/79) with the service continuing to average over 10,000 calls per month.

tain health information. However, members of the Tel-Med Advisory Committee of the local medical society were anxious to determine how Tel-Med was meeting the communities' need for health information and whether specific program objectives were being met.

The basic objectives for Tel-Med were identified as follows:

1. To increase accessibility to health information by providing standardized, medically-certified, easily understood information at no cost to user on a 24 hour/day-7 day/week service; anonymity and confidentiality were to be maintained, parental permission not requested.

2. To combat rising health care costs by reducing unnecessary visits to physicians for standardized medical information.

3. To facilitate access to health services for all citizens where there is a definite medical need.

4. To help persons recognize early signs of illness.

5. To help persons find appropriate community resources to deal with their medical problems.

These objectives served to focus the study and to delineate research goals. Research questions were developed concerning user characteristics, user motivation, action taken, possible benefits, and needed improvements.

Methods

Sample

A pretest of slightly more than 100 cases indicated that approximately 17 per cent of the respondents had used the Tel-Med service. In order to obtain a sample of 500 users 3,000 cases were required. A simple random sample of households was selected from the telephone directory, and a smaller sample was selected by random generation of the last four digits for all exchanges in the telephone system.**

Overall, 3,350 active telephone numbers were contacted. The interview completion rate for telephone numbers contacted was 93 per cent, and the percentage of usable interviews of all active numbers contacted was approximately 90 per cent. The final sample available for analysis consisted of 3,005 respondents.

Data Collection

The interview schedule was in general simple and straightforward. Respondents were asked: 1) if they had heard of Tel-Med before the interview; 2) where they had heard of it; 3) whether or not they had used it; 4) whether or not any tape(s) had an effect on their health behavior; 5) several questions concerning their evaluation of the amount of information received from Tel-Med, the ease with which this information was understood, and their general evaluation of Tel-Med; and 6) background information on age, sex, marital status, education, and family income. The possible re-

**The latter sample was selected to check on the possible effect of unlisted numbers. However, a comparison of the two samples revealed no significant difference among the major variables in the study. Thus, the two samples were combined and analyzed as a single random sample.

sponses to each question are shown in the presentation of results.

The telephone interviews lasted between three and seven minutes and were conducted by ten interviewers (nine female and one male) who had received 8-10 hours of training.***

Several tests for possible biases indicated that the interviewers were able to obtain reliable unbiased data. A check on biases in the evaluation of Tel-Med by respondents was built into the interviews by having the responses to three evaluation questions alternated. For example, the responses to the question concerning the overall evaluation of Tel-Med were: "very useful", "fairly useful", and "not useful at all". The most positive response was read first for one-half the respondents, and the most negative response read first for the other one-half. An examination of the three questions treated this way revealed no significant differences in the percentage of positive responses.

Further tests were made to determine if reported differences existed by interviewer with respect to the awareness, use, impact, and evaluation of Tel-Med. For the most part, no significant differences were found between interviewers. The few deviations that did appear could be explained in terms of differences in socio-economic level among the respondents assigned to each interviewer.

During the pretest, careful attention was paid to the time of day during which calls were made. It was found that morning and early afternoon calls yielded a disproportionate number of female respondents, and later afternoon and early evening (before 9:00 p.m.) yielded more male respondents. Beginning late Friday afternoon and throughout the weekend, the interviewer had difficulty finding respondents at home or getting them to take the time to complete the pretest. For these reasons, call times during the actual survey were weighted heavily toward the afternoon and evening hours. Fewer calls were made during the morning and on weekends. Friday and Saturday evenings were avoided altogether.

In comparing the sample surveyed to the population of the telephone area, we found a slight underrepresentation of males, and a slight overrepresentation of adults with a high school education or better. We found no difference in the age structure of the population age 21 and over, income of the population age 21 and over, or in marital status. Possible biases resulting from sex and education differences in the sample and total population will be discussed in a later section.

Statistical Analysis

The results are presented by frequency and percentage distributions. The chi-square statistic was used to test for possible sampling and interview bias, and to test for the significance of differences in the awareness, use, and reported

***The training consisted of: detailed instructions on the purpose of each question; several practice interviews, two of which were with individuals who filled out evaluation sheets after completion of the interview; and a critique and extra training sessions to correct interviewing faults detected during the practice interviews.

impact, of Tel-Med by background characteristics of the respondents. Only those relationships that were statistically significant at the .05 level or better are reported in the findings.

Results

User Characteristics

Knowledge and use of Tel-Med by age and sex for the entire sample, and by education and income for adults (age 21 and older) are shown in Table 1. These data indicate that a higher percentage of middle-aged adults had prior knowledge of Tel-Med than did very young and very old respondents. By sex, a slightly larger proportion of females than males were aware of Tel-Med prior to the interview. Overall, the results for education and income indicate that socio-economic status is positively related to knowledge of Tel-Med for adults age 21 and older.

Sixteen per cent of the total sample had used Tel-Med and approximately 37 per cent of respondents who had prior knowledge of Tel-Med had actually used the service. While a smaller proportion of younger respondents had prior knowledge of Tel-Med, those who had heard of Tel-Med used it more frequently.

It is particularly interesting to note that the relationship between the indicators of social class and knowledge of Tel-Med does not hold for use when dealing with adult respondents who had prior knowledge of Tel-Med. A comparison of columns 2 and 3 in Table 1 reveals that while education and income show a significant positive relationship with use of Tel-Med for the total sample, the percentage of users among respondents with prior knowledge does not differ significantly by level of education or income. Thus, once individuals at different levels of education and income are informed of Tel-Med, they tend to use it to a similar degree.

The telephone survey of the general public served a dual purpose. It was both an evaluative and an educational tool. Respondents who had no prior knowledge of Tel-Med were read a description of the service and told where to find a listing of the tapes. Of the 3,005 people interviewed, 1,302 (43.3 per cent) had heard of Tel-Med prior to the interviews. Upon completion of the survey then, 1,703 respondents were newly informed of the Tel-Med service.

Respondents who had heard of Tel-Med were asked where they first heard of the service. Adult respondents age 21 or older most often cited the newspaper as their source of information and the friend/relative category was most frequently cited by younger respondents (Table 2). Friends/rel-

TABLE 1—Distribution of Responses to Knowledge and Use of Tel-Med by Selected Background Variables

Variable	Prior Knowledge of Tel-Med	Use of Tel-Med	
	Per Cent Responding Yes	% Yes of Total Sample	% Yes of Prior Knowledge Sample
Age	(d)	(d)	(d)
8-15	30.1	16.6	55.3
16-17	37.9	18.3	48.5
18-20	44.3	21.3	48.1
21-29	52.8	23.7	44.9
30-49	54.0	19.5	36.1
50-59	43.4	13.4	30.9
60 or older	24.8	5.3	21.5
Sex	(c)	(c)	(c)
Male	39.9	13.7	34.3
Female	45.8	17.8	38.9
Education ^e	(d)	(d)	
8 years or less/some high school	20.2	6.2	30.6
High school graduate	43.9	17.0	38.6
Some college	58.1	23.2	39.9
College graduate	64.6	20.4	31.6
Some graduate school graduate degree	72.5	22.0	30.3
Income ^e	(d)	(d)	
Under \$5,000	20.0	7.2	36.2
\$10,000 to \$15,000	53.3	20.6	38.6
Over \$15,000	59.3	21.0	35.5
TOTAL	43.3 (N = 3005)	16.1 (N = 3005)	37.2 (N = 1302)

Cases with missing responses on each variable are not included. Percentages do not total vertically.

^cp ≤ .01

^ep ≤ .001 (Probability based on chi square test).

^eIncludes only adult respondents, age 21-94.

TABLE 2—Distribution of Total Sample Responses to Source of First Knowledge of Tel-Med by Age

	Age					
	Total Sample		8-20 years		21 years and older	
	Number	Per Cent	Number ^a	Per Cent	Number ^a	Per Cent
Newspaper	447	34.9	25	19.1	404	36.6
Television/Radio	219	17.1	15	11.5	194	17.6
Telephone Book	66	5.2	16	12.2	48	4.3
Friend/Relative	239	18.7	38	29.0	195	17.7
Doctor Referral/Brochure in Doctor's Office	32	2.5	1	0.8	30	2.7
Brochure in Location Other than Doctor's Office	174	13.6	11	8.4	157	14.2
Other ^b	104	8.1	25	19.1	76	6.9
TOTAL	1281	100.1	131	100.1	1140	100.1

^aCases with missing responses on each variable are not included.

^bIncludes school and miscellaneous sources.

atives, television/radio, and brochures were also important information sources for adults, while television/radio and the Tel-Med listing in the telephone directory were important sources for the young sample of respondents.

A further breakdown by age for the adult sample revealed a pronounced tendency to report the newspaper as the first source of information about Tel-Med as age increased. Approximately 26 per cent of adults age 21-29 reported the newspaper as the first source of information as compared to over 47 per cent of the adults age 60 and over. Younger adults were somewhat more likely to report brochures as their first source of knowledge about Tel-Med.

User Motivation

Adult respondents who had used Tel-Med were first asked if they had called the service because of a personal health problem, and then asked if they had called because of a health problem of someone they knew.**** Responses to the first question (Table 3) revealed a significant difference by age. Respondents over age 50 were somewhat more likely to have called Tel-Med about personal health problems than were adults age 21-49. In addition, women were more likely than men to say they called Tel-Med because someone they knew had a health problem. Income and educational attainment were not related to motivation for use of Tel-Med.

Action Taken

We sought to determine what impact Tel-Med had upon the behavior of respondents. Questions asked are shown in the Appendix, and answers are summarized in Table 4. Approximately one-fourth of Tel-Med users said that they had been encouraged to seek medical or dental care initially or sooner than they would have otherwise, 30 per cent reported

****Since health care decision-making differs considerably for children and young adults in school or still living with their parents than for adults, the remainder of this analysis will deal only with respondents age 21 or older. Age 21 has been selected as the minimum age at which most people will have completed their schooling and established their own households.

that Tel-Med had made it unnecessary for them to see a doctor and 42 per cent said they followed a suggestion made on a Tel-Med tape. Only a small percentage of users were encouraged to seek community resources to deal with their health problems, but a governmentally-operated telephone service, "First Line" exists in the Tel-Med telephone service area for a similar purpose and the Voluntary Action Center in the community also makes referrals and publishes a comprehensive directory of local, state, and national services and organizations in the health care area.

Tel-Med Tapes Which Encouraged Action

Specific tapes which encouraged respondents to seek medical or dental care are listed in Table 5. From the list given, and those other tapes that are not listed because they were only mentioned once, it is possible that Tel-Med may have motivated some individuals to seek early care for potentially serious problems. Hypertension and breast cancer were the two tapes most cited by respondents.

TABLE 3—Distribution of Adult Responses to Motivation for Use of Tel-Med by Selected Background Variables

Variable	Personal Health Problem	Health Problem of an Acquaintance
	Per Cent Yes	Per Cent Yes
Age	(b)	
21-29	43.9 (132)	53.4 (133)
30-49	36.9 (176)	56.6 (175)
50-59	55.9 (59)	48.3 (58)
60 or older	54.8 (31)	45.2 (31)
Sex	(c)	
Male	41.0 (134)	44.0 (59)
Female	44.7 (264)	58.2 (153)
TOTAL	43.5 (398)^a	53.4 (397)^a

^aNumber of adult respondents from which percentage computed. Cases with missing responses on each variable are not included. Percentages do not total vertically or horizontally.

^bp ≤ .05

^cp ≤ .01

TABLE 4—Distribution of Adult Responses to Tel-Med's Impact upon Behavior and Its Usefulness in Decision Making

Variable	Per Cent of Adult Sample
Number of Adult Respondents ^a	400
Per Cent Encouraged to Seek Medical/Dental Care	24.9
Per Cent Encouraged to Seek Medical/Dental Care Sooner	24.2
Per Cent for Whom Information Made it Unnecessary to Seek Medical/Dental Care	30.0
Per Cent Who Followed a Suggestion Made on a Tape	41.7
Per Cent Encouraged to Contact Another Community Agency/Organization for Help	3.3
Per Cent Encouraged to Contact the Forsyth County Medical Society for Help in Locating a Family Doctor	3.0

^aNumber of total adult respondents from which each percentage computed. Cases with missing responses on each variable are not included. Percentages do not total vertically.

Repeated Use of Tel-Med

Over 80 per cent of users had called Tel-Med more than once.‡ Respondents who called Tel-Med because of a health problem and received a "fair amount" to a "great deal" of information were inclined to be repeated users. Tel-Med's impact upon behavior and its usefulness in decision-making also appears to have had an effect upon repeated usage. Those respondents who reported they did something suggested on a tape; who were encouraged to seek a physician's or dentist's care; or, for whom Tel-Med information made it unnecessary to seek medical help, were more likely to have used Tel-Med repeatedly.

Needed Improvements

Several questions were asked of users concerning their opinions of the Tel-Med service. The adult respondents' opinions were generally positive (Table 6). Eighty-seven per cent found the tape library contained the topics on which they sought information, and 40 percent reported receiving a "great deal" of information. Educational level was inversely related to the degree of information received (data not shown).

Most users (82.7 per cent) gave the service an overall "very useful" rating and less than one per cent found the service "embarrassing or offensive." When asked how the service might be improved, 40 per cent found the service acceptable as is and 38 per cent made suggestions for improvements. Most frequently mentioned suggestions for improvements were to increase advertising of the service and to add a specific tape or topic.

Discussion

As described earlier, the sample surveyed differed slightly from the population of the telephone area. We found a slight underrepresentation of males and an overrepresentation of adults with a high school education or bet-

‡In a survey of 522 Pittsburgh households in March 1978, 72 per cent of the respondent/users had called more than once.¹⁷

ter. These differences are small but, to the extent that they exist, they would bias our findings in two ways. The first would be an over-estimate of the number of users and the number of respondents who have heard of Tel-Med (women are more likely to use the service, and respondents with higher educational levels are more likely to have heard of the service). The second would be a slight under-estimate of the number of those people who reported they received useful information from Tel-Med (better-educated respondents are less likely to report that they received useful information). Our results must be viewed in the light of these possible biases.

However, the overall validity of the results draws considerable support from an independent study of Tel-Med conducted in Pittsburgh during 1978.¹⁷ Data from a stratified cluster sample of 522 households reveals that 14.4 per cent of Pittsburgh area residents had used Tel-Med in comparison to 16.1 per cent of our Forsyth County respondents, and 41 per cent of Pittsburgh residents had heard of Tel-Med as compared to 43.2 per cent of Forsyth County residents. In Pittsburgh, "Tel-Med callers tend to be younger, educated, in white collar occupations, in good health, with both a family doctor and dentist, and aware of a need for health information."¹⁷ The similarity of results in the two studies is striking.

Numerous studies have shown that the poor and less-educated segments of our population utilize health services

TABLE 5—Tel-Med Tapes Which Encouraged Respondents to Seek Medical or Dental Care Sooner Than They Would Have Otherwise

Tape Title*	Times Mentioned
Hypertension and Blood Pressure	9
Breast Cancer	8
Hysterectomy	4
You May Have Diabetes and Not Know It	3
Backaches	3
Birth Control	3
Understanding Headaches	2
Hemorrhoids	2
Pulmonary Emphysema	2
Atherosclerosis and High Blood Pressure	2
Vaginitis	2
Early Prenatal Care	2
Am I Really Pregnant	2
Earaches in Children	2
Cancer—Seven Warning Signs	2
Peptic Ulcers	2
Menopause	2
What About Wisdom Teeth	2
Diarrhea	2
Facts and Fallacies about Contact Lens	2
Itching Skin	2
Bronchial Asthma	2
Gall Bladder Trouble	2
Kidney and Urinary Tract Infections	2
Overweight—A Medical Problem	2
Ulcers	2

*Tapes mentioned only once (N = 52) are not included.

TABLE 6—Distribution of Adult Responses to Needed Improvements in the Tel-Med Program

Variable	Per Cent Of Adult Sample
Number of Adult Respondents ^a	400
Per Cent who Received a Great Deal of Information	39.3
Per Cent Who Found Information Embarrassing or Offensive	0.3
Per Cent Who Found the Tape Library Complete	86.5
Per Cent Who Found Tel-Med Overall to be Very Useful	82.7
Per Cent Who Found Tel-Med Acceptable As It Is	39.8
Per Cent Who Made a Suggestion for Improvement of Tel-Med	38.1

^aNumber of adult respondents from which each percentage computed. Cases with missing responses on each variable are not included. Percentages do not total vertically.

differently than the more affluent and better educated.¹⁻³ Our evaluation shows that the poor and less-educated were less aware of Tel-Med than their more fortunate counterparts. However, among respondents who had heard of Tel-Med, education and income are not significantly related to use. Although there is the possibility of a differential selection process in awareness by social class, the more likely conclusion is that once they know about it, the poor and the less well-educated will use Tel-Med just as much as their better educated and higher income counterparts.

The findings suggest that the almost universal availability of telephones, the simplicity of the Tel-Med system, and the high interest in general health information combine to make Tel-Med highly accessible to all segments of the population who know of the service. However, there is still a great gap in awareness of the service between socioeconomic strata.

Respondents over age 60 who had heard of Tel-Med were using the service less than were younger respondents. This finding may reflect the fact that a limited number of Tel-Med topics are of interest to older adults, that they do not know how to use the service, have less need for health information, and/or have other sources of health information. Further research is necessary to answer these questions.

Consumer evaluation of the Tel-Med service was very positive. Responses to the telephone survey suggest that Tel-Med has been well received by and has contributed a significant service to the community. The system has met,

with varying degrees of success, the objectives of its supporters.

Tel-Med also appears to have had an influence on behavior, at least as reported by respondents. Because of the tenuous links between reported and actual health behavior and between health care use and health status, we hesitate to go beyond our data into cost-benefit calculations. However, our findings suggest that Tel-Med may be a valuable and inexpensive means of improving access to health information and that the information provided by Tel-Med can influence consumer health decisions.

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APPENDIX

Questions Concerning Action Taken as a Result of Tel-Med

Questions asked of Tel/Med Users only:

- Did listening to a Tel-Med tape ever encourage you to seek medical or dental care? (If yes, What tapes?)
- As a result of hearing a Tel-Med tape, did you ever get information which made it unnecessary to see a doctor or dentist (If yes, What tapes?)
- After listening to a Tel-Med tape, were you ever

encouraged to seek medical or dental care sooner than you would have otherwise? (If yes, What tapes?)

- Did you ever do anything that was suggested on a Tel-Med tape? (If yes, What tapes?)
- Did listening to a Tel-Med tape encourage you to seek help from the Forsyth County Medical Society in finding a family doctor?
- Did listening to a Tel-Med tape encourage you to seek help or information from any other community agency or organization? (If yes, What agency or organization?)