MEDINFO 2004
M. Fieschi et al. (Eds)
Amsterdam: IOS Press

Computer Interviewing in a Primary Care Office: The Patients are Ready

Paul D. Smith[a], Michael Grasmick[b]

[a]*Department of Family Medicine, University of Wisconsin-Madison*
[b]*Department of Family Medicine, University of Wisconsin-Madison*

Abstract

Computer patient interviewing has been used since 1968 and must be acceptable to a majority of patients for wide spread use to occur. Computer interviewing is still not used widely in the United States. Potential barriers have not been identified in the literature. Methods: 150 of 164 (91.5%) eligible patients at a family medicine ambulatory practice were enrolled in a study to evaluate computer interview of cough and sore throat complaints. Subjects were given the choice to have the interview in the waiting or examination room. Telephone interviews were conducted 2-4 weeks later with 143/150 patients (95.3%) . Results: 102/150 (68%) of subjects chose the waiting room and 48/150 (32%) chose the examination room for the computer interview. 127/143 (88.8%) were willing to use the computer interview for evaluation of cough or sore throat again in the future. 116/143 (81.1%) were willing to use the computer interview for other medical complaints in the future. Conclusions: Patients are willing to use computer interviewing and some interviews may be conducted in the waiting room.

Keywords:

User-computer interface, medical history taking, primary health care, ambulatory care

Introduction

Computer patient interviewing has been in use for over 35 years [1]. Studies of computer interviewing have shown:

- Patient history by computer interview is more complete than traditional oral history taking [2] [3].
- Patients are more willing to reveal sensitive information during a computer interview, such as information about impotence and suicide attempts [4], adolescent sexual behavior [5] [6], alcohol abuse [6] [7], and suicide risk [8].
- Patients rarely stop a computer interview [9] unlike paper questionnaires where skipping questions is common [10].

In spite of the evidence of advantages, for reasons that are not clear, computer interviewing is used infrequently in ambulatory medical practice [1].

One possible barrier to routine use of computer interviewing would be poor patient acceptability. A few studies have reported data about patient acceptability in various clinical settings [5] [11] [12]. Using Medline to search back to 1966, only one small study was identified in the literature by Pierce [13] regarding use of computer interviewing in a primary care ambulatory office. Pierce reported 25/25 (100%) of randomly sampled subjects were willing to use computer interviewing in a rural primary care practice.

The exploratory study described here was conducted to determine patient willingness to use computer interviewing to evaluate complaints of cough or sore throat in an primary care ambulatory office and after the experience, their willingness to use computer interviewing again in the future.

Methods

Study Setting

The study was conducted at the Belleville Family Medical Clinic, a family medicine residency ambulatory practice located in Belleville, Wisconsin (population 1,800). The clinic has approximately 11,000 patient visits per year. Care is provided by five family medicine residents and six part time family medicine faculty. Study protocol was approved by the University of Wisconsin-Madison Health Sciences Human Subjects Committee.

Subject Enrollment

Upon arrival, the receptionist asked all patients whether they had a cough or sore throat, regardless of their presenting complaint. Patients that answered affirmatively were then asked if they would like to participate in a computer interview regarding their cough or sore throat symptoms. Gender and age data was collected for all subjects, including those that refused participation. Informed consent was obtained by a research assistant in the waiting room. Demographic information, telephone numbers and preferred time for future telephone interview were obtained. All protected health information was kept separate from the rest of the study database and destroyed at the end of the study. Patients were told that the interview could be conducted with computers in the examination rooms or a computer in the waiting room and were asked for their choice of interview location.

The computer in the waiting room was turned 90 degrees from the view of other people and had a privacy screen over the monitor that blurred the monitor picture unless the viewer was directly in front. The only way someone other than the subject could view the monitor was to lean over behind the head of the subject or for the subject to turn the screen toward the other person.

Instant Medical History™ (IMH) [14], a commercially available software was used for the computer interviewing. With the subject seated in front of computer and the first IMH question visible, the research assistant asked if the patient's cold or sore throat symptoms were the primary complaint of the visit. Regardless of the patient's primary complaint, a cough or sore throat was entered as the first complaint in IMH. Subjects were instructed that they could enter additional complaints after the questions about cough or sore throat were completed. Subjects were instructed how to answer questions using a mouse and how to go back to change answers if necessary. The time in minutes to complete the interview was measured from the start of the first IMH question to the moment the patient told the research assistant they were finished.

IMH interview results were attached to patient's chart for their physicians to review before examination. The IMH results were also available to physicians in real time in each examination room.

Chart Review

Shortly after the visit was completed, a chart review was conducted to obtain the following variables of interest:

- Gender
- Age
- Patient choice for completing the interview (waiting room or examination room)
- Primary complaint was a cough or sore throat (yes/no)
- Identification of additional complaints
- Interview completion (yes/no)
- Number of skipped questions

Telephone interview

Post study data were obtained by phone interview between two and four weeks after initial enrollment. A 21-question interview was conducted by the research assistant that included the following variables of interest:

- Perception of computer interview ease of use rated on a six point scale (1 = very easy; 6 = very hard)
- Perception of computer interview accuracy rated on a six point scale (1 = very accurate; 6 = very inaccurate).
- Willingness to use computer interview for cold or sore throat problems in the future (yes/no/unsure)
- Willingness to use computer interview for other visits in the future (yes/no/unsure).

Statistical evaluation

Descriptive analysis summarized the variables of interest. The Chi-square test was used to test the association between categorical variables. Numerical data were tested for significance with one-way ANOVA. All statistical tests were two-tailed and evaluated at the alpha=0.05 level.

Results

Enrollment

Subjects were enrolled from February to August 2003. Five resident family physicians and six faculty family physicians participated in the study. 1864 subjects presented for care during the enrollment period. 164/1864 subjects (8.8%) had cough or sore throat. 14/164 (8.5%) refused to participate and 150/164 (91.5%) were enrolled. Male subjects refused nine times and female subjects refused five times. Subjects who refused participation were more likely to be male (64%) than those who participated (35%, p=0.056). Age was not associated with refusal (mean age=46) vs participants (mean age=43.7) 143/150 (95.3%) completed the telephone interview two to four weeks after the initial visit.

Demographics

Subjects average age was 43.7 (range 14-91). See Figure 1 on previous page for age distribution. 96/150 (64%) were female and 54/150 (36%) male. Average number of years of school was 13.3 (range 8-23 years)

Interview in waiting or examination room

Computer interviews were chosen to be completed in the waiting room by 102/150 (68%) of subjects and in the examination room by 48/150 (32%). The examination room was chosen more often by older patients (41.3 vs 48.7 years, p=0.016) and those with more years of education (12.6 vs 13.6 years, p=0.027). There was no association between gender and choice of interview location.

Interview completion description

One hundred percent of subjects completed the computer interview. The subjects completed the interview in a mean 7.8 minutes (range 2-27 minutes). There was a negative correlation between completion time and years of education ($r = -0.23$, $p=0.006$).

143/150 answered every question in the interview and 7/150 (4.7%) subjects skipped any questions during the interview. One subject skipped 19 questions at the end of an interview for three clinical complaints. A total of 33 questions were skipped, 0.22/interview (range 0-19). Twenty-one (14%) subjects used the interview for more than one clinical complaint (range 1-4 complaints).

Future computer interviews

Telephone interviews were conducted 2-4 weeks after enrollment with 143/150 patients (95.3%). 127/143 (88.8%) subjects were willing to use the computer interview for evaluation of cough or sore throat again in the future. 10/143 (7%) would not use it again and 6/143 (4.2%) were unsure. Males and older patients were less likely to be willing to use computer interview again for cough or sore throat:

- Yes vs No/Unsure: 31% vs 63% males, p=0.010
- Yes vs No/Unsure: 42.9 vs 52.6 years, p=0.033

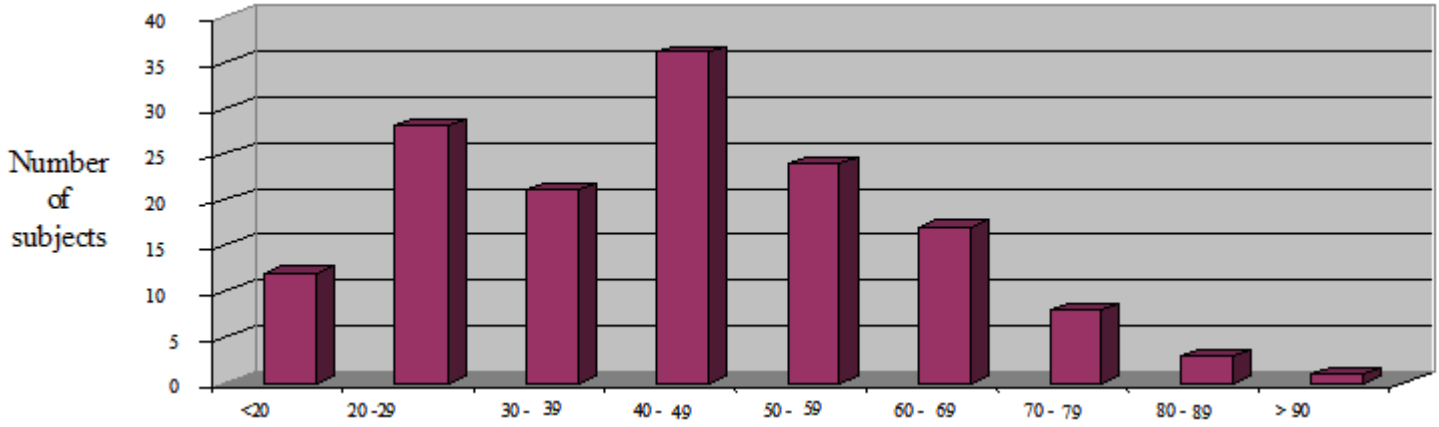

Figure 1 - Age distribution

There were no correlations between willingness to use computer interview for cough or sore throat in the future and completion time, skipped questions or using the computer interview for additional complaints .

116/143 (81.1%) were willing to use the computer interview for other medical complaints in the future. 14/143 (9.8%) would not use it again and 13/143 (9.1%) were unsure. There were no correlations between willingness to use computer interview for other complaints in the future and age, gender, completion time, skipped questions or using the computer interview for additional complaints .

Ease of Use

Rated on a six point scale (1 = very easy; 6 = very hard), the average response to a question about perception of ease of use of the computer interview was 1.3 (range 1-6).

Perception of Accuracy

Rated on a six point scale (1 = very accurate; 6 = very inaccurate), the average response to a question about perception of ease of use of the computer interview was 1.8 (range 1-6)

Discussion

This study evaluated patient willingness to use computer interviewing for evaluation of cough and sore throat and found a very high level of acceptance.

This study showed 91.5% of patients with cough or sore throat symptoms were willing to try computer interviewing for taking the initial history at an ambulatory family practice residency site. The study also found a high level of willingness to use computer interviewing again in future for evaluation of cough/sore throat (88.8%) and other medical complaints (81.1%). This is similar to the 82.9-100 % participation in other studies of computer interview for initial history in an ambulatory office [13] or emergency department [11] [12].

Many ambulatory offices have limited space for patients to use computers in examination rooms. This study revealed 68% of patients will use a computer in a semi-private area of the waiting room for interviewing for the common complaints of cough and sore throat . If this is true for other common complaints, this will help avoid tying up limited examination room space. We do expect a smaller frequency of computer interviewing use in the waiting room for evaluation of more sensitive complaints.

The strengths of this study include its use in a busy ambulatory practice, a high level of enrollment of eligible subjects, a broad age distribution of subjects and a very high follow up rate.

Generalizations from this study are limited because the study was conducted in a single practice located in the mid-western United States. It is also limited because the study subjects had a fairly high average number of years of education and might be more accepting of computer interviewing.

Future studies should evaluate computer interview acceptability in a broad variety of practice sizes and locations. They should also explore the barriers perceived by those patients that refuse to participate.

Computer patient interviewing has several advantages when compared to the traditional oral and paper form methods of gathering a clinical history. The computer interview:

- can be structured to include all pertinent questions.
- never forgets to ask a question.
- can obtain more complete information.
- allows the patient as much time as they desire to answer the questions without interruption.
- allows patients to be interviewed for as many problems as the patient chooses to report.
- allows physicians become aware of all concerns of the patient and can help prioritize the most important to address first.
- can obtain sensitive information that the patient is reluctant or too embarrassed to tell the physician or when the physician is uncomfortable asking.
- can be programmed in different languages with questions in the language preferred by the patient and output in the language preferred by the physician.
- can calculate scores to clinical rating scales for easy interpretation by the physician.
- always provides legible output.

- allows structured data output using standard language that can easily be incorporated into the documentation in an electronic health record.
- can be administered via the internet at a time and place that is convenient for the patient ***before*** the visit to the doctor's office.

Computer patient interviewing holds great promise to improve doctor patient communication, although substantial barriers to use exist.

Computer patient interviewing requires substantial changes in the process of care. Doctors view the patient interview as a time honored tradition of obtaining the history and establishing rapport with the patient. Change in medical care systems is known to be slow and difficult. The computer interview data output may be overwhelming to the doctor for a patient with multiple complaints. Not all practices have space for computers that can be tied up as patients are interviewed or have the technical expertise to set up the network and internet system necessary to access interview data entered from home.

Conclusion

A substantial majority of patients will use computer interviewing for initial medical history at this Wisconsin family medicine residency ambulatory practice. Some computer interviewing can be conducted in a semi-private area of the waiting room. The patient, clinician and health care system barriers to wide spread use of computer interviewing need to be explored further.

Acknowledgments

This study was funded by the Wisconsin Academy of Family Physicians Foundation. Thanks to Marlon Mundt for his statistical analysis and to the patients, clinicians and staff at the Belleville Family Medical Clinic whose hard work and patience made this study possible.

References

[1] Bachman JW. The patient-computer interview: a neglected tool that can aid the clinician. *Mayo Clin Proc.* 2003: 78: 67-78

[2] Quaak M, Westerman R, Schouten J, Hasman A, vanBemmel J. Computerization of the patient history - patient answers compared with medical records. *Methods Inf Med*. 1986: 25: 222-228.

[3] Bingham P, Lilford R, Chard T. Strengths and weaknesses of direct patient interviewing by microcomputer system in specialist gynaecology practice. *Eur J Obstet Gynecol Reprod Biol*. 1984: 18: 43-56.

[4] Carr A, Ghosh A, Ancill R. Can a computer take a psychiatric history? *Psychol Med*. 1983: 13: 151-158.

[5] Millstein S, Irwin C. Acceptability of computer-acquired sexual histories in adolescent girls. *J Pediatr*. 1983: 103: 815-819.

[6] Paperny D, Aono J, Lehman R, Hammer S, Risser J. Computer-assisted detection and intervention in adolescent high-risk health behaviors. *J Pediatr.* 1990: 116: 456-462.

[7] Lucas R, Mullin P, Luna C, McInroy D. Psychiatrists and a computer as interrogators of patients with alcohol-related illness: a comparison. *Br J Psychiatry*. 1977: 131: 160-167.

[8] Levine S, Ancill R, Roberts A. Assessment of suicide risk by computer-delivered self-rating questionnaire: preliminary findings. *Acta Psychiatr Scand*. 1989: 80: 216-220.

[9] Buxton J, White M, Osoba D, Patient's experiences using a computerized program with a touch-sensitive video monitor for the assessment of health-related quality of life. *Qual Life Res*. 1998: 7: 513-519.

[10] Mellner C. The self-administered medical history. *Acta Chir Scan*d. 1970: 406 (supplement): 1-104

[11] Greist J, Van Cura L, Kneppreth N. A computer interview for emergency patients. *Comput Biomed Res.* 1973: 6 : 257-265

[12] Dugaw J, Civello K, Chuinard C, Jones G. Will patients use a computer to give a medical history? *J Fam Pract* 2000: 49: 921-923.

[13] Pierce B. The use of Instant Medical History in a rural clinic. *J Ark Med Soc*. 2000: 37: 444-447.

[14] Wenner A, Ferrante M, Belser D. Instant Medical History. *Proc Annu Symp Comput Appl Med Care*. 1994: 1036

Address for correspondence

Paul D. Smith, MD

777 South Mills Street

Madison, WI 53715

Psmith@fammed.wisc.edu