

Does computer use in patient-physician encounters influence patient satisfaction?

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ABSTRACT

OBJECTIVE To assess whether computer use by physicians during the patient-physician encounter influences patient satisfaction in a family medicine teaching centre.

DESIGN Cross-sectional mailed survey.

SETTING Queen's University Family Medicine Centre in Kingston, Ont.

PARTICIPANTS A random sample of 300 patients from the family medicine centre, all of whom were older than 18 years of age and had visited their family physicians in the past year.

MAIN OUTCOME MEASURES Patient preference for or against computer use by the physician and effect of computer use on various aspects of patient-physician interaction.

RESULTS The response rate was 58.3%. Most respondents (51.4%) had no preference about computer use in the office, and most (88.0%) were either "very satisfied" or "satisfied" with their visits. When assessing the influence of patient and visit characteristics on computer preference, only the "doctor's attitude toward computer use" had a positive correlation with patient preference ($P = .0012$). Respondents were most likely to indicate "positive" or "very positive" effects of computer use on all aspects of the patient-physician interaction, except "level of distraction of the doctor" and "time spent chatting about nonmedical matters," which were most commonly reported as being unaffected by computer use. Specifically, 57.1% of respondents thought that computer use had either a "positive" or "very positive" effect on their overall satisfaction with their visits, with another 30.3% believing there was no effect.

CONCLUSION Most patients expressed no preference for whether or not computers were used in their physicians' offices, although computers did seem to have a positive effect on overall satisfaction with visits. Doctors' attitudes toward computer use influenced their patients' preferences.

EDITOR'S KEY POINTS

- Patient-physician communication is central to every physician's practice and to patient satisfaction. Physicians have been concerned that the introduction of computers into patient consultations will lead to a breakdown of communication.
- This study sought to examine patients' opinions about the effects of computer use on patient-physician interaction and on their satisfaction with their visits.
- Results of this study suggest that concerns about computer use negatively affecting patient-physician relationships and patient satisfaction are largely unfounded. Most patients had no preference for whether computers were used or not, and computer use actually seemed to have a positive effect on overall satisfaction. Other studies have shown that patients' main concerns about computer use have to do with privacy, but in this study only 3.4% of respondents were concerned about a "negative" or "very negative" effect on privacy.

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L'utilisation de l'ordinateur durant une consultation affecte-t-elle la satisfaction du patient?

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RÉSUMÉ

OBJECTIF Déterminer si l'utilisation par le médecin de l'ordinateur durant une consultation influe sur la satisfaction du patient dans un centre d'enseignement de médecine familiale.

TYPE D'ÉTUDE Enquête postale transversale.

CONTEXTE Le centre de médecine familiale de l'Université Queen's à Kingston, Ontario.

PARTICIPANTS Un échantillon aléatoire de 300 clients du centre de médecine familiale, âgés de plus de 18 ans et ayant consulté leur médecin de famille durant la dernière année.

PRINCIPAUX PARAMÈTRES ÉTUDIÉS Préférence du patient pour ou contre l'utilisation de l'ordinateur par le médecin et effet du recours à l'ordinateur sur divers aspects de l'interaction médecin-patient.

RÉSULTATS Le taux de réponse était de 58,3%. La plupart des répondants étaient ni pour ni contre l'utilisation de l'ordinateur au bureau, et 88,0% se disaient « très satisfaits » ou « satisfaits » de leur visite. Quant à l'influence du type de patient et du type de consultation, seule « l'attitude du médecin » au sujet de l'utilisation de l'ordinateur montrait une corrélation positive avec la préférence du patient ($P = .0012$). Les répondants étaient plus susceptibles de rapporter des effets « positifs » ou « très positifs » du recours à l'ordinateur sur tous les aspects de l'interaction médecin-patient, sauf pour le « niveau de distraction du médecin » et le « temps passé en bavardage sur des sujets non médicaux », lesquels étaient généralement considérés comme n'étant pas affectés par ce facteur. Plus spécifiquement, 57,1% des répondants estimaient que le recours à l'ordinateur avait des effets « positifs » ou « très positifs » sur leur satisfaction globale au sujet de leur visite, tandis que 30,3% jugeaient qu'il n'y avait pas d'effet.

CONCLUSION La plupart des patients se disaient ni pour ni contre l'utilisation de l'ordinateur dans le bureau de leur médecin, quoique cela semblait affecter positivement leur satisfaction globale concernant la consultation. L'attitude du médecin concernant le recours à l'ordinateur influait sur la préférence des patients.

POINTS DE REPÈRE DU RÉDACTEUR

- Une bonne communication médecin-patient est essentielle à la pratique de tout médecin et à la satisfaction du patient. Certains médecins ont craint que l'utilisation de l'ordinateur lors des consultations nuise à la communication avec le patient.
- Cette étude voulait connaître l'opinion des patients concernant l'effet du recours à l'ordinateur sur l'interaction médecin-patient et sur leur niveau de satisfaction à l'égard de leurs rencontres.
- Les résultats suggèrent que la crainte que l'utilisation de l'ordinateur nuise à la relation médecin-patient et à la satisfaction des patients est largement injustifiée. La plupart des patients étaient indifférents quant à l'utilisation de l'ordinateur; de fait, le recours à l'ordinateur semblait même avoir un effet positif sur la satisfaction globale. D'autres études ont montré que les principales préoccupations des patients concernant l'utilisation de l'ordinateur avaient rapport au respect de la vie privée, mais dans l'étude présente, seulement 3,4% des répondants se disaient inquiets d'un effet « négatif » ou « très négatif » de cette nature.

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Computers have been used in the examination room since the 1980s in Europe; however, the transition to computerization has been much slower in North America.¹ Only 5% to 10% of family practices in the United States were using electronic health care records in 2002.² Although Canada has been just as slow to adopt electronic health records, in 2001 Health Canada established Canada Health Infoway, an organization focused on establishing a pan-Canadian electronic health record system.^{3,4}

It was hoped that the introduction of computers and electronic health records into medical practice would revolutionize medicine, improving quality of care and patient satisfaction. Electronic health records do bring with them many benefits, including easy access to legible notes, prescription-writing systems, drug interaction systems, and, in some cases, laboratory and imaging information. Other demonstrated benefits include greater adherence to preventive care guidelines and a decrease in the cost of care in the long-term.⁵ However, apart from the obstacle of the initial investment (it is estimated that it would cost a total of \$18.7 billion to create an appropriate Canada-wide electronic health record system³), physicians have numerous concerns regarding electronic health records. These include security, time-effectiveness, loss of eye contact, and negative effects on patient-physician relationships.^{2,6}

The focus of this research is the effects of computer use in the family physician's office on patient-physician relationships, and specifically on patient satisfaction. Patient compliance, health outcomes, perception of physician competence, and malpractice suits have all been linked to physician interpersonal skills.⁷ The physician's ability to communicate is central to patient satisfaction.

A review of studies from around the world from 1980 to 1997 on primary care computing found that in general, patients were positive about computer use in medical encounters, with the most common concern being loss of privacy and confidentiality of medical records.¹ More specifically, no change was found in overall satisfaction with visits, perceived levels of physician distraction, satisfaction with eye contact, degree of listening, and encounter duration.^{8,9} More recent studies have shown that electronic health records have very little effect on patient satisfaction, communication, or eye contact; patients are concerned about privacy of records, but electronic health records have an overall positive effect on quality of care as rated by patients.^{6,7}

Hsu et al studied the longitudinal effects of incorporating computers into outpatient visits.⁵ They assessed different aspects of patient satisfaction before, 1 month after, and again 7 months after implementing a computer system. The study found a significant improvement in overall visit satisfaction (odds ratio [OR] 1.50; 95% confidence interval [CI] 1.01 to 2.22), communication

about medical issues (OR 1.61; 95% CI 1.05 to 2.47), and comprehension about decision making (OR 1.63; 95% CI 1.06 to 2.50) after 7 months. Patients did not report a loss of discussion time for general or psychosocial issues.⁵

The goal of this study was to assess the relationship between patient satisfaction and computer use in an academic setting. At the time of the study, the computer system at the family medicine centre associated with Queen's University in Kingston, Ont, was relatively new, having been implemented in 2004. The transition was not complete from paper to electronic health records, and there was variation between users in familiarity with and appreciation of the electronic health record. Each examination room had a desktop computer, which was used to access patient information and record the encounter. Test results were not yet available through the electronic health record. There was Internet access, which could be used for patient education.

Residents, who are generally not familiar with the electronic health record system, rotate into the family medicine centre every 4 months. Patient satisfaction is extremely important in this setting, where the new residents already represent an added stress on the patient-physician relationship. It is therefore valuable to determine whether computers aid or aggravate patient satisfaction in this academic context. The aim of this study was to determine if patient satisfaction was influenced by computer use during the patient-physician encounter in an academic setting.

METHODS

A mailed survey was sent to patients from the Queen's University Family Medicine Centre between March and May 2006. The survey was sent to a random sample of 300 patients who were aged 18 or older and had visited the family medicine centre in the past year. The survey was resent 3 and 8 weeks after the initial mailing to those who had not replied, according to the Dillman protocol.¹⁰

The survey was developed using a combination of guidelines on authorship of surveys and previous research on the relationship between patient satisfaction and computer use by physicians.¹¹ The survey was pilot-tested with a small group of patient volunteers at the family medicine centre to ensure face validity.

Sample size was determined using an 85% probability that computer use would have no significant effect on patient satisfaction. The calculation was made using an on-line sample size calculator from Grapentine Company Inc, with the assumption of a two-thirds response rate.¹²

Collected data were analyzed using SPSS, version 12.0, using descriptive and correlation statistics. Fisher

exact and χ^2 tests were used to analyze selected results. Fisher exact tests were used to analyze data about respondents' perceptions of family doctors' and residents' attitudes toward computers; "somewhat negative" and "very negative" answers were pooled. Conventional criteria for statistical significance ($P < .05$) were used.

Ethics approval was obtained from Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board.

RESULTS

The survey response rate was 58.3%. Demographic information about the respondent population is presented in **Table 1**. There was a higher proportion of women

Table 1. Demographics of respondent population: N = 175.

CHARACTERISTICS	RESPONDENTS, %*
Female	61.1
Age, y	
• < 20	1.1
• 20-39	13.1
• 40-65	58.3
• > 65	26.3
Ethnic background	
• White	83.4
• Other	12.5
Education level	
• Completed grade school	8.6
• Completed high school	27.4
• Completed postsecondary education	34.9
• Completed postgraduate education	25.1
No. of years respondent has been a patient at the FMC	
• < 5	13.1
• ≥ 5	82.3
Frequency of visiting the physician	
• Once a month or more	10.9
• Between once a month and once a year	60.6
• Once a year	11.4
• Less than once a year	12.0
Personal rating of health	
• Very good	27.4
• Good	52.0
• Poor	5.7
• Very poor	1.1

FMC—family medicine centre.

*Not all respondents answered all questions; percentages do not add to 100% owing to these missing data.

(61.1% vs 55.6%) and people older than 65 (26.3% versus 18.2%) among the survey respondents compared with the family medicine centre general patient population.

Most respondents (51.4%) had no preference between computer use and no computer use in the office, 31.4% preferred computers, and 10.9% preferred no computers. Most (88.0%) were either "very satisfied" or "satisfied" with their visits (**Table 2**).

Self-reported levels of satisfaction with visits, computer malfunction at visits, perception of the doctors' skills at using computers, patients' views of their own health, computer use at work or home, familiarity with computers, patient demographics, and perception of residents' attitudes toward computers did not seem to influence patients' preference for computer use during the consultation (**Table 2**). Perception of the doctor's attitude toward the computer was the one category that influenced patient preference: The more positive they perceived their doctors' attitudes toward the computer to be, the more likely respondents were to indicate a preference for computer use ($P = .0012$). A larger proportion of patients preferred computer use when the doctor was rated as "very skilled," when the patients' view of their own health was "poor," or when the family doctors' or residents' attitudes were "very positive" about computer use.

When asked about the effects computer use had on different aspects of patient-physician interactions, respondents were most likely to indicate that computers had a "very positive" or "positive" effect for all items except the "level of distraction of the doctor" and the "time spent chatting with the doctor about nonmedical matters," which were more commonly rated as being unaffected by computer use (**Table 3**).

DISCUSSION

Patient-physician communication is central to every physician's practice. Physicians have been concerned that the introduction of computers in the office will lead to a breakdown of communication and rapport.^{1,6} The results of this study, which are in keeping with previous research about patient satisfaction and preference for computer use, suggest that this concern is unfounded. Computer use has either been found to have no effect or to have a positive effect on patient satisfaction.^{1,6-9} In this study, 57.1% of respondents thought that computer use had either a "positive" or "very positive" effect on their overall satisfaction with their visits, with another 30.3% thinking there was no effect.

In previous studies, privacy of information has been of concern to both patients and physicians when implementing computer systems in physician offices.^{1,2,6} Most respondents in this study actually believed that there was either a "positive" or "very positive" effect on

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Table 2. Comparison of respondent and visit characteristics with preference for or against computer use in the office: Overall, 31.4% of respondents preferred having their physicians use computers during consultations, 51.4% had no preference, and 10.9% preferred that their physicians did not use computers; N = 175.

RESPONDENT AND VISIT CHARACTERISTICS	NO. OF RESPONSES	PREFERRED COMPUTER, %*	NO PREFERENCE, %*	PREFERRED NO COMPUTER, %*	2-TAILED PVALUE
Level of satisfaction with the visit					.9771
• Very satisfied	81	27.2	54.3	9.9	
• Satisfied	73	35.6	52.1	8.2	
• Somewhat satisfied	18	33.3	44.4	22.2	
• Not satisfied	1	100.0	0.0	0.0	
Computer malfunction during the visit					.7093
• Yes	9	22.2	66.6	11.1	
• No	134	34.3	50.7	9.0	
Perception of doctor's skill at using the computer					.7467
• Very skilled	23	46.2	46.1	5.1	
• Skilled	39	27.6	54.1	10.2	
• Somewhat skilled	98	33.3	53.3	13.3	
View of own health					.9666
• Very good	48	29.2	64.6	6.3	
• Good	91	33.0	52.7	11.0	
• Poor	10	50.0	30.0	20.0	
• Very poor	2	0.0	100.0	0.0	
Perception of doctor's attitude toward computer					.0012
• Very negative	4	0.0	50.0	50.0	
• Somewhat negative	1	0.0	0.0	100.0	
• Unsure	69	23.2	59.4	14.5	
• Somewhat positive	38	34.2	50	13.2	
• Very positive	48	52.1	45.8	2.1	
Perception of resident's attitude toward computer					<.001
• Very negative	1	0.0	100.0	0.0	
• Somewhat negative	2	0.0	100.0	0.0	
• Unsure	74	25.7	51.4	20.3	
• Somewhat positive	33	27.3	66.7	6.1	
• Very positive	43	53.5	46.5	0.0	
Computer use at home					.9927
• Yes	118	35.6	53.4	6.8	
• No	55	21.8	49.1	20.0	
Computer use at work					.9879
• Yes	86	40.7	46.5	9.3	
• No	67	19.4	58.2	14.9	
Familiarity with computers					>.999
• Very familiar	66	40.9	48.5	6.1	
• Somewhat familiar	68	33.8	52.3	12.3	
• Not familiar	16	0.0	68.8	18.8	
• Never used a computer	27	18.5	48.1	14.8	
Age, y					.985
• <20	2	50.0	0.0	50.0	
• 20-39	23	21.7	65.2	8.7	
• 40-65	102	38.2	49	10.8	
• >65	46	17.4	54.3	10.9	
Sex					.8200
• Female	107	28.0	52.3	13.1	
• Male	62	37.1	51.6	8.1	
Ethnic background					.7739
• White	146	32.9	51.4	9.6	
• Other	22	22.7	63.6	9.1	
Level of education					.9932
• Completed grade school	15	33.3	40.0	13.3	
• Completed high school	48	29.2	60.4	8.3	
• Completed postsecondary education	61	27.9	52.5	13.1	
• Completed postgraduate education	44	38.6	43.2	9.1	

*Not all respondents answered all questions; percentages do not add to 100% owing to these missing data.

Table 3. Respondents' views on the effects of computer use on different aspects of the patient-physician relationship: *N* = 161.

EFFECT OF COMPUTER USE	RESPONSES, %				
	VERY POSITIVE	POSITIVE	NO EFFECT	NEGATIVE	VERY NEGATIVE
Level of distraction of the doctor	8.6	10.9	61.1	6.9	1.1
How well the doctor listened	26.3	22.9	38.3	4.0	0.0
Doctor's eye contact	23.4	24.0	33.7	8.0	0.6
Length of visit	18.3	29.7	38.3	2.3	0.6
Overall satisfaction with the visit	24.0	33.1	30.3	2.9	0.0
Ability to voice concerns to doctor	24.0	30.3	33.1	2.3	0.6
Ability of doctor to explain your conditions	26.3	30.9	31.4	1.7	0.0
Ability of doctor to write prescriptions	25.1	28.6	30.3	1.7	1.1
Access to laboratory information	15.4	31.4	34.3	0.0	0.0
Access to chart information	20.0	36.0	28.6	0.6	0.0
Privacy of information	21.7	20.6	36.6	2.3	1.1
Time spent chatting about nonmedical matters	11.4	18.3	54.3	4.6	0.6

privacy; only 3.4% of respondents were concerned about a "negative" or "very negative" effect.

Solomon and Dechter found no difference in perceived level of physician distraction, satisfaction with the level of eye contact, and degree of listening with computer use.⁸ Legler and Oates found no effect of computer use on ease of communication, physician attention to patients, or physicians' ability to explain problems.⁹ Gadd and Penrod found that computer use had no effect on communication or eye contact.⁶ In our study, patients actually indicated more often that computer use had a positive or very positive effect on eye contact and ability to explain problems. Computer use was most commonly rated as having "no effect" on degree of distraction.

Women and older patients have previously been found to have less positive attitudes toward computer use.⁶ However, Gadd and Penrod found that age, sex, and self-rated familiarity with and use of computers did not affect patient preference for computers.⁶ A slight negative trend was noted by Garrison et al between familiarity with and use of computers and satisfaction with computers during consultations, but they found that these factors did not influence patient preference for computer use.⁷

Visits in which a greater proportion of time is spent chatting have been associated with increased patient satisfaction.¹³ Respondents in our survey were most likely (54.3%) to respond that computer use had no effect on time spent chatting about nonmedical matters.

A positive association has been found between physician computer skills and patient's satisfaction with computer use in the office.⁷ Such a relationship was not found in this study; however, there was a very interesting trend between doctors' and residents' attitudes toward the computer and patient attitudes toward computer use.

This is an important reminder of the influence doctors have over their patients' attitudes and preferences.

Our survey generated a surprising amount of spontaneous commentary from respondents, with impressive insight into the relationship between patients and the computer. One respondent actually summed up the results of this research project beautifully:

It is the attitude of doctors to patients that affects overall satisfaction. The attitude of doctor to computer is barely relevant. A computer is a tool. Would you ask if we were concerned about a doctor's attitude to his stethoscope?

Limitations

This study had a fairly low response rate, partly because a number of surveys (13/300) could not be delivered owing to incorrect mailing addresses. Also, the way the survey was constructed meant that the second page was double-sided, and several respondents (7/300) missed that page entirely. Further, the study results were only analyzed using descriptive and correlational statistics, so only trends can be surmised. There was also a higher proportion of female and elderly respondents than in the general patient population, which might have influenced results. While females and older individuals have previously reported less positive attitudes about computer use, this study and the work of others do not support this finding.⁶

Conclusion

Most patients expressed no preference for whether or not computers were used in the physician's office, although computers had a positive effect on overall satisfaction with visits. Doctors' attitudes toward computer use were found to influence their patients' preferences.

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Contributors

Both authors contributed to concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests

None declared

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