

Patient Perceptions of Physician Use of Handheld Computers

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ABSTRACT:

Background: Handheld computers have advantages for physicians, including portability and integration into office workflow. However, negative patient perceptions of physician use of handheld computers in the examining room might limit integration.

Objective: To survey patients' perceptions of handheld use, and compare those with their providers' perceptions.

Methods: A survey of patient attitudes toward handhelds was conducted among patients at a low-income university clinic. Internal Medicine residents providing care were also surveyed.

Results: Patients (N=93) were mostly female (79%) and ethnic minorities (67%) with average age of 39. Only 10% of patients did not like the idea of a handheld computer in the exam room. Other negative attitudes were also seen in a minority of patients. Some physicians (23%) reported reservations about using the handheld with patients.

Conclusions: Negative attitudes were rare among patients, but some providers were concerned about using the handheld in the exam room.

INTRODUCTION:

Recently, use of handheld computers (PDAs) among physicians has been dramatically increasing. The number of free and inexpensive medical programs available as drug references, decision support programs, electronic patient records, and practice management tools has mediated the popularity of these devices. Physicians have reported that they believe use of drug reference software on handheld computers helps prevent medication errors.[1] Also, the portable nature of these devices allows them to be easily integrated into the workflow of clinical practice. Handheld computers can potentially be used easily in the exam room during the patient visit. Because of their small size and rapid accessibility, handheld

computers may be less intrusive than desktops on the physician-patient interaction.

Patient perception of a negative impact of technology on doctor-patient communication or overall care could ultimately limit the effective use of the technology in the examination room. Previous literature on patient attitudes toward computers suggests that patients opinions are mixed.[1-4] In a survey of patients, Rethans et al. reported that introduction of a desktop computer into a general practice surgery clinic did not change the ease of personal contact between physician and patient, as compared with that existing before the installation of the computer.[3] However, 30% of the patients reported that their privacy was reduced.[3] In a more recent randomized, cross-over study of sixty patients, no significant difference was seen in patient satisfaction comparing those seeing a physician with a computer in the exam room versus those without a computer in the examination room.[4]

Although handheld computers are potentially less obtrusive than desktop machines, research on patient attitudes to handheld computers is limited. In addition, knowledge about the alignment of patient attitudes toward handheld computers with that of their physicians is limited. The objective of this study was to survey patients at a low-income university-based primary care clinic regarding their attitudes.

METHODS:

Study Design: In the context of the planning phase of a randomized trial of physician use of handheld computers for decision support to prevent medical errors, a cross-sectional survey was administered to internal medicine residents at the University of Alabama at Birmingham in March 2002. All residents were then provided handheld computers (Palm or Palm OS Handspring Treo). These PDAs were not used for entering patient data into any hospital systems. A research assistant-delivered patient exit

survey of attitudes toward handheld computers was conducted in late 2002, early 2003.

Setting and Sample: A university-based resident-staffed clinic for low-income patients was used to recruit patients. After their office visit, patients were recruited by a research assistant for exit interviews. Patients were reassured that the answers they gave would not have any effects on the care that they received from their respective doctors, and that their doctors would not be notified of the answers that they had provided. Ethnicity and gender were recorded for non-respondents.

Survey Content: Questions for the patient survey on attitudes toward handheld computers were adapted from prior computer attitude questionnaires.[2,3] The survey was developed by the authors using an iterative process and was pilot tested by a small sample of patients. The patient survey recorded demographic characteristics (age, gender, ethnicity, and education), number of visits to the provider, use of computers, and attitudes toward desktop computers. Patients were shown a handheld computer and asked whether the provider used a similar device during the visit. Use was any activity the provider performed in the presence of the patient. Patients were asked questions related to whether they liked the idea of the physician using the handheld computer, whether they would recommend that physicians use handheld computers in the exam room, and whether they felt that the handheld computer would be a useful check against errors. Finally, patients were asked “Doctors who care about their patients do not want a handheld computer in their practice.”

The survey for internal medicine residents included demographic characteristics, comfort using computers, owning a handheld computer, and data related to attitudes toward handheld computers, including the specific question: “I have reservations using a handheld computer in front of the patient.”

Analysis: The frequency of patient attitudes toward handheld computers was first calculated. Correlation between scale items was assessed (Cronbach’s alpha). A summed scale of attitudes was also calculated. Associations between attitudes toward handheld computers and general attitudes toward computers were assessed. Differences in attitudes between those whose physician had used the handheld computer in the exam room were compared with those who did not use the handheld using similar tests. Nonparametric tests (Fisher’s exact and

Wilcoxon rank-sum test for trend) were used to assess significance as appropriate.

Finally, frequency of resident-reported reservations about using the handheld in front of the patient were calculated.

RESULTS:

We approached 246 consecutive patients for exit interviews on 27 separate clinic sessions between November 2002 and February 2003. Of these, 93 (response rate = 38%) agreed to participate in the survey. Non-participants were more likely male (35% versus 21%, $\chi^2 = 5.3$ (df = 1) p = 0.02), but were identical in ethnic distribution to participants. Characteristics of patients are summarized in Table 1.

Table 1: Characteristics of 93 Patients Surveyed		
	N*	%
Age		
Less than 30 years	25	28
30 to 55 years	52	58
Over 55 years	12	14
Male	19	21
Female	71	79
Education		
Less than high school	25	28
High school graduate	55	62
College Graduate	9	10
Ethnicity		
African American	60	64
White	31	33
Other	2	2
I like the idea of a doctor with a computer in the exam room		
Strongly Agree	14	16
Agree	42	47
Neutral	28	31
Disagree	4	4
Strongly Disagree	2	2
Visits to this Doctor		
First Visit	36	39
Two to Five Visits	33	35
Over Five Visits	24	26
Computer Use		
Never	33	37
Rarely/Sometimes	22	25
Frequently/Very Frequently	34	38
* N varies slight due to small numbers of missing values (less than 4%).		

The majority of patients were female, ethnic minorities, and a substantial minority (28%) had less than a high school education. The general attitude towards computers in the examination room was positive, with only 6% of patient participants disagreeing that with the statement “I like the idea of a doctor with a computer in the exam room.”

Attitudes toward Handheld Computers:

In general, patients at this clinic had positive attitudes toward handheld computers (Table 2).

Table 2: Patient Attitudes toward Handhelds	N*	%
Attitude 1. I like the idea of a doctor with a handheld computer in the exam room		
Strongly Agree	14	16
Agree	39	43
Neutral	28	31
Disagree	7	8
Strongly Disagree	2	2
Attitude 2. I think the handheld computer could be a useful check against mistakes		
Strongly Agree	20	22
Agree	51	57
Neutral	11	12
Disagree	6	7
Strongly Disagree	2	2
Attitude 3. Doctors who care about their patients do Not want a handheld computer in their practice		
Strongly Agree	4	4
Agree	19	21
Neutral	36	40
Disagree	28	26
Strongly Disagree	8	9
Attitude 4. I would recommend the doctor continue to use the handheld computer while in the room with the patient		
Strongly Agree	11	12
Agree	40	44
Neutral	24	27
Disagree	12	13
Strongly Disagree	3	3
* total N = 90 (3 patients with missing data)		

Among the 90 patients who answered these questions, the average prevalence of negative response to attitudes indicated by these four measures was 17%. Rates of agreeing/strongly agreeing with the questions worded “I like the idea of a doctor with...” were similar when asked for computers in general (63%) and handheld computers

(59%). Patients were fairly consistent across their self-reported attitudes. The correlation across the four measures was high (Cronbach’s alpha = 0.84).

Patients who never used computers (N=33) less frequently reported that they liked the idea of residents using handheld computers (45% versus 66%, Fisher’s exact, p=0.038) compared with those (N=56) who did use computers. Those patients who never used a computer were also more likely to agree or strongly agree with the statement “Doctors who care about their patients do not want a handheld computer in their practice” (16% versus 36%, Fisher’s exact, p= 0.01).

Use of Handhelds by Resident Physicians:

Eight patients (9%) reported that their physician had used a handheld computer in their presence in the exam room. There was a consistent trend toward more positive attitudes toward handheld computers among those patients exposed to use of the handhelds in the exam room (Table 3).

Table 3: Patient Positive Attitudes toward Handheld Computers by Use of Handheld Computer in Exam Room.	Handhelds	
	Used N=8	Not Used N=82
I like the idea of a doctor with a handheld computer in the exam room		
Strongly Agree/ Agree	90%	57%
I think the handheld computer could be a useful check against mistakes		
Strongly Agree/Agree	100%	76%
Doctors who care about their patients do Not want a handheld computer in their practice		
Strongly Disagree/Disagree	75%	29%
I would recommend the doctor continue to use the handheld computer while in the room with the patient		
Strongly Agree/Agree	75%	56%

A summed scale (from 0 to 4) of these dichotomized four attitudes was calculated. Patients whose physician had used a handheld computer had a significantly higher score (mean = 3.4 (SD 1.4)), compared with those who had not experienced their physician using the handheld (mean = 2.3 (SD 1.6); Wilcoxon rank-sum test z = 2.3, p = 0.02) thus indicating more positive attitudes.

Any additional comments that the patients made to the interviewer were also recorded. Anecdotally, based on review of these comments, during the six-week rotation at the clinic the patients consistently expressed a belief that the use of handheld computer could be very useful in helping to improve the care that they received.

Internal Medicine Residents:

Eighty-two internal medicine residents who staffed our clinic participated in the study. The mean age of residents was 28 years old. The majority (78%) were male and Caucasian (76%). Sixty-two percent of the residents reported owning a handheld computer.

Most of the 82 residents (66%) agreed that they felt that there was enough time to use the handheld computer in the clinic. However, a significant minority (23%) of residents reported, "I have reservations using a handheld computer in front of the patient."

DISCUSSION:

Patient attitudes toward handheld computers were mostly positive, and were consistent with attitudes reported for computers overall. Not surprising, experience with computers enhanced positive attitudes toward handheld computers.

Although all resident physicians were provided handheld computers, patients reported that they only used the handheld computer in front of the patient in 9% of visits. It is possible, but highly unlikely, that patients did not accurately recall handheld use, since they were queried immediately after their visit. Even with these small numbers, we were able to detect a positive association between use of a handheld computer in the exam room and greater positive attitudes toward these devices.

Physicians who are current users of handheld drug database software have reported that handheld computers save time, and are easily integrated into office workflow.[1] Software programs for handheld computers have the potential to decrease medical errors and enhance medical decision-making.[1,5] Use of programs with patients, not just in patients' presence, potentially can facilitate shared decision making and increase patient compliance. However, to be maximally effective, physicians must be comfortable using the handheld computer in the exam room with the patient.

In our physician survey, the prevalence of resident reservations to use of handheld computers in the exam room (23%) seems disproportionate to actual patient concerns when considering that only 10% of

patients did not like the idea of the resident using the handheld computer. The data from the present study on patients' positive attitudes can be incorporated into educational programs as a mechanism to reduce the barriers to use of handhelds in the exam room.

Our setting, with a diverse, often low socio-economic, patient population, including many individuals with limited computer experience, was a strength of our study. Our resident sample also had a range of experience with handheld computers. Although the patients in our study were reassured that their data would be anonymous, they still may have been hesitant about conveying negative attitudes toward their physicians and/or technology. Thus, our results may under-represent the negative attitudes toward handheld technology. Limitations include the small sample size, and lack of participation by all patients. Although most of the non-respondents cited lack of time and other appointments as the reason for not participating, it is possible that the non-respondents had different attitudes from the participants, even though they were quite similar demographically.

In addition, because few physicians were using the handhelds in the patients' presence, more research is needed about patient attitudes in settings where handheld computer use with patients is common.

CONCLUSIONS:

Patient attitudes about physician use of handheld computers were mostly positive, and may be influenced positively by actual experience with the physician using the device.

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