The accessibility of information systems for patients: use of touchscreen information systems by 345 patients with cancer in Scotland.

Janne Pearson BSc, Ray Jones PhD, Alison Cawsey PhD, Sandra McGregor BA, Ann Barrett FRCP, Harper Gilmour MSc, Jacqueline Atkinson PhD, Jim McEwen FFPHM
Glasgow and Heriot Watt Universities, and Beatson Oncology Centre, Scotland UK

ABSTRACT

Aim: *To examine cancer patients' use, and satisfaction with touchscreen information systems. By examining the experience of subgroups, to address issues of equality of access.*

Patients: *345 patients starting radiotherapy at the Beatson Oncology Centre (BOC), Glasgow.*

Methods: *Patients were invited to use a touchscreen computer at the start of treatment. They were sent a printout of what they saw on screen. Patients had open access to the system. Data were collected at recruitment, intervention, 3 weeks and 3 months. Predictor variables included: patients' demographics, information preferences, technology use, and psychological state. Outcome variables included: use and views of the computer and printout.*

Results: *Younger, broadsheet readers with previous computer use were more likely to find the system easy to use. Older, tabloid readers were more likely to find the content new and relevant.*

Discussion: *We need to make systems adapt to users' different needs. More effort should be made to provide affordable information for older, generally less literate and technologically less literate groups in suitable locations.*

INTRODUCTION

The NHS in England and Wales seeks better public access to information, and cites the Internet as a possible method[1]. It recognises the importance of equality of access. There are a number of factors that may influence the accessibility of information systems to a large proportion of the population:

Interest, relevance and presentation of the content: The majority, but not all, patients with cancer want as much information as possible, at the right time, and appropriate to their personal needs and circumstances[2-4]. Many however do not receive sufficient information and sometimes feel that information is being withheld[2]. Preferences for the medium of presentation may vary by ethnic group[5]. There is a plethora of leaflets available on cancer but the supply of these may be restricted not least because they are quite expensive[6] and completely free access may be seen as 'wasteful'. Moreover, the reading age and technical content may make them inaccessible for many patients[7].

Faith in the content: The need to base information for patients on proper systematic reviews of the evidence has been discussed[8]. Most patients will not yet be familiar with this concept; nevertheless, they will have their own views of whether or not they can believe the information they are obtaining.

Ease of use: Both hardware and navigation and other aspects of the interface are important and may be different for naïve rather than regular computer users. Prevalence of previous computer use amongst older people in Scotland is still not great. For example, in a Glasgow study of 200 gastroenterology outpatients (mean age 54, range 16-89 years) about to undertake a computer interview[9], only 20% had used a computer more than a few times. Most patients (88%) chose to use a touchscreen rather than a mouse. The 24 patients who used the mouse were all frequent computer users; 15 frequent computer users still chose to use the touch screen[9].

Convenient location at a convenient time: The proportion of the UK population with home Internet access is still very low, probably about 7%[10]. On the other hand, patients attending health centres may feel stressed and with pressure of time. For example, 37% of gastroenterology patients[9] were case or borderline cases on the Hospital Anxiety and Depression Scale[11] (HADS) for anxiety and 17% for depression. Many come in the car of relatives or friends, or possibly hospital transport, and feel the pressure of time as well as the general anxiety of their visit[12].

Cost: Unlike the USA, in the UK we pay for telephone connect time as well as service provider connect time. An hour-long local telephone call made during daytime costs $4 (calculated using the BT rate of 4 pence/minute + tax and not including line rental and £1=$1.5). The cost of having information systems permanently connected to the Internet during daytime is therefore considerable.

This paper reports on the accessibility of two similar touch screen computer systems used in a randomised trial in Scotland, by 345 patients with cancer. Differences between the two computer systems and comparison with a group receiving booklets will be reported elsewhere[13]. We report here on use of the computers, reported ease of use, numbers using the computer again, and the use made of computer-printed

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materials. We compare this to patients' demographic characteristics and their level of anxiety, previous computer use, attitudes towards using the computer, and expressed information need. In so doing, we address issues of equality of access.

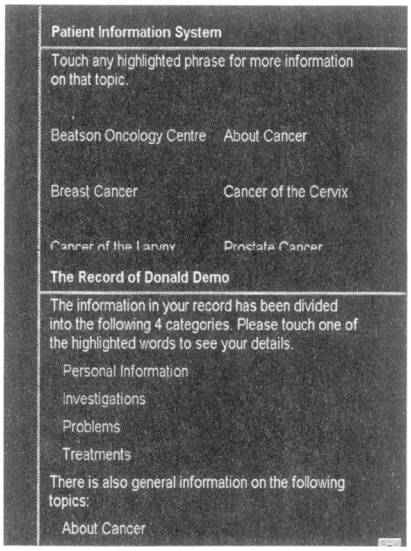
METHODS

Setting: The BOC provides specialised non-surgical cancer treatment for patients throughout the West of Scotland. It is the second largest cancer centre in the UK. Two computers were available for use by patients: one for an invited use in the researchers' office, and a purpose built 'booth' with all but the screen hidden away for subsequent open access, in a nearby waiting area in one of the six treatment areas of the BOC. Both computers had 17" touchscreens.

Patients: Patients were recruited between August 1996 and December 1997. Eligible patients were those planned to receive radical radiotherapy treatment, who knew they had cancer, without visual or mental handicap, without severe pain or symptoms causing distress. Of the 715 asked, 190 (27%) refused to take part. The refusal rate by cancer was 27% breast, 37% cervical, 33% laryngeal, and 18% prostate. Thirty-one percent of refusers said that they were not interested in the study, 13% said that they did not need or want information, 11% had no time; 11% gave no reason. The refusal rate increased with age: 24% of those aged 50-59 and 39% of those aged 70 plus refused.

Patient information systems: patients allocated to computer groups comprised 345 of the 525; 167 used a 'general' system, 85 a system starting from their personal details, 93 chose whether to start with personal or general details. Figure 1 shows the opening menus for general and personal systems. Although designed independently, the content of this system is similar in 'level' to the UK AdultCancer Help Website (http://www/medweb/bham.ac.uk).

Figure 1. Opening menus for 'general' system (top) and 'personal' system (below).



Data Collection: The data used in this report were: (1) a HADS[11] and a questionnaire on expressed information needs[3-4] both completed at recruitment; (2) a questionnaire completed at home afterwards, including previous use of technology and newspaper read. The comparison of 'tabloid' (less 'educated' presentation) vs. broadsheet was found to be a useful predictor when looking at expresssed information need[14]; (3) age, gender, cancer site, postcode (used to calculate Carstairs Deprivation Category (depcat)[15]; (4) time spent using the system; (5) responses to an interview after the invited use of the computer about ease of use; (6) a questionnaire completed at home after the intervention asking about the relevance and utility of the information; (7) a questionnaire completed at home 3 months later about use of the printed information and patient preferences between time with a professional or time with a computer.

Analysis: Outcomes of use and preference were compared to patient characteristics using cross-tabulations and χ^2 tests, t-tests, and multiple logistic regression analysis (MLRA). Questions about the relevance and utility of the information (see Table 2) were answered on five-point scales but were grouped into two, comparing modal category (and categories above or below if appropriate) with the remaining categories. A 'satisfaction with content score' was constructed by adding one for each agreement with a positive attribute (Q1-4) and subtracting one for each negative attribute (Q5-7).

RESULTS

Follow-up of patients

Of 345 patients randomised to use the computer, 21 had withdrawn or been excluded before the invited use of the computer; 305 remained in the study to the three month follow-up of which 284 responded.

Baseline mental state and attitudes

Nineteen percent agreed that the idea of using the computer made them feel a bit anxious, but 50% said that they were looking forward to it, and 32% were neither particularly interested nor anxious. On the other hand, 39% were anxious and 13% depressed, measured

by HADS. Most (84%) wanted as much information as possible; 6% wanted only good news; 7% did not want any details.

Age, previous use of computers and technology

Sixty-eight (20%) of the patients were under 50, 116 (34%) in their fifties, and 161 (47%) were 60 or over. Fifty-five percent (178) had never used a computer before and of those who had 56 (39%) had only used one a few times. Sixty-nine percent drove a car, 90% used a video, 85% used a microwave, and 77% used a cashcard. A 'techno score' ranging from zero to 5 (used all five technologies) was calculated; five people had not used any of the five technologies (score zero), and a further 15 had only used one.

Invited use

The mean time spent using the computer when invited at the intervention was 12 (range 1-44) minutes. The patient's attitude towards obtaining information was the best predictor of using the computer for longer (Table 1). Seventy-eight percent found using the computer easy or very easy. Those who said that they had used a computer before were more likely to find the computer easy to use compared to those who had never used one (88v71%). Males and older patients expressed more satisfaction with the content than younger females. The individual components of this (Table 2) explain why. Older, tabloid reading males were more likely to think the information was useful, new, and relevant even though broadsheet readers and those with previous computer use were more likely to say that the information was easy to find. Tabloid readers and those with little use of technology and no use of computers before were more likely to think that the information technical and overwhelming while younger broadsheet readers thought it too limited.

Further use of computer and printout

93 patients used the system again: 27% of the 345 who participated in the intervention but 30% of the 305 who remained in the trial until 3 month follow up. Sixty-nine used it only between intervention and 3-week follow up, 9 only between 3 week and 3 month follow up, and 15 at least once in both periods. None of these patient characteristics were significant predictors in MLRA of further use. Those who appeared more enthusiastic towards use of the computer initially were more likely (in bivariate analysis) to re-use the computer. We report elsewhere[13] that the personal group was more likely to use the computer than the general group.

Use of computer printouts at home

Patients were sent a printed copy of what they had seen on screen a few days after their use of the computer. At three months, 67% said they had used this at home. Those who were more used to using new technologies seemed to be more likely to make use of the printout at home (Table 1).

Table 1. Predictors of measures of outcome of satisfaction and use of computer

Measure	Predictors from cross-tabulations		Predictors from MLRA
Time using computer > 10 minutes	High Tech. score Wants all information	63v48% 57v32%	Wants all information
Computer easy to use	Age<60 Broadsheet Previous computer use High Tech Score Wants all information	86v68% 85v73% 88v71% 86v71% 80v56%	Age; Newspaper read; Time since diagnosis;
Content Satisfaction score >2	Age 60+ Males Non-breast HADS not anxious	50v33% 53v34% 49v35% 48v28%	Attitude to computer; HADS anxiety
Re-use of computer	Look forward computer	34v24%	None
Use of printout at home	Previous computer use High Tech score Look forward to comp. Wants information	74v62% 74v57% 76v59% 70v44%	Age; Attitude to computer; Technology use;
Prefer computer	None		Attitude to computer;

Patient preference

At three months 75% of patients expressed a preference for 10 minutes with a nurse specialist or radiographer and only 25% preferred unlimited use of the computer. No patient characteristic could be used to predict these preferences.

DISCUSSION

Equality of access to information is an important consideration in the design, development and implementation of consumer health information systems. Location and cost will be important factors.

The complexity of the interface and content will also affect satisfaction and maybe further use. Systems that are tailored to the individual[16] may provide more appropriate interfaces and content and therefore help to provide equality of access. In this study patients offered information from their medical record were more satisfied[13]. However, the system did NOT tailor according to the patient's age, information preferences, previous use of technology, or other characteristics. This report has shown that these do influence how easy patients find a system to use and their satisfaction with it, and further study would be worthwhile of tailoring according to these factors.

Ease of use: This system was designed to be simpler to use than a Web browser. Although nine out of ten patients who had used computers before thought it easy to use only 7 out of ten of non-computer-users did so. To ensure equality of access we should be aiming for 95% finding systems easy to use. Most people still feel more comfortable using paper rather than computer. Interestingly those more familiar with technology were more likely to use the printout, suggesting that they may, in general, more likely to adopt new ideas.

Location: The numbers reusing the computer were not great. One explanation of this is the poor location within the hospital. The only site that we were able to find was in a waiting area for one of the six treatment rooms. Patients being treated in the other five areas would have had to make a special 'trip' to use the computer. Many patients want to leave the hospital as quickly as possible for all the feelings of anxiety and depression they may associate with the hospital.

Table 2. Predictors of components of 'Satisfaction with Content' score

	Question asked	Predictors from cross-tabulations	Predictors from MLRA
POSITIVE ITEMS	1. Was the information useful?	Age 60+ 72v57% Males 73v58% Not Breast 70v59% Diagnosed >1 year 83v69v55% Deprived 73v63v56%	Age Time since diagnosis
	2. Did it tell you anything new?	Age 60+ 67v48% Males 75v46% Not Breast 71v47% Look forw.comp. 63v50%	Gender Attitude towards computer
	3. Was information relevant?	Males 80v70% Tabloid 84v64% Not Breast 81v68% Not depressed 77v49%	HADS depression Newspaper read
	4. Find information easily?	Broadsheet 91v82% Previous Computer Use 92v80% High techno score 91v79%	Use of technology
NEGATIVE ITEMS	5. Feel overwhelmed with information?	Deprived 42v23v18% Tabloid 36v12% Anxious 34v18% Doesn't want all info 45v22% No prev. computer use 34v14% Low techno score 35v16%	Previous use of computers HADS anxiety Newspaper read
	6. Was it too technical?	Anxious 17v8% No.prev.comp.use 14v7% Low techno score 17v6%	Use of technology
	7. Was it too limited?	Age <60 61v43% Broadsheet 61v44% Prev.comp.use 61v46%	Age Newspaper read

Furthermore many have time pressures from accompanying people or hospital transport. Having access at home would be ideal but there are technical and cost barriers for home Internet use by older British populations. If new developments such as WebTV 'take off' in Britain, home access may become a possibility, but at present the Internet is only used by the more educated.

Interface and Information: That more males, older people and those with prostate, laryngeal, and cervical cancers compared to breast cancer, found the

information useful, new, and relevant is not surprising as breast cancer patients tend to be from higher social classes, more educated and also have more information available[14].

The system used in this study was simpler than most consumer sites on the WWW. However, although most patients found the system easy to use and the information useful, there were differences by demographic and social characteristics. Evidence from elsewhere suggests that touchscreens are preferred to use of the mouse, that few people in the UK have access to the Internet at home, that connection charges for the Internet are not insignificant, and that finding health service sites can be difficult. Evaluation of the use of 'stand-alone' touchscreen computers in community sites, supported by, rather than permanently connected to, the WWW, would be worthwhile. However, most WWW sites have been designed for educated technologically sophisticated users without the possibility of adaptation to local needs. More thought in the development of consumer health information sites needs to be given to equality of access.

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