The role of workplace access to the Internet in supporting evidence-based practice: results of the IMPACT study

Presentation Aims and Contents

This paper presents results from the IMPACT study, a UK study funded by the Department of Health. It sought to evaluate how open access to the Internet in the clinical area impacts upon the evidence-based practice of nurses and allied health professionals (AHPs). The study was conducted in an acute care setting in a large teaching hospital.

The paper will limit its focus to the expectations participants had of workplace Internet access and how these expectations compare with experience during the study. Factors influencing the use of the Internet will be discussed. The potential role of library services in promoting use of the Internet for evidence-based practice (EBP) will be considered.

More detailed information of the study results and data collection tools are to be found on the IMPACT website: www.impact.shef.ac.uk

Background

Along with the expansion of Information Communication Technologies (ICTs) is a growing expectation of what these technologies can achieve in the workplace. That such expectations exist in the UK National Health Service is reflected in the current government's Information Management and Technology (IM&T) Strategy outlined in *"Information for Health"* and *"Building the Information Core"*.[1,2]

The current UK Government's IM&T Strategy is the first to reflect the growing social trend in computer and Internet awareness and access.[1,2] As ICT becomes ubiquitous elsewhere, the pressure increases for the NHS to use this electronic technology in order to function and

communicate effectively.[3] For example, the strategy emphasises the importance of the Internet in equipping the NHS to network and communicate with agencies within and outside its organisational boundaries. It also displays awareness that the evidence base necessary to deliver the desired quality of care and clinical governance targets will increasingly to be accessed electronically.[4.5.]

The potential of the Internet as a fast and efficient way of accessing evidence to support practice is well recognised.[6] In the UK, however, nurses have demonstrated difficulty in accessing, appraising and applying evidence to practice.[7] Identified barriers include poor access to ICT and a lack of knowledge and confidence in using the same.[8-10] There a paucity of research on how nurses and Allied Health Professions would use the Internet if access was improved.

The National Electronic Library for Health (NeLH) is a web based government initiative developed to promote access to evidence for clinicians.[1.2.] The success of such initiatives relies upon physical access to the Internet as well as access to the skills, time and inclination to use it. Authors in the American and Australian literature imply that the advantages of the "Internet-driven information age" are beginning to be enjoyed by health care professionals.[6.11.12.] There is an indication that the UK experience is different. Whilst access to the Internet is increasing in peoples homes and public places, nurses have expressed concern about access in the workplace.[11.] The nature of their work and shift patterns can structurally disadvantage nurses from accessing libraries and the Internet. In addition, in their recent report on evidence-based nursing the Foundation of Nursing Studies[13] highlighted the need for training in the use of IT. Many participants in their consultation said that an increase in ward-based access to the Internet was an important factor in promoting evidence-based practice.

The IMPACT study aimed to explore the situation regarding the access and use of the Internet by UK nurses.   It sought to test a number of basic assumptions and expectations which emerge from the related literature and policy cited here. These assumptions are that ward based access to the Internet will lead to:

- An improvement in confidence and skills.

- Use of the Internet to seek clinically relevant information.

- Using the Internet during short periods of downtime during the working day.

- An unacceptable level of misuse of the Internet.

Rationale

Evidence is required on how nurses and AHPs in an acute care setting use the Internet and whether access to the Web has any impact upon practice. These results will inform the implementation of Information and Communication Technologies within health care settings.

Study Aim

The aim of the study was to evaluate the impact of open access to the Internet upon the clinical practice of nurses and AHPs working in an acute care setting.

Sample and Setting

The intervention and control units were two specialist clinical areas in a large teaching hospital: the cardiac and renal units. The two areas are similar in terms of the number and nature of ward areas. They both accommodate a wide range of patients, for example, chronic, acute, critical and interventional care (e.g. angiography and dialysis).

The sample consisted of all registered nurses (n=183 - 208) and AHPs (n=15) in the intervention and control sites. All who agreed to participate were included in the study and

were followed up by questionnaire and interview at three and 12 months. New staff were be recruited into the study.

Methods

Design

The study adopted a before and after controlled trial design employing both qualitative and quantitative methodologies.

Intervention

Dedicated networked computers were installed on each of the four cardiology wards. The computers provided unrestricted access to the Internet via the University of Sheffield network. Each nurse and therapist was given his or her own password to log on to the Internet. The machines were designated solely for use to access the Internet and could not be used for routine ward work, care planning or word processing. The computers were situated so that the nurse or therapist did not have to leave the ward or patient to access the net. A printer was also supplied. The exact location of the intervention was decided in consultation with ward staff.

Data Collection

The data collection methods, times, participants and response rates are summarized in Table 1. Three data collection methods were adopted, questionnaire survey, intervention monitoring and semi structured interviews.

A survey tool was developed specifically for the project as no other suitable tool could be identified. Dimensions of the questionnaire were, factors encouraging or discouraging use of a ward-based networked computer, attitudes to the intervention, views on how they would use it, access and use of the Internet, training requirements and attempts to change

practice. An initial draft of the questionnaire was piloted on a critical care ward which was not part of the intervention or control group.

Continuous monitoring of the use of the networked computers on the cardiology wards was conducted using an Internet surveillance software package, (STARR. © Iopus 2000). Any use of the Internet was stored on the project server. This data was collected from October 2000 to October 2001.

Semi-structured interviews were carried out with 16 participants who were recruited using purposive sampling. The interview required participants to create a concept map illustrating their feelings about workplace access to the Internet. This concept map was used as an interview guide.

Data Analysis

Questionnaire responses were analysed using standard parametric and non-parametric tests. Logistical regression analysis was used to analyse questionnaire responses in order to ensure changes detected were related to the intervention and not to the sample changes.

A database was created to manage and analyse the monitoring data. Criteria were generated to identify categories of "activity" for users of the intervention. Categories were work and non-work searching, work and non-work email, and library databases. A Kappa coefficient test was used to check the reliability of the allocation of categories.

Interpretive phenomenology was used to analyse the interview data. Emerging and recurrent themes were identified using line-by-line analysis.

Results

The study produced a wealth of data on expectations, attitudes and use of the Internet in the clinical area. This paper will focus on expectations of the intervention and how this compares to its actual use in the intervention area.

The multiple and complex nature of the data collection methods create a challenge when presenting the results. In the interests of clarity, the different data will be presented together under the following headings: participation and response rates, access to the Internet, feelings regarding workplace Internet access, expectations, changing practice, factors influencing Internet use.

Participation and response rates

Response and participation rates are summarised in Table 1.
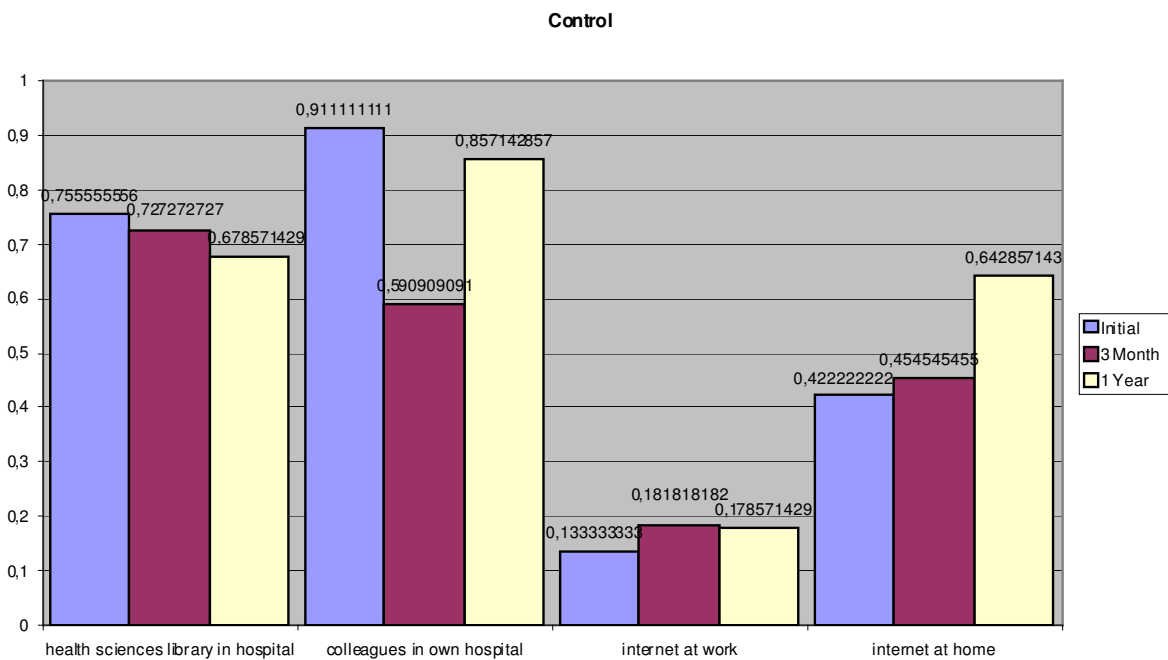
Table 1.   Participation and response rates

Data Collection Method	Sample	Data Collection Period(s)	Response / Participation	
			Intervention	Control
Questionnaire	All qualified nurses (n=183-208) and allied health professions (n=15) in the Intervention and Control area	Baseline	63 (68.5%)	43 (37.4%)
		3 months	39 (41.1%)	22 (19.5%)
		12 months	43 (44.8%)	28 (24.8%)
Interviews	Purposive sample from Intervention and Control area of 16, comprising:	Baseline	16	
	12 registered nurses	3 months	16	
	2 physiotherapists	12 months	16	
	1 radiographer			
	1 occupational therapist			
Monitoring	All qualified nurses (n=88)and allied health professionals (n=7) in the Intervention area	Continuous for the intervention period	Nurses = 73 users AHPs = 3 users	

The sample groups were well matched regarding age, gender, qualifications, professional grade.
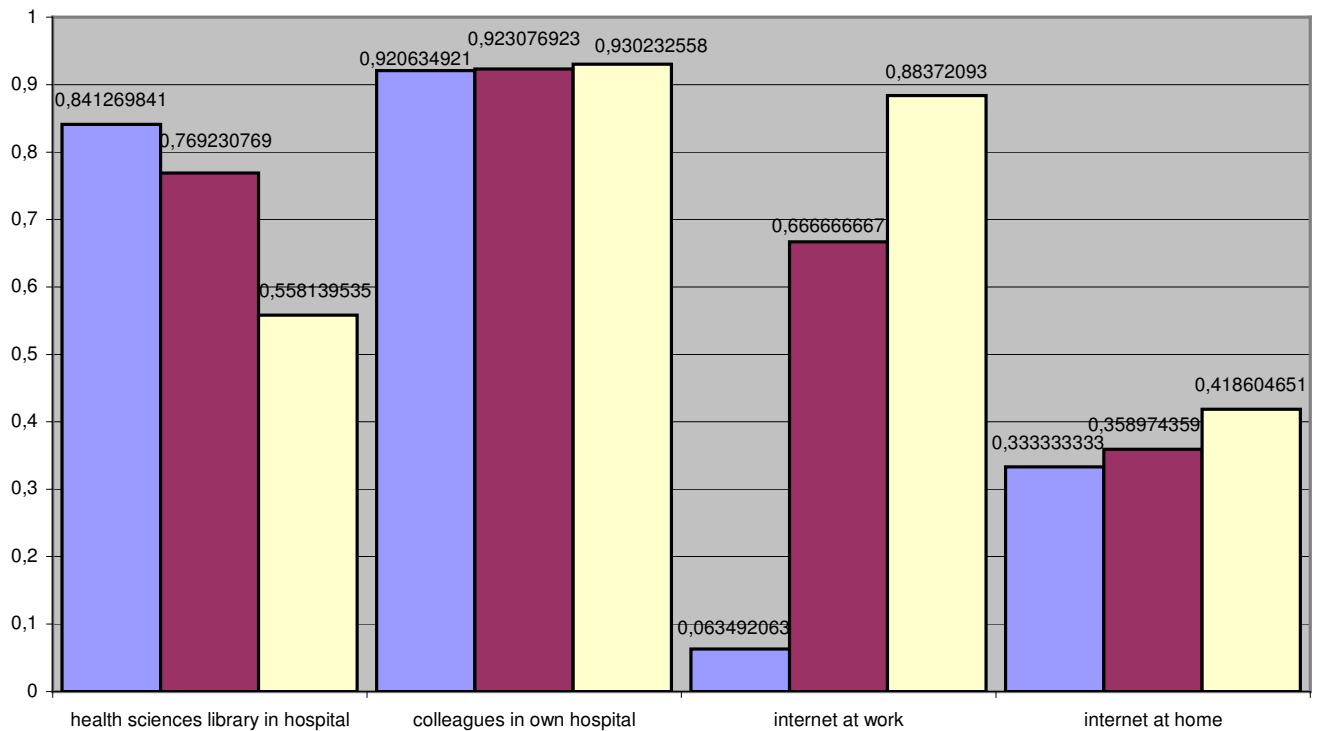
Access to the Internet,

Baseline figures indicated access and use of the Internet at work was low. As expected, work Internet access and use grew in the intervention group. There was a reported increase in the use of the Internet at work to access information for practice in this group.

Home access and use of the Internet was low at baseline. It increased during the period of the study in line with national trends. Again, as anticipated, more members of the control group used the Internet at home to access information for their work (Chart1).

Control

Intervention

	health sciences library in hospital	colleagues in own hospital	internet at work	internet at home

(Bar chart values:)
- health sciences library in hospital: 0,841269841 / 0,769230769 / 0,558139535
- colleagues in own hospital: 0,920634921 / 0,923076923 / 0,930232558
- internet at work: 0,063492063 / 0,666666667 / 0,88372093
- internet at home: 0,333333333 / 0,358974359 / 0,418604651

All participants had right of access to the university health sciences library, which was on the hospital site. Responses indicated a high level of use of this library to access work related information. The indication was that information was obtained via journals rather than electronically as a majority did not know they had access to the Internet at this library. Only a few reported use of the Internet at the library both at baseline and at follow up (Table 2).

Using LRA use of the health sciences library dropped significantly (p=0.0001) in the intervention group during the study period

Participants explained their reluctance to use the library and its Internet facilities. They found their shift patterns and inability to leave the ward during a shift partially responsible.

"It's just not accessible to most people in the hospital now, it's only accessible to medics really now, they can go off the ward whenever they like with their bleeps they don't have to be here all the time".

Table 2. **Health science library Internet access and use**

	Access	Use
Intervention:		
Baseline	8 (13%)	1 (2%)
3 Month	3 (8%	0
6 Month	8 (19%)	1 (2%)
Control:		
Baseline	4 (9%)	1 (2%)
3 Month	4 (18%)	1 (5%)
6 Month	6 (21%)	1 (4%)

% is of those who responded to the question

Interview responses from those who were unfamiliar with and uncertain of the Internet indicated that they felt less awkward learning on the ward than in the library:

> *"I don't feel awkward about being useless with computers, its not my thing, but I'm more likely to get round it if people I know are around, and we are all in the same boat here, not like in the library where people breath down your neck and look annoyed if you look like you don't know what you're doing".*

In addition, the new library was seen as a University, not NHS, facility.

> *"The old library felt like it was ours, part of the hospital, it now feels like part of the University".*

Feelings regarding workplace Internet access

During the period of the study, respondents were consistently positive regarding Internet access on the ward and had expectations it would help them access evidence to improve patient care (Table 3).

Table 3.   Feelings regarding ward-based Internet access

	Intervention			Control		
Feelings towards workplace access to the World Wide Web	*Baseline*	*3 month*	*12 Month*	*Baseline*	*3 Month*	*12 Month*
Positive	51(81.0%)	38(97.4%)	41(95.3%)	33(73.3%)	15(68.2%)	22(78.6%)
Neutral	9 (14.3%)	1(2.6%)	2 (4.7%)	12(26.7%)	5(22.7%)	5(17.9%)
Negative	3 (4.8%)	0(0.0%)	0 (0.0%)	0(0.0%)	2(9.1%)	1(3.6%)
Feelings about workplace access to library databases	*Baseline*	*3 month*	*12 Month*	*Baseline*	*3 month*	*12 Month*
Positive	51(81.0%)	36(92.3%)	42(95.3%)	37(82.2%)	18(81.8%)	20(71.4%)
Neutral	8 (12.7%)	3(7.7%)	1(4.7%)	6(13.3%)	2(9.1%)	5(17.9%)
Negative	2 (6.4%)	0(0.0%)	0(0.0%)	2(4.4%)	2(9.1%)	3(10.7%)
Feelings towards workplace access to email	*Baseline*	*3 month*	*12 Month*	*Baseline*	*3 month*	*12 Month*
Positive	39(61.9%)	32(82.1%)	35(81.4%)	25(55.6%)	12(54.5%)	14(50.0%)
Neutral	19(30.2%)	7(17.9%)	7(16.3%)	18(40.0%)	8(36.4%)	12(42.9%)
Negative	5(7.9%)	0(0.0%)	1(2.3%)	2(4.4%)	2(9.1%)	2(7.1%)
Feelings about effects of access on patient care	*Baseline*	*3 month*	*12 Month*	*Baseline*	*3 month*	*12 Month*
Positive	39(61.9%)	32(82.1%)	40(93.0%)	25(55.6%)	12(54.5%)	18(64.3%)
Neutral	23(36.5%)	7(17.9%)	3(7.0%)	17(37.8%)	6(27.3%)	9(32.1%)
Negative	1(1.6%)	0(0.0 %)	0(0.0%)	3(6.7%)	4(8.2%)	1(3.6%)

% is of those who responded to the question

The respondents remained positive in both the control and intervention area over the period of the study. There was an indication that those exposed to the intervention remained more positive, but this was not statistically significant.

Expectations

At baseline, staff expected to be encouraged to use the Internet because of *"Being able to find information related to my work"* (Table 4). They also had an expectation that the Internet on the ward would be more convenient to use in short periods of quiet time.

Table 4 Factors encouraging use of the intervention

What do you think might encourage you to use a networked computer in the clinical area	Intervention	Control
I'll be able to find information related to my work?		
Baseline		
3 Months	61 (96.8%)	43 (95.6%)
12 Months	37 (94.9%)	20 (90.9%)
	41 (95.3%)	27 (96.4%)
I'll be able to get information as and when I need it?		
Baseline		
3 Months	59 (93.7%)	41 (91.1%)
12 Months	39 (100%)	18 (81.8%)
	37 (90.7%)	25 (89.3%)
I'll be able to give better patient care?		
Baseline		
3 Months	49 (77.8%)	41 (91.1%)
12 Months	34 (87.2%)	18 (81.8%)
	37 (86.0%)	25 (89.3%)
I'll be able to communicate with other people via email?		
Baseline	32 (50.8%)	31 (68.9%)
3 Months	23 (59.0%)	12 (54.5%)
12 Months	27 (62.8%)	21 (75.0%)
I'll be able to use short periods of quiet time more usefully?		
Baseline	49 (77.8%)	24 (53.3%)
3 Months	35 (89.7%)	11 (50.0%)
12 Months	34 (79.1%)	19 (67.9%)
I'll be able to develop computer skills?		
Baseline		
3 Months	55 (87.3%)	33 (73.3%)
12 Months	32 (82.1%)	17 (77.3%)
	38 (88.4%)	14 (50.0%)
I'll be able to develop information gathering skills?		
Baseline		
3 Months	53 (84.1%)	35 (77.8%)
12 Months	30 (76.9%)	14 (63.6%)
	33 76.7%)	19 67.9%)

% is of those who responded to the question

Staff expectations were particularly high regarding email. They anticipated email would assist with communication regarding patients and ward management.

Whilst these expectations remained high, monitoring and interview data indicate that experience did not always match expectations. Expectations of email were not realized. Work related email activity by nurses accounted for only 13 hours of use during the study period. This amounted to 1.6% of total use (Table 5).

Table 5.   Nurses' Internet activity by category

Category	Total time in hours : minutes (% of total use)
Email check	19:24 (2.4%)
Library databases	38:33 (4.8%)
No Activity	7:12 (0.9%)
Non-work email	166:13 (20.7%)
Non-work search	400:56 (49.8%)
Work email	13:00 (1.6%)
Work search	159:06 (19.8%)
Total	804:06 (100%)

Interview data indicated why work email activity was so low. Inability to check ones own email or rely on the recipient having or checking email were cited as explanations.

"My biggest disappointment, email, it's no help because it relies on you knowing that people will check it regularly, at least daily, and they don't"

"We can't all check our email on the ward first thing when we have to share one computer, so you can't depend on it".

Staff expectations regarding the convenience of ward-based Internet access were matched by experience. This was illustrated in the interviews.

"It's been great having the computer here, we can go on when it's quiet, nobody minds".

"I don't go down to the library and use the Internet like I do on the wards it's just not accessible".

Monitoring and interview data demonstrated that participants were able to use short periods of quite time to use the intervention (Table 6).

Table 6. **Length and frequency of episodes of intervention use**

Length of activity (minutes)	Frequency	% of activity
0-10	4877	75.6%
11-30	1344	20.8%
30+	230	3.6%
Total	6451	100%

"Now I'm on the net here that's sort of opened up a lot of opportunities because if I've got ten minutes between doing something, I can have a quick gander".

The ability of nurses to use the Internet during quiet times was best illustrated at night.

"If I wasn't on the Internet I'd be reading a paper or chatting, you have to do something when you are just keeping an eye on patients".

The expectation that Internet access on the ward would enable staff to access clinically relevant information was not always borne out by experience.

"I use it more for non-work as I started getting disappointed with there not being much stuff around on practice that I was looking for".

Despite this, the expectation persisted. *"Being able to find information related to my work"* was reported to be the factor which would most encourage participants to use the Internet on the ward.

Changing practice

Questionnaire responses indicated that, despite increased access to evidence via the Internet, those working on the intervention wards did not report any increase in trying to change practice. Change did occur in the control group (Table 7). Using logistical regression, an increase in attempts to change practice was demonstrated within the control group (p=,0.0001). This increase created a significant difference between groups (p=0.014).

Table 7.   Changing practice

	Tried to change practice	Succeeded in changing practice
Intervention:		
Baseline	17 (27.0%)	10 (15.9%)
3 Month	9 (23.1%)	2 (5.1%)
6 Month	14 (32.6%)	7 (16.3%)
Control:		
Baseline	11 (24.4%)	6 (13.3%)
3 Month	11 (50.0%)	3 (13.6%)
6 Month	12 (42.9%)	5 (17.9%)

Despite this, having Internet access on the ward as opposed to the library was seen to be better in promoting sharing information obtained. This may lay the foundations for future change in practice.

"If we were in the library doing this we wouldn't think of sharing it with others, we'd just print it and take it home".

"We shared the information with some doctors and a physiotherapist on the ward at the time, and decided to put together a patient information sheet".

Factors influencing Internet use

A number of factors emerged which influenced Internet use. These are: skills, ward culture, and the nature of the information.

Monitoring data indicated immature computer, information and searching skills. An example of this was the preference for popular search engines to search for clinically relevant information, rather than library databases. The preference for popular search engines may also reflect lack of time and the need to conduct a search in periods of less than ten minutes.

"I find Google really easy to use so I look for something, not work, then while I'm there have a quick look for something to do with work".

Ward-based Internet access did have a positive impact on skills. Participants felt less embarrassed about admitting their lack of skills to colleagues than they did in the library. They were also able to share skills and learn from one another:

"I think we will all learn together here and help each other, if I was on my own and something went wrong I'd probably just give up whereas this way we'll crack it between us".

Skills were developed by the one or two staff on each of the intervention wards who emerged as "enthusiasts" for the Internet. Not all of these were proficient at using the Internet prior to the study, but they appeared to recognise the benefit of the intervention and helped others in two ways. The "enthusiast" was sometimes consulted to carry out the work, for the other staff or would be asked to work with a staff member to help them develop their own skills.

> *"I don't use it myself, but I get loads of stuff copied that other people have found, and if I want something I ask Mo, she gets it for me".*

> *"Penny was around and came to see what I was ranting about, between us we worked things through".*

Monitoring data echoed this as some participants were seen to log on and have difficulty with the task in hand. The "enthusiast" would then log on and complete the task.

The ward culture was seen to heavily influence use of the Internet on the ward and use of evidence in practice. Monitoring data showed that use of the Internet was lower on the wards where nurses reported a management culture resistant to change and negative towards evidence-based practice.

> *"The ward sister thinks the Internet will be a waste of time so I think the rest of the staff will go along with her"*

On the wards with a culture open to change and which reflected trust, the attitude to the Internet and its use was much more positive.

> *"On here, everyone is for it, I think, definitely the people in charge, they want us to make the most of it, so we will I guess".*

A disincentive to using the Internet was the nature, emphasis and content of nursing research and literature. Nurse participants did not consider the published materials they located on the Internet to be appropriate to their practice. Research identified by searching the Internet considered too biomedical in orientation and was not seen to be useful in informing nursing care. Other information was not evidence based.

> *"We had a patient admitted with a Hickman line, we don't get many so I thought I'd better get up to date so I did a few searches, the medical databases gave me some medical stuff but not real care research. I tried Ask Jeeves or Google, that was better as I found stuff on how to care for your child's line in advice for parents. But none of this was research based, just someone's opinion".*

The theoretical and philosophical emphasis of nursing research was a disappointment to nurses. They considered such literature of use to staff undertaking post registration education but of little clinical relevance.

> *"Somehow I don't see how all these so called models or theories of nursing are going to help… that's one thing I've learnt in this project, don't go to nursing databases go to Medline or Google".*

Discussion

These results will now be discussed in the light of the assumptions the study sought to test. Key messages of relevance to health sciences libraries are then identified.

In summary, by locating the Internet in the ward area, access to the technology at work did increase in the intervention group. Ward access was perceived to circumvent obstacles preventing use in the health sciences library. The fact that the majority of use was in periods of 10 minutes or less, and the pattern of use in the four intervention areas, did support the assumption that staff would make use of short periods of quiet time on the ward to use the Internet. Staff remained positive about the Internet being a source of information related to their work. However, exposure to the Internet as a result of this study did not trigger an increase in reported attempts to change practice. At the end of the study, the vast majority of respondents saw IT skills development as a factor to encourage use of the intervention. This response, in addition to lack of search proficiency indicated by the monitoring data, implies that many staff had not yet been able to develop their skills as anticipated.

A small number of enthusiasts emerged who were able to increase their knowledge and skill in using the Internet. There was also an indication that the ward location prompted shared learning. However, these results indicate that 12 months may not be sufficient to develop the skills required for most staff to easily access information related to practice. In addition, the study highlights that physical access to the Internet is not the only factor involved in promoting staff to use the Internet and trying to change practice. Time and a supportive ward culture were still required. There was also a reported lack of applied research available which would be helpful to nurses in practice.

The final assumption relates to the level of misuse of the Internet, which was predicted to occur as a result of it being based in the clinical area. It would be easy to interpret the high level of non-work searching as misuse but this should be resisted. Often, non-work searching was interspersed with work searching. In addition, staff used non-work activity to develop the skills necessary to move on and conduct a work related search.

From these key points a number of messages emerge for consideration by nurses, allied health professionals, NHS organisations and health sciences libraries. These are as follows:

- Access to time and support, in addition to hardware, is required to develop the necessary skills for NHS staff to participate in the Internet driven information age.
- Basic, ward-based IT training is required in order the technologically terrified to engage with the Internet as a tool to inform practice.
- By investing in the training and development of ward-based enthusiasts, large acute Trusts can help to build the information seeking capacity of their staff.
- More positive and creative partnerships need to be developed between health sciences libraries and NHS Trusts to improve the access to and skills in retrieving information to inform practice. Potential projects could include library staff participating in ward-based, outreach training of clinical staff, supporting organisational knowledge management schemes or helping in the development of "push technologies" which would provide staff with a short cut to accessing information relevant to their practice.
- The nursing profession needs to engage in the health services research agenda in order to produce evidence relevant and applicable to nurses' practice.

Conclusion

This study provided an opportunity to compare expectations of ward-based access to the Internet with this facility as used in practice. The results indicate that the intervention was valued and used. However, there is some distance to travel, before staff in the UK can actively participate in the Internet-driven information age. Expectations regarding Internet access on the ward were revealed as partially unrealistic. The study generates evidence and adds to existing knowledge indicating that factors other than location are important. Culture, supportive management, dedicated time and training opportunities are necessary to facilitate the use of IT and

promotion of evidence based practice. By developing partnerships with health sciences libraries, NHS Trusts may be assisted in developing the information and knowledge management skills required of both the clinical staff and organisation.

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