Refereed papers

Barriers to the use of e-health technology in nurse practitioner–patient consultations

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ABSTRACT

Purpose This paper examines primary care nurse practitioners' (NPs') use of information available via e-health technology (EHT) within consultations. It explores which information resources NPs use in clinical decision making, their comparative use of electronic versus paper-based and human information resources, the reasons behind their choices and how the use of different resources impacts on patient interactions.

Methods Semi-structured interviews were undertaken with 12 NPs recruited from 11 different general practitioner (GP) practices and five primary care trusts (PCTs) within the West Midlands South Strategic Health Authority, UK.

Findings The key finding was that for NPs an effective information resource is one that provides sufficient information to generate a patient management plan rapidly. Speed, familiarity and trust are vital ingredients for regular use. Paper-based information resources therefore retain a significant role, and together with human information resources are still more frequently used than most electronic, and particularly web-based, resources. The latter are not yet well established within the context of patient consultations. Electronic clinical support systems (such as Mentor, PRODIGY and GPnotebook) are regularly used, however, because they are often linked electronically to patient records, and generate brief information in a form accessible to both nurses and patients. By contrast, searching for information from web-based resources was considered time-consuming, technically difficult and disruptive to patients. All NPs reported some negative effects on patients of using computers: mostly disrupted rapport and longer consultations. However, the majority had developed ways of working to overcome these difficulties and that helped them to maintain their patient-centred focus.

Conclusions Study NPs had received only very limited information technology (IT) training, but nevertheless were enthusiastic about computer use. This suggests that with further training they could adapt their practice to embrace more EHT, which would enhance their ability to be more autonomous and to base their practice on sound clinical evidence.

Keywords: electronic information, information resources, nurse practitioners

Introduction

This paper examines the extent to which UK primary care nurse practitioners (NPs) use information available via e-health technology (EHT) within the context of routine patient consultations, and barriers to EHT use. First, we explore NPs' comparative use of electronic, paper-based and human information resources, and the reasons behind their choice of which to use in the consultation setting. Findings are considered in the light of their impact on patient consultations and NPs' ability to achieve autonomous, evidence-based practice.

These are important issues because successive UK policy documents emphasise the need for nurses to work within extended roles and new service paradigms, particularly at the interface between primary and secondary care.[1–4] As a result, NPs are a heterogeneous and growing group, taking on roles traditionally fulfilled by general practitioners (GPs) and emergency care doctors. NPs are required to work more autonomously, so that being able to use EHT that provides supporting clinical evidence and expertise is important. We consider reasons why this might not happen in the next section. We then describe the research we carried out with NPs and conclude by considering implications for future policy and practice.

Background

The impetus for increasing usage of EHT in UK primary care comes mainly from the rollout of the National Programme for Information Technology (NPfIT), but other policy drivers are important, particularly those aimed at reducing health inequalities, and at empowering patients to manage their own chronic disease.[5,6] Realisation of these policy benefits is associated with the successful implementation of EHT, but, to date, there is little evidence that EHT improves either patient or organisational outcomes.[7,8]

Royal College of Nursing (RCN) surveys indicate that implementing EHT and achieving evidence-based nursing practice are not simple; one does not automatically lead to the other.[9,10] A practical barrier is lack of access to information technology (IT) hardware. In 1998, the National Health Service (NHS) pledged that all nurses would have access to a computer, the internet and email by 2002, but these targets remain unmet.[10–12]

Another barrier to EHT usage is a lack of educational and training support. Nearly 70% of RCN survey respondents had received no recent IT training, and the training the NHS does provide (for example, the European Computer Driving Licence programme) is not always taken up.[10,13]

Infrastructure issues aside, insufficient attention has been paid to the 'people' side of technology transfer when designing and implementing EHT.[7,14–16] It is necessary to assess and customise the fit between implemented IT systems, nurses' established work processes and practice time constraints, followed by careful planning of change management strategies, backed up by on-the-job training and support.[17–19] Unfortunately, available evidence demonstrates that 63% of interested nurses have not been involved in any NPfIT consultation or planning.[9,10]

Nurses and EHT

The success of different nursing populations in implementing EHT is also variable. Research suggests that age and education are key predictors, with younger age and higher education being positively associated with these activities.[20,21] Gender may also explain variation in EHT usage.[22]

Additionally, a generalised computer anxiety has been identified amongst nurses. They are likely to articulate multiple concerns such as: perceived monotony and fear of being deskilled by using clinical decision support systems (CDSSs); fears that care will become computer process-driven rather than patient driven; lack of confidence in computers' ability to assist care provision; practical fears about multitasking during consultations and fears of computer usage alienating patients or disrupting practitioner–patient relations.[8,23–27]

Accessing research evidence has also been identified as antithetical to the value many nurses traditionally place on 'head knowledge'. As research evidence grows, so does recognition that clinicians routinely tackle problems that exceed the bounds of human cognition, yet many nurses still appear to believe that they should be able to resolve such problems without the assistance of EHT. This has been called the 'guild mentality' or practising 'memory-based medicine'.[28,29] However, trust can be improved if CDSS advice is fully justified and based on clearly-displayed data.[30]

Further barriers to EHT usage reside in operational difficulties and problems with the design of software–user interfaces. Clinicians report that using CDSSs is too time-consuming, they lack appropriate data and nomenclature standards, and the quality of information available through web-based resources is questionable.[31,32] There are also concerns about patient safety, privacy and legal liability.[33] If EHT is to improve patient safety, nurses must be involved in its development and implementation.[29,34] We will return to these issues after first describing the study methods.

Methods

A qualitative approach was used to obtain in-depth understanding about NPs' attitudes, motivation and experiences of using EHT during patient consultations. We recruited from the West Midlands South Strategic Health Authority (SHA) through primary care trust (PCT) nurse leads and snowball sampling. We needed a sample of 12 NPs; the final sample of 12 NPs came from 11 different GP practices across five PCTs, out of a total SHA population of 49 NPs. All those recruited were female, experienced nurses, aged 33–58 years. Twelve interviews were deemed sufficient for detailed, but exploratory research, and the necessary ethical and local research approvals were obtained.

Semi-structured interviews with NPs explored:

- which information resources they use
- use of electronic versus other types of information resources
- reasons for choices about which information resource to use
- whether electronic resources have the right format for use during consultations
- how using electronic resources affects patient care during consultations
- the frequency with which NPs direct patients to use web-based resources.

As far as possible, interviews were conducted in the workplace, to establish available EHT and NPs' access to it, and also so that they could demonstrate how they use EHT within their daily practice. Interviews were audiotaped and transcribed verbatim, and data were subjected to thematic analysis following best practice principles for qualitative data analysis.[35]

Results

Information resources used by NPs

NPs used the British National Formulary (BNF) most frequently: all used it daily and sometimes several times a day. The next most commonly-used resources were electronic clinical support systems (ECSSs) such as Mentor, PRODIGY and GPnotebook, followed by textbooks and GP colleagues. Less popular were specialist web pages, databases and clinical guidelines, and if guidelines were used, it was usually in paper rather than web-based formats. This highlights the continuing dominance of paper-based resources for NPs during patient consultations, and also the importance of human information resources over and above available web-based resources, and the necessity of ensuring that EHT does not interfere with using them.[30] However,

ECSSs maintain an important position within NPs' information armoury.

A recurrent theme throughout the interviews was that an effective information resource for consultation use is one that provides sufficient information for rapid generation of patient management plans. It must be quick to use, familiar and trusted. Thus, a major advantage of book use is that familiarity makes navigation quicker and easier compared with web-based competitors. One NP compares using the BNF book with accessing the web version, illustrating difficulties with a too-rigid search facility, and the tension she feels with a patient in front of her:

> 'with the BNF [book] if you actually know exactly, like the antibiotics, I know what section they're in and what pages. I can turn straight to it and just quickly flip through to what I want, where with the eBNF [on-line] I'd find that you've got to write exactly what you want in it and when you've got a patient in front of you sometimes even if you just get one letter wrong, which sometimes you do and it can get quite difficult, so I much prefer to actually use the book on the BNF than the website.'

Portability is another major advantage of paper-based resources. Some NPs worked peripatetically, so that EHT was not always available at the point of care.

While our sample of NPs reported working closely alongside practice nurses, other NPs and pharmacists, they consulted most frequently with GPs, particularly when new to the NP role. Cited advantages of consulting GPs were that: NPs did not need to waste patient time searching for information in unknown locations; GPs were assumed to be up-to-date; discussion with GPs reduces the likelihood of NPs making unsafe decisions; and NPs trust GPs' judgement in situations where there is conflicting evidence. One new NP explains:

> 'Well I do use the doctors, the GPs, because a lot of them are very up-to-date with a lot of studies ... I think that they probably get access to better journals than us ... during the mornings sometimes when you need to know something and the patient is with you, I know certain doctors have got their specialities ... so I know who to go to.'

However, deferring to GPs may introduce value judgements that could lead to bias, albeit from a trusted source, as the following quote illustrates. An NP explains:

> 'my senior partner ... [said] ''NICE is best evidence and British Hypertension Society is just a bunch of old boys ... with what they think might be the best way forward ... that's not evidence''.'

NPs' use of EHT

All 11 study practices were moving towards increasing EHT use: all had computer-based patient records

systems and a few had gone, or were going, 'paperless'. A couple were preparing for specific NPfIT initiatives, such as access to the national information Spine and electronic hospital appointment booking. So NPs in the study were practising within a context of increasing EHT usage, yet most were unaware of the NPfIT. NPs were, however, more aware of the role played by the General Medical Services (GMS) contract and the Quality and Outcomes Framework (QOF) as drivers of increasing EHT usage, linked to practice funding. One NP said resignedly:

> 'NSFs [National Service Frameworks] were bad enough, now we've got the GMS contract which doesn't measure quality, but box ticking. The GP business has to be maintained so it has to be done.'

Compared with RCN survey respondents, our sample of NPs was relatively well-equipped and used computers daily for completing electronic patient records.[10] All had computer access, and all those whose work was predominantly practice-based had their own computers and internet access. However, some were constrained by low computer specifications or slow, unreliable internet access.

Regarding gender, our sample did not concur with research suggesting that middle-aged females are more resistant to EHT usage.[21] Instead, the NPs were very positive about IT usage, and did not report feeling deskilled, or that their practice was becoming more monotonous as a result of increased computer-driven standardisation, as others have suggested.[24] Instead, the NPs were enthusiastic and comfortable about using electronic patient records. One said:

> 'I would hate to go back to written notes, and [the electronic patient record system] makes you write good notes.'

Given their positive attitude, it was surprising that the NPs had received little or no formal IT training. What they had received was limited, focused on the use of electronic patient records and generally comprised only half a day. NPs described themselves as self-taught computer users, and most received their IT support from other household or family members. Their equable attitude to this was surprising.

Electronic clinical support systems

The importance of fast, familiar and trustworthy information has already been highlighted. One way of achieving this is by presenting information in formats that can be readily used in consultations, as one NP explains:

> 'We'd be more inclined to look at the resources that are more easily available like Mentor really. I mean ... I wanted to look up temporal arteritis the other day and so I just went through that and just printed that off and I found

> that more user-friendly than doing [a literature] search ... I just wanted a general outline, I wanted to know the signs and symptoms, the length of treatment and what, the dose of drugs ... I wanted to refresh my memory on that.'

Packages such as Mentor present overview information of clinical conditions at the right level of detail for consultation use. Most importantly, NPs can produce printouts in accessible formats for patients. By contrast, literature searches are seen as unwieldy, user-unfriendly and lacking sufficient information synthesis.

Another important factor in the popularity of ECSSs was that NPs had bookmark links or embedded electronic links to them from patient records systems. This facilitated their use without disrupting the patient focus:

> 'Well Mentor is linked to the EMIS system so that's what we've got ... You [don't] have to actually go into that separately ... For me to [go onto the web] I would have to go into, I'd have to bring the screen down and I would have to go in like this. I do go into it sometimes. But the patient does feel, if you find that we do any of these things, that you're not concentrating on them ...'

Other web-based electronic information resources

Other websites most frequently used by NPs (with NP numbers using them) were: RCN (6); specific disease sites (5); immunisation (4); Clinical Evidence (4); Department of Health (4); BNF (3); pharmaceutical databases (3); *British Medical Journal* (BMJ) Learning (3); and Nursing and Midwifery Council (2). More frequent use of the RCN website bodes well for the joint RCN/NHS Connecting for Health (NHS CfH) nursing web portal initiative. Our findings suggest that NPs already view the RCN website as a trusted information mediator. A few NPs browsed online journals (mainly via the RCN and university links). Only one NP spontaneously mentioned the National Electronic Library for Health, and none reported using interactive CDSSs. Directing patients to web-based information usually occurred when prompted by patients, and was infrequent.

NPs, computers and patient interactions

NPs were asked whether the demands of computers, rather than patients' needs, were driving consultations.[8] They responded that it was complying with QOF data entry requirements that was influencing consultations, rather than computer demands per se. This facilitated business processes, but not necessarily

high-quality care. However, some NPs spoke positively about QOF alerts prompting them to undertake certain health checks during consultations. One explains:

'Yes, [we do have alerts] ... for the Contract ... Or possibly for the patient care, God forbid! [Laughs] Yes, yes, we do have a prompt system, which is absolutely excellent I have to say, because it does concentrate your mind.'

All NPs reported some negative effects of using computers: mostly disrupted nurse–patient rapport and longer consultations. A particular difficulty concerns recording information on the computer with the patient present. Strategies developed for minimising negative effects on patients include: typing most notes once patients have left; maximising eye contact; only typing once patients have finished talking; and positioning the computer screen so that patients can see notes. Others acknowledged the problems to patients:

'[I] say to the patient "Excuse me, I'll just put it on, and isn't it a pain in the neck?" you know?'

We did find evidence of a 'guild mentality'. Half the sample of NPs was uneasy about searching for information in patients' presence, because they thought patients expected them to have the required information in their heads. Others were more comfortable with sharing uncertainty, and several involved patients in searching for information with them. NPs remained sensitive to patients' needs, however, and varied their practice to accommodate individual patient preferences in this respect. One NP describes how she shares pictures with children, to hook their interest:

'in dermatology the patients just laugh, especially the smaller children, you know, so in a way it covers up your own inadequacy really ... Kids just love anything horrific, the worse the better.'

Sharing information resources with patients was particularly useful for validating NPs' management plans, particularly where patients had arrived with alternative advice.

Discussion and conclusions

We explored NPs' use of EHT within patient consultations by identifying the information resources they use routinely, and comparing their use of electronic resources versus other types. Amongst our sample of 12 NPs we found that paper-based resources retain a unique, significant role, and together with human information resources are still more frequently used than most electronic, and particularly web-based, resources. The latter are not yet well established within the context of these NPs' patient consultations.

Three other key messages were identified. First, an effective information resource for these NPs is one that provides sufficient information to generate a patient management plan rapidly. It must be quick to use, familiar, and generate trusted information. ECSSs such as Mentor, PRODIGY and GPnotebook met these needs better than other web-based resources as they provide 'overview' information in formats suitable for both NPs' and patients' immediate reference. They are familiar because they have been available for a long time in practices, and, most importantly, there are embedded electronic links to them within some patient record systems.

Second, by contrast, searching for information from external web-based resources was considered time-consuming, technically difficult and disruptive to patient-centred care. Once identified, web-based resources could prove more difficult to navigate than paper resources, and produced outputs in user-unfriendly formats. There were also issues about the trustworthiness of information derived by this means, as reported by others.[20]

Finally, a significant barrier to EHT use may have been our sample's lack of IT training, reflected in national trends.[9] Nevertheless, the NPs had a positive attitude and were enthusiastic about computer use, which suggests that with further training they could embrace more EHT in practice.

Initiatives such as the joint RCN and NHS CfH nursing portal (currently being developed) are in harmony with NPs' tendency to access web-based information via a trusted mediator, which in most cases is the RCN website. NPs have also developed ways of working with patients that minimise disruption caused by computers, and help maintain their patient-centred focus.

Although this study is small and exploratory, we consider our sample is typical of many currently practising UK NPs. This has been confirmed anecdotally through our involvement at national NP events, and through conference presentations to primary care and nursing audiences. Taken together, these findings suggest that NPs are well placed to continue developing as more autonomous practitioners, increasingly able to base their practice on sound clinical evidence accessed through a variety of electronic resources.

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CONFLICTS OF INTEREST

None.

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