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Acute care nurses' perceptions of barriers to using research information in clinical decision-making

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Acute care nurses' perceptions of barriers to using research information in clinical decision-making

Aim. To examine the barriers that nurses feel prevent them from using research in the decisions they make.

Background. A sizeable research literature focusing on research utilization in nursing has developed over the past 20 years. However, this literature is characterized by a number of weaknesses: self-reported utilization behaviour; poor response rates and small, nonrandom sampling strategies.

Design. Cross-case analysis involving anonymised qualitative interviews, observation, documentary audit and Q methodological modelling of shared subjectivities amongst nurses. The case sites were three large acute hospitals in the north of England. One hundred and eight nurses were interviewed, 61 of whom were also observed for a total of 180 h, and 122 nurses were involved in the Q modelling exercise (response rate of 64%).

Results. Four perspectives were isolated that encompassed the characteristics associated with barriers to research use. These related to the individual, organization, nature of research information itself and environment. Nurses clustered around four main perspectives on the barriers to research use: (1) Problems in interpreting and using research products, which were seen as too complex, 'academic' and overly statistical; (2) Nurses who felt confident with research-based information perceived a lack of organizational support as a significant block; (3) Many nurses felt that researchers and research products lack clinical credibility and that they fail to offer the desired level of clinical direction; (4) Some nurses lacked the skills and, to a lesser degree, the motivation to use research themselves. These individuals liked

research messages passed on to them by a third party and sought to foster others' involvement in research-based practice, rather than becoming directly involved themselves.

Conclusions. Rejection of research knowledge is not a barrier to its application. Rather, the presentation and management of research knowledge in the workplace represent significant challenges for clinicians, policy-makers and the research community.

Keywords: evidence-based nursing, research information, barriers to research utilization, Q methodology, mixed method case design

Introduction

The notion of research evidence as a basis for professional decision-making underpins the modern-day National Health Service (NHS) (Kirk 1996) and has long been a part of nursing's professionalization project (English 1994). Research-based practice has become a part of contemporary nursing and nurse educational discourse (English National Board for Nursing, Midwifery and Health Visiting 1990). However, despite *prima facie* acceptance of the value of research for nursing, it is also known that for many reasons nurses and midwives do not seem to incorporate the results of research routinely into the clinical decisions they make (Kenrick & Luker 1996, Meah *et al.* 1996).

The sizeable research literature focusing on the issue of research utilization in nursing developed over the past 20 years is characterized by a number of weaknesses. Most studies rely on self-reported utilization behaviour (Funk *et al.* 1995, Retsas 2000, Rodgers 2000). This cannot be relied upon to provide the most valid results. Work exploring the information needs and information-seeking behaviours of doctors reinforces this assertion (Covell *et al.* 1985, Wyatt 2000). Few observation studies have been conducted to establish whether what nurses say they do correlates with what they actually do.

Many surveys of research utilization suffer from small, nonrandom sampling strategies, are underpowered and have poor response rates. This begs the question: 'Would a different picture emerge if ways were found to include the 40–50% of people who do not respond to survey-type approaches?' More fundamentally, the value of self-report studies *per se* may be questioned in relation to the veracity of the results, due to the possibility of inflated reports of research utilization by those responding.

Estabrooks' (1999) recent analysis of the correlates of research utilization reveals that the concept is often poorly defined and understood by researchers. The possibility therefore exists that studies which impose a 'top down' view

of research utilization against which people are 'measured' may in fact be observing very different phenomena. [The multiple applications of Funk *et al.* (1995) 'Barriers' Scale is a prime example.].

This paper, the third in a series, reports on a study that used a mix of observation, interview and Q methodological modelling to explore nurses' use of research information. Here, we focus on the barriers which nurses feel prevent them using research in the decisions that they make. Two previous papers in *JAN* (Thompson *et al.* 2001a, 2001b) have reported acute care nurses' views of perceived usefulness and accessibility of research. Ideally, this paper should be read in conjunction with them.

The study

Aim

To describe perceived and observed barriers to research utilization amongst acute care nurses in the United Kingdom (UK).

Study context

This paper presents some of the findings of a larger study investigating nurses' perceptions of the need for research evidence to support clinical decision-making; how nurses currently access such information; nurses' perceptions of the barriers and obstacles to access and use of research-based information; the extent to which nursing involves making clinical decisions which require research evidence (Thompson *et al.* 2001a, 2001b).

Case sites

The study took place in medical, surgical and coronary care wards in three NHS trusts in the north of England. A detailed description of the case site characteristics may be found in an

earlier paper (Thompson *et al.* 2001a). Site 1 was a district general hospital (700 beds), which acted as a referral centre for a wide geographical area and incorporated a postgraduate medical education centre with good access to on-line databases; Site 2 was a university teaching hospital (800 beds) with a large postgraduate medical library and extensive on-line database provision; Site 3 was a district general hospital (650 beds) offering general medical and surgical services, Accident and Emergency and Out Patient departments; nurses had access to a well-stocked library with on-line access to databases.

Design

The study used a mixed (quantitative and qualitative) method approach in the three case sites, employing interviews (108), observation (180 h) and a form of statistical modelling (Q methodology) to explore and describe data from nurses working in acute care settings regarding the use of research information in clinical practice (122 Q sorts).

Method

Q-sorts, Q samples, and Q methodological modelling

Interview and observational data were used to construct a Q sample (a set of stimuli used to model respondents' shared subjectivities on a phenomenon or concept, in this case, barriers to using research in practice). For a more detailed account see Thompson *et al.* (2001c), Stainton-Rogers (1991), Brown (1993).

The 60 statements making up the Q sample are shown in the factor array in Appendix 1.

From qualitative coding To Q sample

The statements used in the Q sorts derive from analysis of interview material and observational field notes, and represent the interpretative 'pattern' codes associated with transcripts. Coding and analysis of qualitative material had three levels. First, descriptive codes were developed that

reflected the text's relevance to a particular research question (for example, does the text relate to barriers to research information use?); second, interpretative codes were developed from 'coding on' from the descriptive coding. Finally, pattern codes were developed that represented themes in the descriptive and interpretative codes. These pattern codes, expressed as exemplar statements, were printed on 60 small cards for sorting by respondents according to a common condition of instruction (COI). An example of the conversion of codes to statements is presented in Table 1.

Condition of instruction and sort distribution

An individual's interpretation of what the phenomenon means *to them* arises as a result of the COI (see Table 1). One hundred and twenty-two individuals (response rate of 64%) sorted the Q sample cards into a roughly normal distribution. Q statement positions were then scored. A statement placed in the -5 position would score 1, +5 would score 11, and so on. The demographic and biographical details of the subjects are shown in Table 2.

Analysing the Q data

PQMethod version 2.09a (<http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/>) was used for the Q analysis; Eigenvalues of more than 5.0 were deemed potentially theoretically significant.

Conventional factor analysis relies on having more rows than columns in a data matrix (Kline 1994), which in Q translates to having more Q statements (rows) than individuals sorting (columns). However, this convention has been shown to be of no practical or conceptual importance to Q approaches, with simulations of different row: column ratios and methods of factor extraction revealing no statistically (or theoretically) significant differences in results (Arrindell & van der Ende 1985). However, PQ Method is not designed for large numbers of sorts and so the data spiking method was used on the advice of Dr Schmolck, who is Maintainer of the Q-Method Knowledge and Software

Table 1 An example of the conversion of Pattern Code, Definition, Q Sample Statement Procedure

Pattern code	Coding definition	Q sample statement
Block-stats	Blocks on research info-use due to statistical fear or deliberate avoidance of 'numbers'	'Statistics put me off research papers or other kinds of research information'
Block-past cost	Blocks on research info use due to previous negative experiences of implementation in terms of 'costs'	'Whenever I have tried to use research in the past it costs me too much money, time or commitment – like getting papers from the library or whatever'

Table 2 Demographic composition of the barriers perspectives

Variable	Barrier perspectives							
	1		2		3		4	
	Mean (SD)	n (%)	Mean (SD)	n (%)	Mean (SD)	n (%)	Mean (SD)	n (%)
Age	32 (7.6)	36 (29)	36 (10)	32 (26)	38 (9.5)	29 (24)	36.5 (10)	20 (16)
Length in speciality	6 (6)	36 (29)	5.5 (5)	32 (26)	8 (8.3)	29 (24)	7 (7.1)	20 (16)
Length since registration	9 (7.05)	36 (29)	12.4 (9)	32 (26)	16 (10.8)	29 (24)	15 (11)	20 (16)
Post								
Staff nurse		13 (65)		18 (75)		16 (62)		11 (61)
Senior staff nurse				1 (4)		4 (15)		3 (17)
Ward manager		4 (20)		2 (8)		1 (4)		1 (6)
Clinical nurse specialist		1 (5)		1 (4)		2 (8)		1 (6)
Other		1 (5)		1 (4)		1 (4)		1 (6)
Education								
5 O Levels or GCSEs		5 (25)		2 (8)		11 (42)		6 (33)
A Levels		1 (5)		4 (17)		3 (11)		3 (17)
Diploma		3 (15)		1 (4)		2 (8)		1 (6)
Vocational		4 (20)		3 (12)		3 (11)		2 (11)
1st degree				3 (12)		1 (4)		3 (17)
Higher degree								1 (6)
Other		2 (10)		7 (8)				
Professional preparation								
SEN				2 (8)		2 (8)		
SRN		2 (10)		4 (17)		12 (46)		4 (22)
RGN		5 (25)		5 (21)		3 (11)		3 (17)
Dip		6 (30)		5 (21)		4 (15)		4 (22)
Degree				1 (4)		1 (4)		2 (11)
Conversion				3 (12)				
Other		3 (15)		(12)				
Research or management involved in job?								
Yes		9 (56)		13 (54)		10 (38)		9 (50)

Note: where subgroups do not total 100% this is due to missing values.

Archive (<http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/>). We used 78 randomly selected Q-sorts, which yielded the four factor initial solution (from a 60 × 78 data matrix). The factor scores for these four factors were inserted back into the beginning of the full (60 × 122) data matrix as reference sorts and the analysis run again resulting in a correlation matrix for the 122 Q sorts against the four reference sorts (representing the extracted factors). This process enabled the use of these correlation coefficients as dependent variables in regression modelling. Quotes or observational data from those individuals who loaded significantly on a factor were used to aid qualitative interpretation of the factors and to add depth to reporting. Analysis was, as in all qualitative projects, not always linear and rigid. However, key analytical decisions and choices were agreed within the research team at each stage.

Regression modelling

Regression modelling (using SPSS 9.0) allowed exploration of factor associations with key demographic variables in the nurses: age, level of education and clinical experience. After checking that assumptions underlying least squares regression were met via scatter plotting, independent variables were entered into a multivariate linear regression model (using the SPSS 9.0 default stepwise option) and where there were significant associations with the Q factors we entered the significant variables into the model together (using the SPSS enter option) as a way of controlling for interactions. The independent variables entered were:

- clinical experience;
- clinical experience in a specific domain;
- clinical specialty/domain;
- nonprofessional educational attainment;

- mode of professional preparation (for example, RGN or Project 2000);
- previous involvement in research as a data collector or subject.

Findings

Q factors: perspectives on barriers to research use

Four perspectives (or factors) on barriers to research information use were revealed which captured most of the variance:

- Perspective One: '*Confidence and Products of Research*';
- Perspective Two: '*Organizational and Cultural Barriers*';
- Perspective Three: '*Prescription, Direction and Clinical Credibility*';
- Perspective Four: '*Individual Scepticism and a Desire to Work Through Others*'

These headings give a sense of the central characteristics associated with each perspective and are discussed below.

Perspective One: 'Confidence and products of research'

This perspective accounted for 12% of the variance between the Q sorts sampled and was held by all nurses (including graduates). Those defining this perspective were characterized by three stances:

- the products of research were 'problematic', overly complex and intellectually inaccessible;
- confidence was lacking in understanding and using the products of research;
- a sense of internal conflict was generated as a result of *wanting* to use research-based information and not being able to.

Problematic nature of research products

Interviews with individuals defining this perspective reveal that statistical material in research publications was a negative influence on engagement. This aversion to quantitative data affected the ways in which nurses approach research material; people often took 'short cuts' in the appraisal process when faced with statistical material:

Int: So would you be put off by an article [with statistics in it]?

Nurse: 'No, I'd read it, but I'd probably scan over the statistics and not analyse them as much as I should do. (Staff nurse, CCU: Site One.)

Interestingly, these shortcuts apparently meant that the nurses focused on alternative characteristics in their apprais-

als of research material, such as who the authors of a report were and the institution involved in producing it.

Role of continuing professional development (CPD)

CPD was the main route by which people came into contact with critical appraisal techniques. The educational experiences of nurses defining this perspective suggested wide variability in the quality of their preparation in CPD, particularly in respect of statistical concepts. Interview data suggested that levels of prior knowledge assumed by teachers, and the teacher's own grasp of the subject, determined successful acquisition of 'statistics':

Nurse: They said, 'don't worry about the numbers just concentrate on who wrote it...whether they knew what they were on about' (Staff nurse, CCU: Site Three)

Nurses outlined patterns of knowledge acquisition that stressed the value of 'background' types of knowledge (e.g. general knowledge such as clinical presentations) as opposed to more useful 'foreground' types of knowledge of patient *management* (Sackett *et al.* 2000). Background knowledge is more commonly associated with facts and the information needs of novices, whereas foreground knowledge is of more use to expert decision-makers. Foreground knowledge demands some knowledge of concepts of benefit, harm, risks and costs – the raw materials for evidence-based decisions, and areas in which quantitative presentation is often a feature.

Attractiveness of plain English

Sometimes it was the language used, rather than the statistics, which was seen as alienating and inaccessible. One of the most attractive and oft-quoted benefits of the two journals cited as the 'most readable' ('Nursing Times' and 'Professional Nurse') was their lack of academic (*sic*) language:

The reason I get the Nursing Times is 'cos it's a bit like a doctor's surgery read, you can put your feet up and...it's just ordinary nurses writing in and saying what they think, and that's what I like about it really. It's not really heavily academic at all really, and it's got a lot of like...bullet points in. (Staff nurse, Surgery: Site Two)

Lack of confidence leading to conflict

Research information was seen as overwhelming in both volume and style of presentation (statement 38, +3), producing a sense of conflict between wanting to use research and not having the skills and confidence to do so. Much of this lack of confidence related to use of computer technology and yet, despite recognizing that computer skills were going to be a key

driver in future ways of accessing information efficiently, many also recognized that they lacked the skills necessary to make use of this technology (statement 28, +3).

Adequacy in professional preparation (*vis à vis* research and computer skills) appeared to be strongly associated with developing confidence in using research-based products for the people defining this perspective. In contrast, those defining perspectives two and three (organizational blocks and need for clinical credibility and prescription) were strongly associated with positive valuations of their educational preparation and confidence in their computer skills, as well as a positive motivation towards research.

Lack of confidence but research motivation

Nurses' lack of confidence with research-based technology and the rejection of research language, complexity and statistics were accompanied by recognition that research-based knowledge itself could be useful. Indeed, the overwhelming characteristic of this perspective is one of internal conflict. Specifically, individuals recognized the potential of research-based knowledge and at the same time acknowledged that it had a place in their clinical decisions. Moreover, they saw research use as everyone's personal responsibility.

Changing cultures: blocking by colleagues

As in perspectives two and three, nurses defining this perspective saw *other nurses* as a major block on research-based information use (statement 35, +3). They rejected the reasons for this as 'cultural' and stated that facilities to help implement research were not available on their ward (statement 46, +3). There was broader recognition that it was change *per se* that was problematic, even for the most mundane of issues:

Nurse: What we're doing now isn't bad practice, it's not going to be detrimental to anybody's health. But I think it's things that should be done slightly differently. But I think it's got to be done gradually. I think you'll just come up with lots of hostility if you try and change things all in one go. Little things like stacking the washing bowls in a pyramid... (Staff nurse, Surgery: Site Two)

Production process

Nurses stated that using written forms of information was too time-consuming to be useful in practice (statement 13, +4). Moreover, attempts to adapt national or international guidelines or protocols to the local setting were often protracted and perceived as bureaucratic. These nurses felt that practice developed faster than the processes intended to improve it:

We changed our 24-hour management sheet a few years ago, and it took about 6 months to get it through to the department, to go from,

like, Practice Development Nurse and then they would then pass it back with comments, and it would go to, like, [the Assistant Director of Nursing], and then it went to the Trust Board, and then it eventually came back, and then it had to go to the printers, it was a real long time... we've had to rewrite the guidelines three times because, like, the administration of the drug and the treatment of the patient has changed three times in less than a year. (Staff nurse, CCU: Site One.)

Perhaps because of these obstacles, interviewees expressed a desire to see research used to improve existing tools (statement 52, +4), such as pressure sore risk calculators.

Associated characteristics

None of the demographic characteristics hypothesized as predictors of this perspective were significantly associated with the stance. This suggests that individuals who lack the confidence to make use of technologies needed to access research-based knowledge (including critical appraisal of statistical data) are not restricted to a single demographic category. Perhaps most surprisingly, educational attainment appeared to make little difference to the view that skills and overly complex presentation act as barriers to using research information.

Perspective Two: 'Organizational and cultural barriers'

This second perspective – accounting for 10% of the Q sort variance – was characterized by an organizational or 'cultural' locus. Nurses defining this approach stressed their:

- lack of intimidation by the perceived complexity, or 'academic' nature of, research-based information;
- view of research information as practically relevant;
- personal motivation towards using research-based information in decision-making;
- view that extensive clinical experience does not preclude the use of research evidence.

Increased confidence

Interviews with individuals defining this perspective revealed their relatively high levels of confidence in engaging with research-based material:

It is very basic what I can do but I can go along to the library – look something up – I know how to reference things properly, I know how to use a computer to find things, I know how to produce something and how to do my assignments as well. [Staff nurse (D grade), Surgery: Site Three]

Of course, such a perspective does not allow us to judge whether these individuals are overconfident. However,

interviews with this group of nurses revealed their awareness of the dangers of overconfidence:

You start guessing things for yourself, which is a bit dangerous sometimes, and if you don't know that area, if you don't know that specialty, I think you can assume things, and there are usually very good reasons why people ask for things, which you think, 'Well why are they asking for that?' Well, it is not necessary but if you ask behind there is a very good reason why and I think you have to be careful of being overconfident. (Staff nurse (E grade), Surgery: Site Three)

Often these nurses used information as a way of validating their own knowledge. Some also recognized that information-seeking could be seen as a negative practice when caring for patients:

As I say, it's silly, it's making more work for everybody, and I think sometimes patients must think, 'Well, does she know what she's doing, if she's going off to check with somebody what's being used, and why it's being used', or whatever. [Staff nurse (E grade), Surgery: Site Two.]

Relative inaccessibility

Not surprisingly, these nurses perceived inaccessibility of research information sources as a major block on their use:

Em, I think it [research] needs to be much more accessible. There's never anything on the ward...I think it should be drip-fed really, I think it should be there all the time, [otherwise] people aren't going to do it. The last thing they want to do after a 10 day stretch is to go to the library and start getting stuff out. We have to be realistic. I think they need to be fed it. I think there needs to be much more available, it needs to be on the wards. It needs to be free...it needs to be much more available. [Staff nurse (E-grade), Medicine: Site Two]

It is important that these perceptions be seen in terms of *relative* inaccessibility (relative to the human sources of information which dominated), however. Each site had well stocked libraries with good quality electronic information sources but only text-based information on the wards (at the time). Nurses appeared to access library-based resources primarily in connection with CPD courses or as part of the *link nurse* role. Moreover, across the 15 wards sampled there were over 4000 separate pieces of written clinical information (files, posters, journal articles, protocols, books, etc.), although only a third of these had any form of explicit research basis.

Consumption and opportunity costs

Whilst these individuals had all encountered research-based materials, retrieving clinically useful material from them was seen as having significant opportunity costs in terms of time

and money. Often, using research information meant having to pay for photocopying or travel expenses from personal funds and the loss of personal time.

Availability of time in practice

The busy nature of practice and time taken for implementation were also frequent features of many accounts in this group. In 180 hours of observation, we witnessed over 1820 clinical decisions in action. Observation of one medical admissions staff nurse yielded an average rate of one decision every 10 minutes; clearly this volume of activity generates substantial information needs. What is not clear is that if nurses had the skills and technologies available to make more rapid use of information, they would do so. Clearly the perceived lack of time for 'building in' research evidence into clinical decisions was a powerful influence on the information-seeking behaviours of nurses (go for what is immediately available and likely to give you a sensible answer rather than what is likely to provide the 'right answer' but takes time to get a hold of).

However, for some nurses, incorporating research into practice was not the problem. As with Perspective One, it was the perception that practice developed faster than the technologies meant to inform it. Aside from specific technologies such as protocols or guidelines, nurses often described complex and lengthy processes and bureaucratic control procedures as a context for change. This staff nurse's interview demonstrates that even for the simplest decision tasks nurses face difficult cultural barriers and are not even always 'allowed' to make decisions:

Nurse: ...it's a simple matter of [the] patient needed urine medicine and they were on cytotoxic therapy and we were taking the [urine] from their room, they were in a side room with a toilet, to the sluice, measuring it and then tipping it down the sluice and we wanted to know why we couldn't put the jug in the patient's toilet and measure it there and tip it down their toilet. So we wasn't taking cytotoxic stuff up the corridor, which could cause harm to the person carrying it if it got spilt or to anybody else if they tripped and fell over, that type of thing. Oh yes, they said that they welcome change, but it's got to go through the relevant channels, which meant that it had to go through Sister, then it had to go through the haematology nurse specialist that we've got on the ward. and then it had to go through Dr X and Dr Y, the consultants, as well as, which they would just turn round and say, 'Do what you want anyway'. It's up to you what's in the best interests of you. Z, the haematology nurse had said that there were no reasons why you couldn't do it, there's no evidence that you would be causing harm from carrying it from A to B and then the person that she'd asked had said, 'Well, we've done it for years, so

why change it now'. So it didn't get done, we're still carrying it up there [Staff nurse (D grade), Medicine: Site Three.]

Given the complexities associated with changing practice, many nurses again favoured the incorporation of research knowledge into existing decision aids or tools.

Power and personality

In contrast to the first perspective, the second stresses a number of distinct organizational-cultural blocks on using research-based information; specifically, the role of nursing and (to a lesser extent) medical colleagues and a perceived lack of commitment by management.

Peers singled out many of those defining this perspective during data collection as 'dynamic' or 'keen'. They often had enthusiasm for learning (as evidenced by their link nurse roles and extensive CPD portfolios) and many spoke of a philosophy of 'constantly learning'. A number alluded to the problems of introducing change in systems which rely on experience and a form of 'cultural validation' by peers in order to be successful:

Nurse: People are very reluctant to change. Very reluctant. and I've got to say, it's more higher up than lower down the ladder. They don't feel, whether or not it's because they are going [retiring], that they don't want to change their practices now, or what, I don't know... [Staff nurse (E grade), Medicine: Site Three]

Cultural resistance was more manifest through apathy and inaction rather than overt or active resistance. The extract from field notes in Appendix 2 shows the subtle ways in which information-seeking behaviour as a response to clinical uncertainty in practice was not always welcomed by all members of the clinical team.

This was the only example we observed of a nurse explicitly using a protocol, in real time, for observable decision choices. The nurse in question was clearly questioning and keen to ensure that she made the correct decisions. It was unfortunate, however, that this was her last shift – she was leaving nursing to take up another career.

Associated characteristics

Regression modelling revealed that nurses were less likely to hold this perspective the longer they were qualified (adjusted $r = -0.75$, $P = 0.01$). The most credible explanation for this finding is that a sense of trust, perceived clinical credibility and success in informal negotiation were all crucial factors in the ability to influence change. Experience in a speciality provides more of these valuable characteristics. The paradox here is that despite being more likely to be able to overcome organizational blocks on research use, those

defining Perspective Two tended to view research knowledge as a (relatively) unimportant factor in clinical decision-making.

Perspective Three: prescription, direction and clinical credibility

This perspective – explaining 8% of the Q sort variability – shares some of the previous factor's elements (other nurses as a block on research use) but is marked by three important characteristics:

- perceived lack of time for implementation;
- desire for a greater level of prescription in research messages for practice;
- greater clinical credibility in research.

Time

For the nurses defining this perspective a lack of time was a primary block on their ability to use research-based materials in practice:

We brought in this temperature taking thing, but sometimes if you're not careful research is going to be put on the back boiler I think, and it gets busy, there's no time, the staff start getting tired then, because of the nature of the ward, and em..., the enrollers that have done a conversion course they've have had to do some research on hand washing and mouth care, so because of that we've *had to do it*, and I think it's only if *you have to do it* that people will instigate it. (Sister, Medicine, Site Three – emphasis added)

The consequence of separating 'research' from mainstream clinical ward activity was that information use to meet information needs was seen as an additional burden on scarce resources, and as requiring special efforts.

Despite the lack of time for implementation, the recognition that experience alone does not provide the necessary knowledge for practice is pronounced. These nurses were relatively confident in handling research-based information. However, in contrast with Perspective Two, they did not argue that questions of relative physical inaccessibility of research information within the organization acts as a primary barrier to implementation, perhaps because they preferred to foster others' use of such technologies.

Direction

Many of these nurses stated their belief that research material should offer guidance for practice and seemed disappointed that it often had few 'answers' for clinical practice. This perceived lack of guidance might go some way towards explaining why they seemed to prefer sources of information, such as colleagues, which offered decision-specific advice.

'Advice' was adopted uncritically and was subjected to only the simplest of appraisal processes, such as 'Do I trust this source?'

Credibility

The basis for this trust seemed to rest on the *clinical credibility* of the source. Whilst nurses seemed to recognize the *academic* credentials of research authors, most were not often seen as *clinically* credible:

I look at the place they work as well, I must admit, I'm probably subtly swayed by not letters behind their name, but what they're doing for a living, you know at the part, at the bottom where it says what they're doing, if it says 'Professor in Something' I think 'Oh, no!' – or if it says practice development nurse at a unit and I think, 'Oh, yeah, I'm interested in that'... [Staff nurse (D grade), Surgery: Site One]

Associated characteristics

Being a graduate (in any discipline) was the most pronounced predictor of likelihood to define this perspective (adjusted $r = 0.25$, $P = 0.001$). Based on this relationship it is feasible to suggest that graduate-level nurses (in any discipline) favour research messages coming from clinically credible sources that give practitioners clear direction.

Perspective Four: 'Individual scepticism and a desire to work through others'

This perspective accounted for 8% of the Q sort variance. Unlike the other three perspectives, nurses defining this perspective did not see responsibility for acquiring research-based information as lying with the individual, and despite seeing the value and worth of research knowledge, they lacked (relatively) the motivation to use it in their own clinical practice. They did, however, see themselves as facilitators for others' use of research. This perspective is characterized by a strong emphasis on organizational or workload-based blocks on research implementation:

Nurse: Because X, I mean he wrote the article that sort of kick-started a lot of it, really. About nurses initiating thrombolysis, can they sort of be safely trained to assess thrombolysis. I'm trying to think when that was written. I don't know, 7 or 8 years ago, and we haven't moved on too much from then.

Int: What slows that kind of process down do you think?

Nurse: I think the day-to-day running of things, you know, it has to play a big part, you just need a bit of sickness here and there as well. I mean, this thing gets pushed to the background because it's not the priority. [Staff nurse (E Grade), CCU: Site Three]

Support for educational development;

The two primary manifestations of lack of managerial commitment to getting research into practice for these nurses were perceived lack of support for CPD and lack of provision of information technology. CPD was the significant influence on development of critical appraisal skills. Furthermore, many nurses only encountered research during CPD courses. Most funded at least part of their CPD themselves and there was widespread confusion regarding the funding for courses:

Um...it was that I was a junior nurse when...different nurses were being accepted to do specialist courses...and I applied for 2 years, and then the last 2 years I didn't bother 'cos I just thought...it was just – you don't get an explanation, your application form comes back and it just says 'not accepted' on it... (Staff nurse, Medicine: Site One)

One of the sites examined placed heavy emphasis on publicising its nurses' involvement in R&D, both locally and nationally. However, for many nurses in the study, the reality of work and previous negative experiences with R&D precluded their involvement in Trust R&D, or at the very least they maintained a healthy scepticism:

Most nurses are the same, anything that you want to do or you want to progress, you do it in your own time... You know, when things like the strategy come out of the Trust...everyone just looks and laughs and...you know, the *real* nurses that are there laying the hands on the patients – who are there, cuddling the relatives when they've lost someone, and just laugh..., because they just think, right, when then...? [Staff nurse (D grade), Medicine: Site One]

This quote is a powerful illustration of a view expressed by many of the nurses' interviewed: that research is somehow removed from the 'real' world where 'real' nursing takes place. It highlights the importance they attached to the credibility of research findings that have direct relevance to clinical practice.

Supporting electronic dissemination

The second manifestation of lack of organizational commitment was the lack of deployment of IT resources in clinical areas. Where computers were available in clinical areas, they were primarily used for administrative purposes and did not offer ward-based links to computerized databases.

Lack of skills to exploit the potential of research

These nurses' experiences of IT often highlighted both the *potential* of online research-based knowledge and their own limitations in terms of being able to access and use it:

I think it's like everything – you don't know what you don't know until someone shows you. If anything I'm more aware of my flaws

since I started learning again! [Staff nurse (E grade), CCU: Site Two]

Push vs. pull in information provision

Because many of these nurses had been frustrated by the experience of electronically aided information retrieval, it was perhaps not surprising that they expressed a preference for having information passed to them via a third party. A further driver for this preference was that (in contrast to the other perspectives) research implementers were often seen as good clinicians as well. The translation effect of research messages being passed through credible clinicians was *the* crucial component in persuading many nurses to consider research findings in their decision choices:

Int: You say they listen to you now, did they listen to you on the ward as much?

Specialist Nurse: To a certain extent, but I think they do much more now because they respect my opinion and I think that's very gratifying that they do respect my opinion. (Liaison Nurse, Medicine: Site Three)

Motivation

Two distinctive characteristics of this perspective set it apart from the others: a relative lack of personal motivation towards research use (statement 45, +1) and a rejection of the idea that other nurses are a block on research utilization (statement 35, -3).

Of course, if people as implementers, have little motivation to use research results, then it is less likely for colleagues to be perceived as a barrier to its use. However, whilst the nurses involved may not have been motivated to use research material themselves, this does not necessarily mean that they thought it had no worth. Here the same nurse continues on from an earlier expression that evidence-based practice (conceptualized as things being 'proven') is not an alternative to experience:

Int: Right, so do you feel there is a place for research?

Nurse: Yes, I do, yeah...I think it's not particularly for me, it's em..., I thoroughly enjoy nursing although sometimes it's been pushed a bit too far, in the point of view of computers and research... [Staff nurse (D grade), Medicine: Site Three]

Many nurses equated using research in practice with electronic or computer technology and this seemingly negative perception played a part in their assessments of personal utility.

Combining experience and facilitation

Several of those defining this perspective combined extensive experience with the handling and dissemination of informa-

tion. They were often those who 'facilitated' the development of others with regard to engaging with research materials or by using these materials themselves, for example:

- the CCU ward manager with an MBA who single-handedly acquired a computer system offering access to the internet before the hospital's intranet was developed;
- the liaison nurse who maintained an extensive library of resources (much based on research in varying levels of depth) and offered specialized teaching and clinical skills sessions;
- the coronary care staff nurse who developed teaching packages for night staff in Advanced Life Support and based the format on a research article she had read, which said that dedicated ALS facilities on wards led to better uptake of information.

Overall, our impression was that nurses' expressed reluctance to use research arose from a recognition of the limitations of (rather than a resistance to) research related to practice in nursing. Most of the individuals defining this stance had significant levels of experience and clinical credibility amongst peers. The reason why they did not see nurses as a block on the introduction of research findings could conceivably have been that they did not encounter such blocking on a routine basis. As a source of evidence, they were already credible clinical role models and therefore people were more ready to adopt their advice or suggestions.

Associated characteristics

Regression modelling revealed those who were prepared according to the SRN system of training were more likely to be aligned with this perspective of combining experience and facilitation (adjusted $R = 0.12$; $P = 0.003$). Conversely, graduate nurses were less likely to adopt this position (adjusted $R = -0.13$, $P = 0.003$). This finding is difficult to explain, but it was clear from the regression modelling that the SRN mode of preparation was not simply acting as a proxy for experience.

The finding that nurses with higher levels of mainstream educational attainment are negatively associated with the perspective could be explained by the argument that they are more likely to have engaged with individualized information retrieval strategies during their studies (as opposed to information provided by a third party). Similarly these nurses had significantly less speciality-specific experience (around half the amount) than their nondegree educated counterparts.

Discussion

The findings of this study echo, to some extent, the findings of others examining the application of research findings to

clinical practice. The four perspectives isolated can be seen as encompassing at least some of the categories presented as barriers in the existing research literature (Funk *et al.* 1995, Parahoo 2000, Retsas 2000, Rodgers 2000). Specifically, we found that characteristics of the individual (such as a lack of confidence in interpretation and application of research evidence), organization (support for implementation, the cultural impact of colleagues), information (the amount and nature of statistical material, the language used) and environment (workload, timescales, personal commitment required) all featured to varying degrees as blocks on research use.

What makes this study original is its examination of research use in the *context of* real time clinical decision-making, at a time when it is more socially and professionally desirable than ever to be seen to be engaging with research evidence. Moreover, it is based on a large sample size, which distinguishes it from similar studies. Estabrooks' (1999) recent analysis suggests that the concept of research utilization itself is poorly defined and ambiguously used in studies. Our approach – by firmly focusing attention on the role of research knowledge in clinical decision-making – overcomes this problem and relates knowledge application to the choices that clinicians face in practice.

The use of Q methodology in conjunction with qualitative data collection allows a much richer picture to emerge than if either a simple self-report survey or qualitative data collection alone had been used. For example, it is possible to say with some degree of confidence that nurses do not uniformly align themselves with a single perspective on those variables that constitute barriers to research use in practice. They cluster around a series of themes. Just as links between clinical decision-making and demographic/biographic variables exist (Thompson 1999), it is clear that the demographic and biographical make-up of practice teams may have an impact on the ways in which people view the information that feeds team decisions. Successful professional practice needs change strategies to be informed by a diagnostic analysis of the likely barriers that will need to be overcome and around which interventions can be planned (NHS Centre for Reviews & Dissemination 1999). For example, marketing of change interventions that emphasize the support of the organization are more likely to have an impact on the less experienced members of a ward team. Similarly, a third-party such as a clinical nurse specialist can act as a conduit, translating research findings into straightforward messages for practice, using language and exemplars that are more likely to pay dividends with more experienced nurses.

Study limitations

Like all case studies, this work has some limitations. It was primarily a descriptive hypothesis-generating exercise and it is clear that many of the hypotheses it generates need further exploration. For example, more research is needed to explore whether the links between viewpoint and demography are maintained in other practice settings and other sites. More research should also be carried out on the impact of using these insights to tailor or focus practice change in institutions in health care settings. Diagnosing barriers to change is a large part of any strategy and the use of Q methodology and context specific stimuli could prove useful. Feedback of the results to the sites involved suggests the technique produces 'believable' (Lincoln & Guba 1985) results in the case sites used – even though it is not always a comfortable experience.

Conclusions

Q methodological exploration, when used in conjunction with qualitative data derived from interview and observation, produces results that are useful for planners and policy-makers when considering strategies aimed at overcoming the barriers to research use in clinical decision-making amongst nurses. Demographic correlates can be generated and the shape and nature of the barriers to be overcome can be isolated and therefore interventions can be developed in response.

Nurses clustered around (and therefore defined) four main perspectives on the barriers to research use:

- Problems in interpreting and working with research products, which are seen as too complex, 'academic' and overly statistical. Those defining this perspective want to use research but feel limited in their ability to do so by their lack of research appreciation skills and confidence.
- Organizational and cultural barriers – despite being confident with research-based information, and the perceived ability to be able to engage with such material if they so wished. Those defining this perspective perceive a lack of organizational support (in the form of restricted local access to information and unsupportive colleagues) as a significant block. The more experience nurses had in a clinical domain the less likely they were to be aligned with this perspective.
- Many adopted the stance that research products and researchers lack clinical credibility and that they fail to offer the desired level of clinical direction. It would appear that nurses educated to graduate level are more likely to want to see clinically credible and more prescriptive research products in the workplace.

- Some lacked the skills and (to a lesser degree) the motivation to use research themselves. Consequently, they liked research messages passed to them by a third party and sought to foster others' involvement in research-based practice rather than direct involvement themselves. Old style SRN-trained nurses were most strongly associated with this perspective. Graduate level (in any subject) nurses were less likely to be aligned with the perspective. These results suggest that there may be a significant skills (with respect to interpreting and using research material) disparity between SRN-trained and graduate nurses.

These results suggest that 'quick fix' approaches to diagnosing barriers to research use, or interventions to increase this, are unlikely to succeed. More work is needed to establish the reliability of the perspectives isolated here, and their applicability to other settings and sites. The results suggest that a considerable amount of work needs to be carried out by those seeking to foster evidence, individuals, organizations and environments that are fit for the purposes of promoting research use in nurses' clinical decisions. For instance, nurse educators need to consider the best ways of teaching epidemiology and statistics, of developing skills in critical appraisal, and engendering familiarity with the basic principles and concepts of research. Researchers must take responsibility for presenting their findings clearly and in a format, which promotes ease of understanding. Finally, managers can promote the dissemination of research findings by actively fostering existing 'conduit' roles, for example, clinical nurse specialists and by ensuring that guidelines and protocols are explicitly research-based.

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Appendix 1 Barriers to Research Information Use Q SAMPLE

No.	Statement	Perspectives			
		1	2	3	4
1.	Research information is too academic	5	-5	2	-3
2.	Research information is too complicated	4	-4	1	-1
3.	Research information uses complex language and is just a tool for academics to show how clever they are	2	-4	2	-1
4.	I read a paper if it is written by a nurse rather than a Professor as they are more relevant	1	0	3	-2
5.	The authors of research are just not credible to most nurses	-2	0	3	-2
6.	Research is often not compatible with what I believe as a nurse	0	-2	-1	-3
7.	Research often says we shouldn't do stuff that I personally know was good when we did it anyway	-1	0	1	-2
8.	My experiences with doing research in the past make me really sceptical of research findings	0	-2	0	0
9.	Research is just done for its own sake its not practice related	-2	-5	0	0
10.	There is no need for research. The experience of daily ward life means that you get enough experience to make most decisions	-4	-3	-4	-5
11.	Implementing research is just unrealistic because of time pressures	-1	2	3	5
12.	Nursing practice is so busy that there is no time for implementation	-2	3	5	5
13.	Written kinds of research information are too slow to read and use; its better to have a human person to get the messages across	4	1	2	4
14.	The problem with research information is that it takes too long to learn the skills necessary to use it	1	-1	0	2
15.	Its unrealistic using research information in clinical decisions as most patients can't, or don't want to, handle it	-3	1	-1	0
16.	I have no real confidence in reading research	3	-4	-4	-2
17.	Statistics put me off research papers or other kinds of research information	5	1	1	3
18.	Most kinds of research don't give me enough direction in my practice to be useful	1	1	4	1
19.	I think that knowledge gained through experience is more useful than research	2	0	0	1
20.	Research is only limited to a small bit of nursing practice — mainly procedures and we do much more than that	0	-1	1	0
21.	Policies and procedures are unwieldy and once you work here a while you get to know them anyway	-3	-1	1	0
22.	Whenever I have tried to use research in the past it costs me too much money, time or commitment — like getting papers from the library or whatever	0	4	1	0
23.	I have worked with people with responsibility for implementing research but you don't get any feedback so its not worth it in the long run	0	2	0	1
24.	Implementing research is not often led by nurses who are good practitioners	0	1	4	-4
25.	I don't know enough about what is available to help me implement research in the hospital	2	3	-2	4
26.	The people in the hospital — like practice development or research — who are supposed to be helping us implement research are more of a hindrance than a help	-3	0	-1	-1
27.	There is no real commitment on the part of management to help us get to grips with using research in our work	0	3	3	3
28.	My own professional education hasn't really prepared me for using research in my decisions	3	-1	-5	3
29.	Research is often unrealistic in practice because its not based on practical things	-1	0	2	-1
30.	Its better to have time out and reflect on your practice than try and understand research	1	0	0	2
31.	All the facilities which would help me use research based information are off-site and so difficult to access	2	5	-4	1
32.	The library is not geared up for nursing here	-1	2	-3	-4
33.	The age of the nurses I work with is a real block on implementing research	-1	1	-2	-5
34.	We try and implement research but the doctors block it and its really frustrating	-1	2	0	-2
35.	Other nurses themselves are often a block on using research	3	5	5	-3
36.	Using research is a gender thing. If we try and implement stuff its like women nurses telling the men (Drs) what to do — and they don't like it	-5	-1	-3	-4

Appendix 1 (continued)

No.	Statement	Perspectives			
		1	2	3	4
37.	Research never says anything its too wishy-washy in its findings	-1	-4	-2	-3
38.	The research information we get bombarded with is just too overwhelming	3	-1	2	3
39.	I don't have the necessary computer skills to access and use research properly	4	1	-3	4
40.	I don't have any research-role included in my job and that's a real pain when it comes to using research	0	0	-1	2
41.	The decisions I make are really complicated and research is often too simple to be of any use	-3	-2	0	-1
42.	There are people and resources available here to help implement research but you can never get hold of them when you need them	0	3	-1	-1
43.	Journals are difficult to read and there are better ways of presenting information than that	1	0	0	1
44.	The research we get presented with is often related to American work which isn't that appropriate for nursing	1	3	1	1
45.	I don't really have any motivation to use research in my practice	-2	-3	-5	1
46.	We don't have the facilities to use research in the ward itself. It would be better to have computers and CD-ROMS on the wards rather than somewhere else	3	4	-2	-3
47.	Its better to have somebody else pass on the research-based messages for practice rather than try and do it yourself	1	-1	0	4
48.	Its easier for senior staff to implement research as they have more power with other nurses and the Drs	2	4	4	2
49.	The culture of my unit isn't really geared up for using research, we're more practical	-4	-2	-3	1
50.	Research is more for managers than practising nurses	-4	-3	-2	-1
51.	Patients are all individuals and research tends to ignore that! I find it hard to relate it to my patients	1	2	2	0
52.	We need research built into the tools we already use like the Waterlow scales and stuff if it's going to be used by everyone	4	4	4	3
53.	Using research just means more paperwork	-2	-2	3	2
54.	Using research in the past hasn't resulted in noticeably better care in my experience	-3	0	1	0
55.	Using research is best left to nurses coming out from college who know how to use it	-5	-3	-4	-4
56.	Using research won't actually help in my career - there is absolutely no incentive for me to use it	-4	-3	-3	-2
57.	Research is always out of date it can't keep up with our practice	-1	-1	-1	2
58.	Being able to use research doesn't make you a better nurse	2	1	-1	-1
59.	I find the research published in medical journals more use than that in the Nursing Times and the other nursing journals	0	2	-1	0
60.	I make better decisions without using research. Practice is better dealt with in the here and now	-2	-2	-2	0

Appendix 2 Extract from field notes: subtle resistance and cultural inertia in information seeking

[The House Officer] told Sarah to go ahead and give the i.v. drug...[to a patient with raised blood pressure]

Sarah expressed concern about giving the i.v. nitrate. She said the HO seemed a bit unclear about what she was doing, and she was the one who had prescribed the drug.

Sarah said there was no dosage stated. It was written: 'Give i.v. nitrate as per protocol.' Sarah said 'I've only heard of giving nitrates in connection with angina, and then you monitor their pain and alter the dose accordingly. But G. can't tell us if he has pain, and anyway I don't know if he's having pain!' Sarah asked Jacqui about giving the drug. She answered in rather an offhand sort of way: 'Well, give it according to the protocol like it says!

Sarah went to get the Coronary Care Protocol book and started to look it up. Jacqui saw her from the desk and said 'Don't use the yellow one, use the red one, it's more up to date.

Sarah got the red book and started to look up the dose, all the while saying 'I don't really know why he's having this, I don't think he's in pain.' She found the instructions for giving the drug: 25 mg of Nitrocline in 25 mLs of N/Saline, to be administered via Graseby syringe pump. Sarah said: 'I'm not happy about his...I've not seen it used before for high blood pressure.' She said the patient was to have his blood pressure monitored hourly, and that his blood pressure was 210/140.

Sarah decided that she was going to ring pharmacy to check what she should do. She said: 'I'm not used to giving this.' Sarah picked up the phone and was put through to pharmacy. She explained the situation to the pharmacist: 'We've got this patient who's had a CVA. He's to have i.v.

nitrates for his high blood pressure. I've never seen it used except for pain in angina, but this is just for his blood pressure...would they not usually use something else? She replaced the phone and told me that the pharmacist said 'It is a recognized use'.

Sarah then said: 'The next problem is, is it compatible with saline and potassium. Sarah decided to look up the BNF to see if she could see if the drug should be given with saline. She didn't seem to get a satisfactory answer, and decided to ring pharmacy again, this time to check for compatibility with saline and potassium. The pharmacist told her the drug was compatible with both.

Sarah then decided to check the patient's blood pressure again herself and the reading she recorded was 200/130.

She said aloud; 'I don't even know what we're supposed to be aiming towards with his blood pressure...it's not written down what it's supposed to be reduced to'.

10:45 am: Sarah washed her hands and drew up the nitrate drug, diluted in the appropriate amount of saline. She asked

Sam to check it with her and then fixed the syringe to the Graseby syringe pump and adjusted the rate to 6 mLs per hour. She signed the prescription chart. She told the patient what the drug was for, and explained to him that she would be returning to check his blood pressure soon.

[In this intervening period the patient became agitated and appeared in pain]

Sarah went to the desk, where Jacqui was writing in the desk diary. She informed Jacqui that G. seemed agitated, and that she was going to ring the HO to find out by how much they were supposed to reduce his blood pressure. Jacqui: 'Don't worry, it will probably just come down gradually'.

Sarah: 'It has reduced... quite dramatically...I want to phone her. Jacqui (in an irritated manner): 'OK, if it will make you any happier.'

[There is obviously some tension between Sarah and Jacqui, and when Jacqui moved away, Sarah said to me 'You can see why I'm leaving.']

Field Notes, Observation, Medical Ward, Site 3