

Information in practice

Integrating service development with evaluation in telehealthcare: an ethnographic study

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Abstract

Objectives To identify issues that facilitate the successful integration of evaluation and development of telehealthcare services.

Design Ethnographic study using various qualitative research techniques to obtain data from several sources, including in-depth semistructured interviews, project steering group meetings, and public telehealthcare meetings.

Setting Seven telehealthcare evaluation projects (four randomised controlled trials and three pragmatic service evaluations) in the United Kingdom, studied over two years. Projects spanned a range of specialties—dermatology, psychiatry, respiratory medicine, cardiology, and oncology.

Participants Clinicians, managers, technical experts, and researchers involved in the projects.

Results and discussion Key problems in successfully integrating evaluation and service development in telehealthcare are, firstly, defining existing clinical practices (and anticipating changes) in ways that permit measurement; secondly, managing additional workload and conflicting responsibilities brought about by combining clinical and research responsibilities (including managing risk); and, thirdly, understanding various perspectives on effectiveness and the limitations of evaluation results beyond the context of the research study.

Conclusions Combined implementation and evaluation of telehealthcare systems is complex, and is often underestimated. The distinction between quantitative outcomes and the workability of the system is important for producing evaluative knowledge that is of practical value. More pragmatic approaches to evaluation, that permit both quantitative and qualitative methods, are required to improve the quality of such research and its relevance for service provision in the NHS.

Introduction

The promise of telehealthcare is that it might revolutionise the practice of medicine by enabling remote interaction between clinicians and patients, through the use of information and communications technologies such as interactive video, digital imaging, and electronic data transmission.^{1 2} For policy makers and clinicians, telehealthcare offers the potential to

solve problems of structural and spatial inequalities of access to specialist care, and to increase the speed of referral and management decisions.³

In practice, however, telehealthcare is somewhat contentious and unstable.⁴ Although its proponents value the potential organisational benefits it may bring, others express concern about its implications for the practice of medicine, particularly in relation to the doctor-patient interaction.⁵ Concerns about clinical risk and potential litigation⁶ and, internationally, ongoing difficulties relating to licensure and reimbursement⁷ may add to the resistance to telehealthcare in practice.

The production of evidence about the safety and effectiveness of telehealthcare is therefore vital for its progression. Although there have been many trials of telehealthcare in Britain and elsewhere, such services typically fail to become part of routine healthcare delivery.⁸ This makes achieving sufficient levels of use of telehealthcare services to provide meaningful evaluations difficult.⁹ The existing evidence base for telehealthcare is therefore not as strong as some of its champions have suggested.^{10–12}

Understanding how this evidence base is constructed is important because there are concerns about the utility of applying medical models of evaluation to technological systems.^{13 14} Research suggests fundamental problems in integrating telehealthcare into systems of professional practice in everyday settings.^{15 16} Our study was intended to further understanding of this knowledge production process by exploring the methodological issues that arise when integrating evaluation with the (often experimental) development of telehealthcare services.

Methods

Participants and settings

Between 2000 and 2002, we undertook an ethnographic study—using a variety of qualitative techniques to study telehealthcare projects and their development in depth and over time¹⁷—of factors that promote and inhibit the effective evaluation of telehealthcare. We studied seven telehealthcare evaluation projects in a variety of specialties—dermatology, psychiatry, respiratory medicine, cardiology, and oncology (see box 1 on [bmj.com](#) for details of the individual projects). Projects were chosen to represent good variability in specialties, settings, and evaluation methods. We identified project



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leaders from websites and databases and then asked them if we could include their project in our study. With the help of project leaders, we identified key informants within the project teams and asked them if we could record interviews with them. We obtained appropriate ethical approval and followed stringent procedures to ensure the anonymity of participants.

Data collected

We conducted interviews with key informants (n = 76), recorded steering group meetings and other meetings (n = 19), observed the projects, and analysed project documents. Interviewees included clinicians (nurses and physicians), researchers (principal investigators, research associates and assistants, health economists, and statisticians), and technical experts associated with the specific projects. Participants were interviewed up to four times (typically two or three times). We used a semistructured interview guide for all initial interviews, with subsequent interviews designed more specifically around the interviewee and project.

Data analysis

Our analysis of transcribed interview material was guided by the broad precepts of constant comparative analysis.¹⁸ The trustworthiness of the data was established by involving all authors in data interpretation and the development of analytical themes.

Results and discussion

Our results reveal the complexity of interaction between the evaluation of a telehealthcare service and its development. Here, we outline some of the major processes that emerged as evaluators struggled to integrate these tasks.

Evaluating the system: operationalising clinical practice

Evaluation generally involves producing knowledge about attributes of a new service or technology that relate to its potential effectiveness from various perspectives. The task of constructing measures to assess these attributes is further complicated if the research is conducted in parallel with service development. It requires not only identifying and specifying existing clinical knowledge and practices, but also anticipating ways in which practices will be changed in the new system and designing research instruments that capture such changes. Our respondents spoke of “hard” and “soft” outcomes in ways that prioritised quantitative methods of evaluation, assuming that “hard” outcomes were those that mattered most. However, participants found it difficult to define clinical knowledge and practices in terms that permitted such measurement. This problem extended beyond measuring clinical outcomes to other effects of the telehealthcare system, such as patients’ and professionals’ views and particularly to the cost effectiveness of telehealthcare.

The difficulties experienced in defining clinical practice contributed to another problem for evaluation—recruitment. Although this problem is certainly not specific to telehealthcare,¹⁹ we find here a particular impediment to recruitment, as clinicians using the telehealthcare system come to identify more and more characteristics of patients and their

Box 1: Recruitment of patients and validity of results

“Really, in the last two months or so I’d say that recruitment has slipped, certainly at our site, because the winter months tend to generate more patients [with the condition], and what I’m finding, though, is that they’re either end stage . . . and they’re just too sick, there’s no way that they could manage with equipment at home, they’re more respite care really. All the patients have just said no, they just don’t want anything to do with it.”—Research nurse, site 6

“The recruitment’s a crucial issue, not just for the actual achievement of numbers but also for the external validity, which I think is very important.”—Clinical leader, site 4

conditions that make them inappropriate candidates for telehealthcare (see box 1). The experience described here is common to other telehealthcare projects. It seems to reflect a growing understanding of the limited capacity of telehealthcare systems to accommodate clinical practice in the way that it is routinely enacted. Increasing exclusion criteria not only reduces the possibility of achieving recruitment targets but, more importantly, limits the claims that can be made for the effectiveness of the telehealthcare system for the broader patient population (box 1).

Managing conflicting demands of service provision and evaluation

Integrating service development with evaluation often requires clinical staff to perform additional research tasks. Evaluators expressed difficulties in ensuring complete and accurate data collection, because clinicians were inexperienced in research or did not have time to complete both clinical and research duties (see box 2). Research is often not considered a priority when it competes with the demands of service provision. The importance of accommodating everyday “workability” within a trial design is shown by the dilemma posed when nurses working an “extra” telehealthcare service felt that the trial created obligations that compromised their role as care

Box 2: Managing conflicting demands of service provision and evaluation

“Partly, but I think the GPs say that there are two things that have added to their burden, and they find it difficult to say which is worse. One is the actual telemedicine, and the other is the research bit, including the ethics bit. . . . The telemedicine has added to their work, but it would have been easier if they’d just been implementing a telemedicine project. I can actually see that if you can produce a telemedicine project that makes GPs’ lives easier they’ll like it, but nobody will ever learn anything about it.”—Clinical leader, site 4

“And the trouble really is, just because the equipment was late coming we were then trying to start at peak time [for this condition] which means that at [the hospital] there they’re just lined up on trolleys, so it’s very hard for the nurses to say, ‘Sorry, we’re not going to see this patient because we’re doing this trial.’”—Clinical leader, site 3

providers by placing unmanageable demands on their time (box 2).

A major part of the conflict around service provision and evaluation concerned the management of risk. In routine settings, clinical practice is based on minimising risks to patients. For clinicians in this study, the introduction of a telehealthcare system and its evaluation highlighted the possibility of increased risk from what they perceived as new forms of practice. Clinicians involved in telehealthcare evaluations were thus faced with a dilemma: they had concerns about patient safety and their own personal liability but needed to engage with these new technologies in order to prove their safety.

In the evaluations we examined, ensuring that the system was safe was clearly the priority. Often individual clinicians managed perceived risk to patients by reverting to the default model of service provision. At site 1, this focus on risk minimisation meant that 60% of patients had to be recalled to a conventional doctor-patient encounter. The priority of clinical safety therefore needed to be built into the research protocol: clinicians needed flexibility to exercise their judgment and revert to standard care if they considered a patient was at risk, though too much flexibility could invalidate the research. At site 3, it became apparent that an unexpectedly large proportion of eligible patients were being excluded because of healthcare providers' concerns about clinical risk and their lack of confidence in using the new system. Thus, professional assessments of risk attributed to the system were perceived and acted on in ways that could (and did) adversely affect evaluation.

Making sense of study findings

Accurately understanding the effects of a telehealthcare system is essential if the study results are to inform further service development. However, we observed that some evaluators found it difficult to determine how much the results of their study reflected effects of the telehealthcare system and how much they were a product of the research process and the disruption to normal practice that was caused by it (see box 3). Clinicians and researchers themselves recognised these limits, knowing that their studies reflected experimental work that was sometimes considerably different from the experience of normal service provision. Difficulty in interpreting effects of the new systems was also sometimes a product of knock-on effects through different levels of service provision and depended greatly on which perspective of "effectiveness" was being considered (box 3). The problem of judging effectiveness was an ongoing problem for telehealthcare evaluators and contributes to the broader problem of translating research findings into everyday practice.

Randomised controlled trials versus pragmatic evaluation

The dominance of the randomised controlled trial (RCT) as the "gold standard" of medical research is clearly apparent in our research. In practice, however, many respondents re-evaluated the appropriateness of randomised controlled trials for assessing telehealthcare, having expressed disappointment about progress or uncertainty about the outcomes of their projects. Participants in studies applying such formal study designs found that trying to impose sufficient constraint on the

Box 3: Ambiguity in attribution of effects

"I think what it's not brought out, or we can't conclusively draw out, is whether it has been the trial and all the problems with the trial or whether it's the telemedicine per se, and I think that's a big problem and that's what I'm having to write up—that we're not quite sure."—Research associate, site 4

"Yes, but the thing is, you see, like all these things in life, it's not where the truth lies, it's where it's perceived to lie. They see the waiting list numbers going down, therefore it's working, that's the simple equation. Because all they're concerned about is numbers on the waiting list, because that's what they get the pressure upon."—Clinical leader, site 1

system for the purpose of measurement conflicted with the dynamic nature of the health service environment, where some flexibility is necessary.

The need for more pragmatic approaches to the evaluation of telehealthcare systems was apparent. Evaluators who had adopted non-randomised designs felt they were producing results they could use, even though they too experienced problems with integrating telehealthcare systems into existing practice. However, because they were less restricted in their evaluation approaches, they were able to modify both clinical practice and technical systems more readily, and so improve the stability of the project overall. In doing so, respondents often drew a distinction between two types of knowledge—experimental quantitative knowledge about outcomes, and experiential qualitative knowledge about workability (see box 4). They regarded the former as having higher status, and saw its publication as the main objective of their work, but found the latter to be more useful, particularly for judging the utility of the system in practice but more generally for informing service development. These findings have important implications for commissioning processes, which must permit greater acknowledgement of the practical value of research methods that produce knowledge about processes rather than healthcare outcomes.

Conclusion

The complexity of a combined implementation and evaluation of a telehealthcare system is often under-

Box 4: Different forms of knowledge

"It sounds like you're saying that you feel that the research won't necessarily tell you the answers you want in terms of 'Is this useful?'"—Interviewer

"No, no, I think it will. I think it's the other way round. I think it probably won't tell me 'Yes it's useful,' but hopefully it will tell me it's not dangerous. So it won't be able to demonstrate that it's useful—that will be up to me to say whether it's useful or not—but it should be able to tell me that I'm not putting patients at risk."—Clinician, site 7

"And how will you judge whether it's useful?"—Interviewer

"By seeing how positive we feel about using it. Because if it really is an effort to use it then it will turn out to be not useful, because it won't get used."—Clinician, site 7

What is already known on this subject?

Telehealthcare is a rapidly growing field of clinical activity and technical development

New technologies offer clinicians and policy makers the potential to solve structural problems around inequalities of service provision and distribution

Despite many pilot studies, telehealthcare has not yet penetrated practice in any systematic way

What this study adds

This ethnographic study of seven telehealthcare evaluation projects identified key difficulties that are experienced when evaluation and development of a telehealthcare service are combined

More pragmatic approaches to evaluation would improve both the quality of such research and its relevance for service provision in the NHS

estimated in both the design and the conduct of evaluation studies. The requirement of stability for the evaluation protocol conflicts with the need for flexibility in the provision of health services to individual patients. This tension raises particular methodological issues, which centre around defining and measuring clinical practice, managing conflict between evaluation and service provision, and difficulty in interpreting study findings. Evaluating telehealthcare thus requires more pragmatic and flexible approaches to the production of evidence than those permitted within the rigid structures of controlled study designs. The issues identified in this paper, such as workability, must be given greater attention in the design of evaluation studies in order to improve both the quality of such research and its relevance for clinical practice.

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“I was too well brought up to say it”

Four days after her right hemicolectomy, my patient was getting on well. She reported little pain and no nausea and was getting up and about with more and more confidence. Her wound was dry, and routine observations were fine. But I was after that extra bit of information that every surgeon wants. “Have you passed any wind today?” I asked.

“Yes doctor, I . . . er.”

The clumsy expression flummoxed her for a moment, so I gently whispered “Farted?”

“Yes, that’s right,” she said, “just this afternoon for the first time. It’s just that I was too well brought up to say it.”

The verbalisation of bodily function is a daily challenge for doctors in general and coloproctologists in particular. The description of bowel habit is central to history taking, and the news that a postoperative patient has “passed wind down below” reassures the surgeon that intestinal function has returned and the anastomosis is secure. Clarity in communication is an obligation, yet we struggle to articulate these issues in plain language. Understanding quaint terms such as “bowel

movements,” “motions,” or “stools” requires a solid grasp of medicalese. Patients of a genteel upbringing or well experienced in the language of doctors may have little difficulty, but having such a discussion with the average person can lead to ludicrous verbal gymnastics.

It is a pity that the words fart and turd are taboo, to use the description of *Collins English Dictionary*, since their routine use would save a lot of, well, farting about. Both have long if vulgar pedigrees. Fart has Middle English and Old High German roots, and the Sanskrit equivalent “pardate” places it squarely in our common Indo-European linguistic culture. Turd derives from the Old English “tord” and must surely have been a favourite of Chaucer. May I suggest that in the interests of communication and good practice the *BMJ* starts a campaign for the emancipation of these words from the nether regions of English vulgarity?

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