‘Teleswallowing’: a case study of remote swallowing assessment.

Elaine Bidmead, Tilly Reid and Alison Marshall, CaCHeT, University of Cumbria, Lancaster, UK, and Veronica Southern, IM&T Department, Blackpool Teaching Hospitals NHS Foundation Trust, Blackpool, UK.

Cite:
Bidmead, E., Reid, T., Marshall, A. and Southern, V. (2015), " “Teleswallowing”: a case study of remote swallowing assessment", Clinical Governance: An International Journal, Vol. 20 Iss 3 pp. 155 – 168.

Abstract

Purpose – Telemedicine has enabled speech and language therapists (SLTs) to remotely assess swallowing difficulties (dysphagia) experienced by nursing home residents. The new technique, “teleswallowing”, was designed by the Speech and Language Therapy Service at Blackpool Teaching Hospitals NHS Foundation Trust. It allows prompt assessment, avoiding potential risks of aspiration pneumonia, malnutrition, poor rehabilitation, increased hospital stays and reduced quality of life (Hinchey et al., 2005; Langmore et al., 1998). The purpose of this paper is to report on a second pilot of teleswallowing and the concomitant adoption study.
Design/methodology/approach – The adoption study employed qualitative methods, including consultations with senior managers, semi-structured interviews with nursing home matrons/managers and nurses, two focus groups and semi-structured interviews with SLTs. The project clinical lead kept an activity log, which was used to estimate resource savings.
Findings – Over a three-month period, six SLTs and 17 patients in five nursing homes participated in teleswallowing assessments. Teleswallowing benefited both patients and participating nursing homes. Better use of therapist time and cost savings were demonstrated and evidence showed that the service could be successfully scaled up. Despite this, a number of barriers to service transformation were identified.
Originality/value – This is the first implementation of teleswallowing in the UK, but it has been used in Australia (Ward et al., 2012). The approach to engaging stakeholders to understand and address barriers to adoption is novel. The value lies in the lessons learned for future innovations.

Keywords Telemedicine, Qualitative research, Dysphagia, Nursing homes, Digital health adoption, Remote assessment

Paper type Case study

Teleswallowing was funded by an award from the NHS England Regional Innovation Fund (RIF). Investment in equipment and for the clinical lead was funded by Blackpool Teaching Hospitals NHS Foundation Trust and the North West NHS Shared Infrastructure Service, who also funded the earlier pilot study.

Introduction

Blackpool Teaching Hospitals NHS Foundation Trust provides acute and community services in speech and language therapy. Speech and language therapists (SLT) undertake assessment of patients with swallowing difficulties (dysphagia). A key problem is responding quickly to calls to assess, which conventionally requires a visit by a SLT as assessments can sometimes be delayed significantly due to service pressures. The impact of this includes increased emergency admissions, poor rehabilitation, progression to aspiration pneumonia and other problems. (Hinchey et al., 2005; Langmore et al., 1998; Ward et al., 2012).

This paper presents a case study of a telemedicine innovation, "Teleswallowing", which was piloted from December 2014 to February 2015. Telemedicine enables health professionals to assess, diagnose and treat patients in remote locations using telecommunications technology; it can facilitate access to expertise quickly, efficiently and without travel.

The opportunity offered by the use of digital technologies within health and social care is becoming widely recognised by policy makers and industry (NHS England, 2013; National Information Board and Department for Health, 2014; CoSLA and NHS Scotland, 2012). Digital health is not a new idea and has offered promise for over a decade. Indeed, similar technologies and concepts have become mainstream within social care (telecare). However, within healthcare, it has proved difficult to move from pilots, trials and even large scale demonstrators (such as Whole System Demonstrator; Cartwright et al., 2013) into mainstream implementation, although this is now a policy objective (see, e.g. NHS England, 2014). Numerous studies have identified barriers to the adoption of telehealth innovations these include:

- poor functionality of the technology (Brewster et al., 2013; Buck, 2009; Odeh et al., 2014; Taylor et al., 2015; Vuononvirta et al., 2011);
- telehealth unreadiness: poor implementation processes and unresolved problems impact on staff acceptance (Taylor et al., 2015);
- non-awareness and/or non-acceptance by staff of associated benefits (Buck, 2009; Odeh et al., 2014; Taylor et al., 2015; Wade et al., 2010);
- short-term funding (Joseph et al., 2011; Odeh et al., 2014; Taylor et al., 2015; Wade et al., 2010) and lack of funding for service re-design (Taylor et al., 2015);
- lack of integration with existing practices and procedures (i.e. additional, bolt on innovations rather than being core services) (Taylor et al., 2015; Vuononvirta et al., 2011; Wade et al., 2010);
- inappropriate selection of patients (Taylor et al., 2015); and
- lack of staff acceptance (Brewster et al., 2013; Buck, 2009; Joseph et al., 2011; Odeh et al., 2014; Segar et al., 2013; Taylor et al., 2015; Vuononvirta et al., 2009; Vuononvirta et al., 2011; Wade et al., 2010).

A lack of acceptance amongst staff is seen as a major barrier to the adoption of telehealth solutions; attitudes can range from resistance to enthusiasm which results in contrasting theories about the motives for and impacts of telehealth (Joseph et al., 2011; Taylor et al., 2015; Vuononvirta et al., 2009).

The teleswallowing pilot

Teleswallowing enables remote assessment of dysphagia experienced by nursing home residents. Dysphagia is common following neurological insult or disease and is known to precipitate aspiration pneumonia, malnutrition, poor rehabilitation, an increased length of hospital stay and a reduction in quality of life. Dysphagia is an independent predictor of poor patient outcome and death. Studies have demonstrated that patients who receive formal swallowing assessments have reduced risk of poor outcome; prompt assessment can avoid deterioration in health and subsequent hospital admission (Boaden, 2014). Assessment of swallowing by SLTs can be delayed due to workload pressures or by community carers not recognising swallowing difficulties in patients. Consequently, by the time a patient is admitted to hospital or seen by a SLT their swallowing difficulties are more severe, precipitating, for example, decreased alertness, confusion, tube feeding and

chest infection. This is poor quality of care for the patient and inefficient use of limited NHS resources. An expected exponential increase in the geriatric population required a visionary approach; teleswallowing is a response designed by Blackpool Speech and Language Therapy Department.

Teleswallowing was initially piloted in three nursing homes between August 2013 and March 2014, and evaluated as successful in April 2014 (Boaden, 2014). In this second phase, teleswallowing was expanded to five further nursing homes. Associated benefits were posited to be decreased patient transport usage; reduced staff travel time; increased access to clinical expertise with more timely assessment, advice and intervention; improved quality of care; better decision making through peer-to-peer discussions and improved community skills and knowledge through on-site education and training.

The clinical work was led by a Principal SLT at the Trust. The intervention was scheduled to take six months from September 2014. However, the clinical lead could not be released from normal duties until November 2014. Consequently, the clinical work was undertaken over a shorter three-month period from December 2014 to February 2015.

Nursing homes with higher levels of referral for swallowing assessment were invited to participate. During this pilot the speech and language therapy department was under particular pressure and waiting times were growing; nursing home staff were very aware of the impact of waiting on their patients and anything that could speed up assessment was welcomed.

A dysphagia specialist provided training to registered nurses in the nursing homes consisting of the anatomy and mechanics of swallowing and use of equipment. Each nursing home was lent a laptop with Polycom and TeamViewer software[1], a webcam, a pulse oximeter and torch. Teleswallowing required nursing home staff to prepare for the assessment before tele-link-up; this meant having fluids of varying consistency ready and the patient sitting in an upright position, with oral hygiene completed and pulse oximeter attached, thus allowing the SLT to focus only on the assessment. The SLT was in control of the teleswallowing assessment and guided the nurse throughout.

Patients were recruited to teleswallowing on receipt of referral from participating nursing homes:

- six SLTs participated in teleswallowing assessments;
- ten nurses were trained; all assisted in teleswallowing assessments; and
- 17 patients received 22 fast track remote swallowing assessments.

Adoption study

A concomitant adoption study was undertaken by researchers from the University of Cumbria (UoC). The study employed the Stakeholder Empowered Adoption Model (StEAM), which was developed by UoC in an attempt to overcome the difficulties experienced in telehealth adoption, particularly to address the impact of professional staff attitudes and perspectives on the speed of adoption and scale-up (Marshall and Heginbotham, 2013). The study objectives were to:

(1) identify and describe potential barriers and benefits for patients, clinical professional team and nursing homes to managers and commissioners; and

(2) build an adoption case for “teleswallowing” as a clinically effective service delivery method.

Three researchers from UoC undertook the StEAM data collection, facilitation and analysis. The study focused particularly on professional users and the organisation. Patients were not interviewed due to timescale and resource availability, but their stories were reported through the contributions of professional users.

Researchers engaged with stakeholders before, during and after the clinical study. Using action research methodology they fed back findings and modified their approach as required. This approach is practical and recognises that conditions rarely allow for a full-scale randomised trial, but involving stakeholders iteratively in design and problem solving can influence success effectively. Organisational stakeholders included the Director of Community Services, the Head of Therapies, Performance and Project Managers and the Team Leader of the Community Home Support Team. Professional users (actual and potential) were the SLTs, nursing home managers and nurses.

An initial meeting with organisational stakeholders identified the evidence required to facilitate service adoption:

(1) improved patient experience;
(2) reduced numbers of hospital bed days;
(3) an impact on staff travel time and efficiency; and
(4) the potential for the innovation to be extended to other services.

These requirements drove the initial design of the study. A study protocol was produced and scrutinised by the Trust Research Lead and given ethical approval as a service evaluation.

A single discussion guide was devised to be used with all user stakeholders. Two focus group discussions, pre- and post-intervention, were undertaken with SLTs, and four follow-up telephone interviews with SLTs were conducted including the team leader and a dysphagia specialist. Face-to-face interviews were undertaken with matrons/managers of five nursing homes and they provided feedback post-intervention. Telephone interviews were conducted with three nurses who had participated in the teleswallowing assessments. All interviews were transcribed and analysed using NVivo software; direct quotations from transcripts are used here to illustrate key themes.

Secondary analyses of patient/trust data was also undertaken. Hospital admission histories for participating patients were obtained to explore the impact of the intervention and clinical outcomes. Records were kept of time spent on assessments, as well as travel distances and costs.

Findings

The study identified benefits and concerns of professional users and patients. The concerns were discussed during the implementation and some were resolved directly. Remaining concerns (or barriers) were highlighted to stakeholders in the project report and discussed with senior managers.

Benefits

Participants identified the main benefits of teleswallowing:

- upskilled staff in nursing homes;
- quicker assessments/shorter waiting times;
- avoidance of serious problems and hospital admission;

- less distress for patients and improved quality of life;
- benefits to patients and nursing homes from not attending outpatient appointments;
- prestige for participating nursing homes; and
- freeing up SLTs' time.

All participants in the study saw the upskilling of nursing home staff as a major benefit. Improved knowledge had increased confidence amongst nurses and enabled them to provide better quality of care to patients through, for example, improved feeding techniques and being quicker to recognise signs of dysphagia: "The patients have a better quality of life because we can manage their symptoms here and we're more alert to them; more alert to swallowing, choking, moist voice and to refer" (NH-Matron1). In turn, the speech and language therapy service benefitted through improved and more appropriate referrals from nursing homes: "The referrals are just more appropriate; they said exactly what they needed to say; they saw the symptoms and did exactly what they needed to" (SLT2).

All nursing home staff mentioned extended waiting times prior to their involvement in teleswallowing, their participation in the innovation resulted in dramatically shortened waiting times:

> It gives us access to a service quickly that's needed quickly, that people don't recognise further up the management chain, if you've got a 6 week wait for this sort of service that can be the difference between life and death […] It's a win win situation where you get the service that you need, when you need it (NH-Matron4).

Speedier assessment was reported anecdotally to have helped prevent deterioration in patient condition; some nursing home staff referred to a reduction in numbers of aspiration pneumonias. The prevention of deterioration had in turn reduced hospital admissions:

> I would say that probably 80% of our unplanned admissions were swallowing problems; we now don't admit (NH-Matron4).

Nursing home staff were convinced that teleswallowing had resulted in less distress for patients and had allowed them a better quality of life. For example, less distress resulted from less discomfort and deterioration in condition and patients being familiar with the person doing the "hands on" assessment. Moreover:

> If their swallow is improving, you can actually move them off a blended diet onto a soft diet. So you're looking at quality of life, you're not just looking at risk of aspiration we can also move forward (NH-Matron1).

Matrons welcomed dysphagic patients not having to attend outpatient appointments. Attendance at outpatient appointments can be challenging for frail elderly people and especially for those with dementia. Attendance is also expensive as it necessitates hospital transport and a staff member to escort the patient, sometimes taking them away for considerable time.

Nursing home staff were very aware that being involved in the teleswallowing innovation had resulted in increased prestige for the nursing home and care group:

> It's really good to be able to say to people that it's another thing that we can offer that makes us look like we're at the forefront of the technology, in the community, that we're not isolated from the service, the dysphagia service (NH-Matron2).

Teleswallowing was also understood to have freed up time for SLTs; it greatly reduced the time taken to do an assessment and in the case of remote nursing homes the savings in travel and time were considerable. The average time taken per teleswallow assessment was 26 minutes, giving an average saving of 64 minutes per standard assessment.

Concerns

Despite the benefits identified above, participants also raised a number of concerns:

- Accountability – could SLTs be confident in making diagnoses?
- Competencies of nursing home staff – could SLTs have confidence in the competence of nurses? Might nursing homes be "doing their own thing"?
- Using teleswallowing appropriately – ought teleswallowing be reserved for certain types of patient and/or scenarios?
- Patient experience – how do patients feel about being assessed via digital technology?
- Clinical validity – have sufficient numbers been assessed to demonstrate that teleswallowing is a safe method of assessment?

It is worth noting that most concerns were raised by SLTs; some were addressed during the study and were found overall to be less significant in later group discussions.

Accountability and competency

SLTs had some concerns about the interaction between themselves and the person doing the assessment in the nursing home. For example: "would we get enough information from the person at the other end of the link to allow us to give safe recommendations?" (SLTFG1). Other concerns were over the competency of nursing home staff to undertake their part of the assessment, to maintain their own competency and to maintain competency in the nursing home. For example:

> I did have some [concerns], just on the risk front really, you're making a recommendation on something that somebody else has done as a proxy for you. And that's a different contact to you seeing them yourself (SLT3).

> I think the issue is you provide the training but they're not having enough chance to practise their skills and how do they maintain that competency? (SLTFG2).

> It depends how well the training is kept up by the people involved at the other end, that is a concern because if you get good staff in now that's great but if they change and then there isn't the money for the extra training to get other people up to speed then that is a concern (SLT4).

Many nursing home staff had participated in the dysphagia training; this had increased their knowledge of swallowing and had enabled them to better support residents with dysphagia. Nonetheless, only a small number of nurses were actively involved in teleswallowing. Further, it appeared the nurse chosen to undertake the teleassessment was both senior and good with technology. Consequently limited numbers of nurses gained experience of teleswallowing and so their absences produce inevitable impacts. In a diary kept by the project lead she noted one nurse was: "not available for link-up; also […] two other trained nurses have gone on maternity leave. [A fourth was] not confident to do on her own for the first time". Training in nursing homes was paid for through the project; this was short-term funding, it is difficult to predict where money will be found to support ongoing training.

There was also a level of distrust apparent; some SLTs suggested there was a risk of nursing home staff having a little training and then "doing their own thing":

> As long as they understand their remit and where the boundaries are. So they're looking for signs and symptoms and then hopefully, mindfully, referring in - not getting a bit gung-ho with the thick and easy themselves (SLTFG1).

> I think there's a lot to be said for personally, in my experience, going into a home and seeing what's actually happening; so I'd be concerned if we weren't going to visit at all because I think you can learn an awful lot about what's actually really happening (SLTFG1).

The above concerns were debated and overcome during the course of the pilot; SLTs conceded that some misgivings were unfounded because each assessment was supervised by a SLT and therefore a nurse's competency was constantly monitored. SLTs recognised they were in charge of the assessment and responsible for the contribution of those assisting in the nursing home: "In practice they don't have to do anything independently, you instruct them" (SLTFG1). However, the importance of the SLT being both able and trusted to stop an assessment when necessary was also stressed: "Staff should have the confidence to say 'no, I really need to be with this person while I'm doing this assessment'" (SLTint2).

Comments from nursing homes on this subject were patchy but did suggest that staff initially held concerns about accountability; were keen to maintain competency and were actually quicker to refer to SLT since teleswallowing than previously. Indeed, SLT concerns were countered by the intervention with homes now less likely to do their own thing compared to the traditional approach:

> If we can't admit them to hospital we would have to make a best guess but we don't know exactly and then it's not until several days later that the chest infection develops and you think "no we're not right with fluids". This stops that because anyone we have concerns about we automatically refer because we have access to this [teleswallowing] (NH-Matron4).

Patient experience

In interviews and focus groups, SLTs stressed the importance of using teleswallowing appropriately, that is with the right patients; at the right times. The determinants of an appropriate patient or situation for teleswallowing were open to much debate and the question was never quite answered.

Although there was some initial concern for the patient's experience of teleswallowing, it was noted that patients had not expressed any dissatisfaction and had no prior experience with which to compare: "we never gave them the choice […] so they thought this is what happens" (SLTFG1). Moreover, SLTs were able to describe positive patient reactions and occasions where remote assessment was potentially more appropriate and successful than face-to-face – with patients with challenging behaviours, for example. Nursing homes reported that many patients requiring assessment had neurological problems and diminishing cognitive ability. Nursing home staff highlighted the benefits to patients from the assessor being someone familiar and from not having extended waiting times or to attend outpatients; a scenario they wanted very much to avoid. Where patients had capacity it was reported that they were generally accepting of the teleswallowing method:

> There was one resident […] we asked for consent because he had capacity and he thought it was really good and he was quite happy to do it and he was really, really pleased to do it (NH-Nurse3).

A number of nursing homes were older premises which caused Wi-Fi connectivity problems. Consequently, three nursing homes identified "Hotspot" areas within the building to which patients were moved to be assessed. Whilst SLTs were not impressed with the idea of moving patients nursing home staff were pragmatic; determined to make teleswallowing work:

> With something like this you make the space, you make the environment right because it's such a wonderful opportunity to be able to offer your residents this service because it's got to help them and the nurses so you make it work (NH-Matron2).

Validity and reliability

All involved in the project were disappointed with the low number of referrals, which were lower than in previous years. It may be that the dysphagia training meant nursing homes were better placed to care for dysphagic residents. Nonetheless, low numbers limited the ability to demonstrate validity and reliability, and produce sufficient financial evidence for adoption at scale.

Barriers

Barriers identified from the qualitative data are grouped below into common themes.

Problems with technology

The delayed start to the project meant the technology had not been sufficiently tested before going live, consequently, small problems impacted for longer than was necessary. This had further negative impacts: the problems undermined SLTs' confidence in the technology, reduced their opportunities to become experienced in doing teleswallowing and meant early successes were limited. Participants at the second focus group highlighted the technological problems experienced; excerpts from the discussion illustrate:

> SLT – There's ongoing problems.
>
> SLT – I tend to agree.
>
> SLT – We have problems now with the kit here.
>
> SLT – The actual software has locked out and the actual computer isn't working properly and that was logged a month ago, I've escalated it.
>
> SLT – It's a different IT problem every time.
>
> SLT – It's not changed for me since we did the first pilot, there's always been, like we did one it was forty minutes of trying, to kind of, connect (SLTFG2).

The project benefitted from the dedicated support of a named IT professional who was on hand to assist. Inevitably, there were times when he was unavailable and when that occurred SLTs found they had no other support.

SLT attitudes

Attitudes to teleswallowing varied amongst SLT focus group participants, few presented as "enthusiastic" or "positive"; most were "neutral" or "hesitant" and a small number were "critical" or "negative" (using terminology developed by Vuononvirta et al., 2009). In contrast, all nursing home contributors were "enthusiastic" and even more positive post pilot.

IT problems undoubtedly impacted upon staff confidence and, when coupled with low referral numbers, greatly reduced the opportunity for SLTs to become experienced at teleswallowing during the pilot. SLTs were very concerned about the time taken up by IT

problems which they interpreted as time that might have been spent doing more important things. According to one SLT:

> I have attempted to do three […] and I have not been successful in doing any of them, and the time that I spent on them I could have been out to the nursing home and back! It was the technical side of it, I don't know if it was the broadband link or the Wi-Fi link or whatever, but the link did not give us the picture that we needed, that was one occasion, it didn't connect on the other occasion, and one I tried to do the nursing home broadband wasn't working. So it was all technical reasons (SLT4).

Further, SLTs felt such problems undermined their professionalism in the eyes of others. Buck (2009, p. 56) emphasises that telemedicine changes the role and not the status of those using it and asserts the importance of professionals feeling in control of the technology and not the other way round. SLTs are used to being in control and in charge; teleswallowing disrupted this and IT problems exacerbated their unease:

> I think initially you come up with lots of thoughts, is the clarity of the picture going to be good enough? Are the staff going to be trained enough? Initially I think […] A kind of a letting go sort of thing. Do I really want to let someone else be in charge of my swallow assessment? I want to be there and in control, it is, it's control isn't it? (SLT2).

SLTs mentioned that they enjoyed being with people, face-to-face, spending time and getting to know them. Some did not value the prospect of doing remote assessment; others over imagined the possible consequences, i.e. being stuck behind a computer all day (Brewster et al., 2013; Segar et al., 2013):

> I do, I want to see the real patient, I don't just want to look at a computer screen (SLTFG1).

As previously mentioned, the speech and language therapy department was under great strain during the pilot due to staff shortages; this meant that waiting times were going up rather than down. Hence, an innovation like teleswallowing was necessary, yet simultaneously the situation undermined the successful adoption of the innovation. Therapists already felt under pressure and so may at times have resented being asked to take on new ways of working and having to deal with tools they did not understand. They thus perceived teleswallowing as burdensome (Brewster et al., 2013). Telehealth alters work roles but not necessarily workload, therefore implementation requires sufficient levels of both time and staff; staff are unlikely to accept telehealth innovations unless their workload is reduced (Odeh et al., 2014, p. 1136).

As with many digital innovations, teleswallowing was pushed forward by a "champion" who was convinced of its value. Without this person it would be difficult to imagine the innovation becoming embedded.

Extension to other services

It was recognised that return on the investment could be realised more easily if telemedicine could be extended to other services; nursing home staff were extremely enthusiastic about this possibility. Informants suggested a range of services that might utilise remote technology, including communication therapies, tissue viability assessment, falls services and GP surgeries:

> This technology has the ability to cover so many different aspects other than swallowing […] The first one that I witnessed, I was amazed and then my brain started to tick, I was thinking how many other things could we possibly use this for and there are so many

> other disciplines that could tap into this knowledge and could save so many hospital clinics and things like that; it was then that I started to get excited about it […] There's tissue viability, there's continence, it would have a huge impact, falls, physio […] (NH-Matron4).

Trust managers were keen to explore this further and to build a positive cost model.

Discussion

The findings from this study resonate with other published work and indicate that engagement of staff with innovation is critical to its success. A number of factors need attention.

Technological problems feature highly as a barrier to staff acceptance (Brewster et al., 2013; Buck, 2009; Odeh et al., 2014; Taylor et al., 2015; Vuononvirta et al., 2011). Problems during implementation result in early poor experiences and impact negatively on staff acceptance (Brewster et al., 2013; Odeh et al., 2014; Taylor et al., 2015). Staff relationships can be affected, due to staff concentrating on fixing problems rather than their patients (Brewster et al., 2013, p. 28). A lack of confidence in using the technology can be related to inadequate training and to changes in job role (Brewster et al., 2013, p. 28). Even so, such issues have important consequences, as Brewster et al. (2013, p. 28) assert:

> Maintenance of professional identity and credibility was vital if […] staff lacked confidence in using telehealth equipment, they felt that this undermined their professionalism as perceived by patients.

The impacts on staff credibility and autonomy are important considerations. In research by Segar et al. (2013) a recurrent theme from those not yet involved in telehealth was anxiety over how a tele-service might change or undermine professional roles. Further, Brewster et al. (2013, p. 27) reported that staff generally enjoyed face-to-face contact with patients but remote interventions challenged staff/patient relationships when they did not feel patient focused.

In using telehealth professionals are being involved in procedures which often differ from those in face-to-face encounters (Segar et al., 2013). Vuononvirta et al. (2011, p. 193) highlight "force of habit" as inhibiting change to healthcare processes purely because "habituation has made them easy and fluent for health professionals". A lack of fit between the innovation and normal practice is a barrier to acceptance (Brewster et al., 2013, p. 27).

Segar et al. (2013) highlight that telehealth alters professional spheres of influence due to its collaborative nature and the requirement to work with a range of individuals which is at variance with accustomed divisions of labour. Tele solutions lead to an evolution of professional roles. However, tensions exist when the tele solution appears to impinge on another's domain (Segar et al., 2013, p. 612).

The impact of telehealth innovations on staff workload is also an important consideration; the amount of time needed has been underestimated (Joseph et al., 2011). Some staff perceived telehealth as burden due to the accompanying extra work and responsibility (Brewster et al., 2013, p. 28). Even enthusiastic users can become neutral once they discover the level of input required from them (Vuononvirta et al., 2009, p. 293).

Context is also significant (Odeh et al., 2014; Segar et al., 2013; Taylor et al., 2015). Odeh et al. (2014, p. 1135) reported that nurses' perception of telehealth as time consuming was exacerbated by staff shortages and was considered to be "an overload on their busy timetables". Taylor et al. (2015, p. 330) reported staff feeling overwhelmed at the level of

change to their work patterns, thus telehealth implementation frequently competes with other priorities – a competition it sometimes loses. Some staff in this situation saw telehealth as optional and others as a fad (Taylor et al., 2015, p. 330). In the nursing context Segar et al. (2013, p. 607) point to staff resistance to acceptance of additional responsibilities and to defensiveness of their professional identities (Segar et al., 2013, p. 607).

Two further important reasons for delayed adoption involve incomplete understanding of economic impacts and concern about clinical effectiveness. Taylor et al. (2014, p. 330) highlight that the implementation of telehealth solutions that are not supported by a strong evidence base leads clinicians to question the rationale and motives involved. Taylor et al. (2015, p. 332) point to the mixed published evidence about the clinical and cost effectiveness of telehealth. It is argued that substantiating knowledge and providing evidence about the benefits could tackle barriers (Taylor et al., 2015, p. 334).

Other studies have shown the attitudes of stakeholders vary according to clinical profession and location (Buck, 2009; Taylor et al., 2015; Vuononvirta et al., 2009). The same is true in this study. Teleswallowing necessitated participation and collaboration from differently placed health professionals; it required one group of professionals to delegate part of their practice to another group. Ultimately, telemedicine involves some level of transfer between professionals; this is usually unidirectional. Shared delivery of care can create anxiety amongst health professionals due to uncertainty about where responsibility for patients lie (Brewster et al., 2013; Taylor et al., 2015).

A further issue was with the funding of the teleswallowing innovation process. External funds had been secured for each pilot which had the negative effect of allowing staff to see it as something separate and temporary. The investment costs (staff time and equipment) were therefore not seen as a service investment and teleswallowing was perceived as a project with external drivers. Despite being the main beneficiaries of teleswallowing it remains to be seen whether nursing homes are willing to fund infrastructure set up and running costs in the future. In this project they gained access to specialist services (and potentially other services) at no cost, and gained the most benefit from the innovation.

These stakeholder issues need to be addressed before teleswallowing can proceed effectively and its economic benefits to the Trust and clinical value to the patient population be realised. This is a common theme with digital health innovations. The approach taken in this study showed that the barriers were at least understood by stakeholders and the process of addressing them has begun as a result.

Conclusion

Expectations for telemedicine innovations and the learning or evidence that a short-term study can provide tend to be unrealistic. It was not possible to demonstrate unequivocally that teleswallowing would reduce patient-bed-days, unplanned admissions or improved rehabilitation times. The financial information was limited by the scale of the study, further reduced by slippage in the project deliverables.

However, by using the StEAM and engaging all stakeholders in understanding the problem space, the issues to be solved and the possible evidence base, this study has gone some way to enabling managers and staff to identify and overcome barriers.

The most significant impact was shown to be on patients and their direct carers, the nursing home staff. It is clear that digital health in general and teleswallowing in particular has the capability to improve patient experience greatly.

SLTs were able to identify "potential benefits"; these included a reduction in the SLT waiting list and SLT response times and, as required, a reduction in SLT travel time and mileage costs was achieved. However, these benefits were not optimised due to the small sample size. Moreover, a delayed start to the project reduced both the opportunity for ensuring readiness of the technology and numbers of patients assessed, which in turn affected therapists' confidence in the innovation; this was exacerbated by staffing pressures within speech and language therapy which left some feeling already too overwhelmed to consider new ways of working. SLTs also raised concerns relating to accountability and the ongoing competencies of nursing home staff.

Published evidence shows that these findings are not untypical. In particular, it is acknowledged that staff perspectives can severely limit digital health adoption and scale-up in a range of contexts.

Note

1. www.polycom.co.uk/ and www.teamviewer.com/en/index.aspx

References

Boaden, E. (2014), "Swallowing assessment and management via telemedicine: service evaluation" internal report, report prepared for Blackpool Teaching Hospitals NHS Foundation Trust Speech and Language Therapy Department, Blackpool.

Brewster, L., Mountain, G., Wessels, B., Kelly, C. and Hawley, M. (2013), "Factors affecting frontline staff acceptance of telehealth technologies: a mixed-method systematic review", Journal of Advanced Nursing, Vol. 70 No. 1, pp. 21-33.

Buck, S. (2009), "Nine human factors contributing to the user acceptance of telemedicine applications: a cognitive-emotional approach", Journal of Telemedicine and Telecare, Vol. 15 No. 2, pp. 55-58.

Cartwright, M., Shashivadan, P.H., Rixon, L., Beynon, M., Doll, H., Bower, P., Bardsley, M., Steventon, A., Knapp, M., Henderson, C., Rogers, A., Sanders, C., Fitzpatrick, R., Barlow, J. and Newman, S.P. (2013), "Effect of telehealth on quality of life and psychological outcomes over 12 months (whole systems demonstrator telehealth questionnaire study): nested study of patient reported outcomes in a pragmatic, cluster randomised controlled trial", British Medical Journal, available at: www.bmj.com/content/346/bmj.f653 (accessed 30 June 2015).

Hinchey, J.A., Shephard, T., Furie, K., Smith, D., Wang, D. and Tonn, S. (2005), "Formal dysphagia screening protocols prevent pneumonia", Stroke, Vol. 36 No. 9, pp. 1972-1976.

Joseph, V., West, R.M., Shickle, D., Keen, J. and Clamp, S. (2011), "Challenges in the development and implementation of telehealth projects", Journal of Telemedicine and Telecare, No. 17, pp. 71-77.

Langmore, S.E., Terpenning, M.S., Schork, A., Chen, Y., Joseph, T., Murray, J.T., Lopatin, D. and Loesche, W.J. (1998), "Predictors of aspiration pneumonia: how important is Dysphagia?", Dysphagia, No. 13, pp. 69-81.

Marshall, A. and Heginbotham, C. (2013), "Adopting telehealth innovations: when evidence is not enough", paper presented at the King's Fund International Congress on Telehealth and Telecare, London, 2-3 July, available at: http://view6.workcast.net/?cpak¼9103627766822086&pak¼3108794281894367 (accessed 23 June 2015).

National Information Board and Department for Health (2014), "Personalised health and care 2020: using data and technology to transform outcomes for patients and citizens: a framework for action", HM Government, available at: www.gov.uk/government/publications/personalised-health-and-care-2020 (accessed 23 June 2015).

NHS England (2013), "NHS England guidance for technology enabled care services", available at: www.england.nhs.uk/2013/11/15/new-tech-imprv-hlt-serv/ (accessed 23 June 2015).

NHS (2014), "Five year forward view", available at: www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf (accessed 23 June 2015).

Odeh, B., Kayyali, R., Nabhani Gebara, S. and Philip, N. (2014), "Implementing a telehealth service: nurses' perceptions and experiences", British Journal of Nursing, Vol. 23 No. 21, pp. 1133-1137.

Segar, J., Rogers, A., Salisbury, C. and Thomas, C. (2013), "Roles and identities in transition: boundaries of work and inter-professional relationships at the interface between telehealth and primary care", Health and Social Care in the Community, Vol. 21 No. 6, pp. 606-613.

Taylor, J., Coates, E., Brewster, L., Mountain, G., Wessels, B. and Hawley, M.S. (2015), "Examining the use of telehealth in community nursing: identifying the factors affecting frontline staff acceptance and telehealth adoption", Journal of Advanced Nursing, Vol. 71 No. 2, pp. 326-337.

Vuononvirta, T., Timonen, M., Keinänen-Kiukaaniemi, S., Timonen, O., Ylitalo, K., Kanste, O. and Taanila, A. (2009), "The attitudes of multiprofessional teams to telehealth adoption in northern Finland health centres", Journal of Telemedicine and Telecare, No. 15, pp. 290-296.

Vuononvirta, T., Timonen, M., Keinänen-Kiukaanniemi, S., Timonen, O., Ylitalo, K., Kanste, O. and Taanila, A. (2011), "The compatibility of telehealth with health-care delivery", Journal of Telemedicine and Telecare, No. 17, pp. 190-194.

Wade, V., Eliott, J., Karnon, J. and Elshaugh, A.G. (2010), "A qualitative study of sustainability and vulnerability in Australian telehealth services", Stud Health Technol Inform, Vol. 161, pp. 190-201.

Further reading

CoSLA and NHS Scotland (2013), "A national telehealth and telecare delivery plan for Scotland to 2016: driving improvement, integration and innovation: a joint national delivery plan from the Scottish Government", The Scottish Government, available at: www.gov.scot/Publications/2012/12/7791/0 (accessed 23 June 2015).

Gray, L.C., Edirippulige, S., Smith, A.C., Beattie, E., Theodoros, D., Russell, T. and Martin-Khan, M. (2008), "Telehealth for nursing homes: the utilization of specialist services for residential care", Journal of Telemedicine and Telecare, No. 18, pp. 142-146.

Marshall, A. (2013), "Designing telemedicine apps that health commissioners will adopt", Proceedings of the 14th Conference of Open Innovations Association FRUCT, IEEE, November, pp. 63-68, ISSN: 2305-7254, doi: 10.1109/FRUCT.2013.6737946.

Marshall, A. and Heginbotham, C. (2015), "Adopting digital health innovations by obtaining appropriate evidence: the stakeholder empowered adoption model", Forthcoming in BMC Health Services Research.

NHS (2014), "Five year forward view", available at: www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf (accessed 23 June 2015) .

Vowden, K. and Vowden, P. (2013), "A pilot study on the potential of remote support to enhance wound care for nursing-home patients", Journal of Wound Care, Vol. 22 No. 9, pp. 481-488.

Ward, E.C., Sharma, S., Burns, C., Theodoros, D. and Russell, T. (2011), "The validity of conducting clinical dysphagia assessments for patients with normal to mild cognitive impairment via telerehabilitation", Dysphagia, Vol. 26 No. 1, pp. 437-438.

Corresponding author

Dr Elaine Bidmead can be contacted at: elaine.bidmead@cumbria.ac.uk